

Why Should One Choose Pharmacy as a Career?

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Abstract

Objective of this article is to motivate the disheartened pharmacy professional toward profession through giving thorough knowledge of opportunities in pharmacy field. Although job opportunities for pharmaceutical professionals are with private as well as government sector but in these studies is mainly to point out the career opportunity of pharmaceutical professionals in department wise in private as well as government sector. At the commencement, the article gives a picture of the draft of enormous and growing industry. This study also reflects the all requirement for pharmacy professional doing job in various departments. Inside the pharmaceutical industry, pharmacy professional might be involved in various activities relating to the discovery, development, action, safety, formulation, production, quality control, quality assurance, packaging, storage, marketing, clinical research, legal advisor, documentation and technology transfer etc. There is ample scope of research for the pharmacy professional in India and abroad. Knowledge Process Outsourcing and Business Process Outsourcing, Bio-Informatics and Medical Transcription are the new options for job opportunity and career advancement for the pharmaceutical professionals. There is an enormous career opportunity for pharmaceutical professionals in the pharmaceutical industry but only those which are having progressive attitude and confidence.

Key words: Job prospect, opportunities in pharmacy field, pharmaceutical industry, pharmaceutical specialists

INTRODUCTION

Pharmacy is the branch of science, which dealing with collection, preparation, and standardization of drugs, derives its name from the Greek root pharmakon, a drug and pharmaceutical words is related to drugs used in medical treatment and a company which makes and sell drug known as pharmaceutical industry.^[1] The builder of the Indian pharmaceutical industry would be Acharya P.C. Ray. In the year 1901, Acharya P.C. Ray founded Bengal Chemicals and Pharmaceuticals Works Ltd. It started by making drugs from indigenous materials and then went on to manufacture quality chemicals, drugs, pharmaceuticals and employed local technology, skills, and resources. The Indian pharmaceutical sector is highly fragmented with more than 20,000 registered units.^[1,2] It has expanded drastically in the last two decades. This industry plays an important role in promoting and sustaining development in the

field of global medicine. The pharmaceutical and chemical industry in India is an extremely fragmented market with severe price competition and government price control. The Pharmaceutical industry in India meets around 70% of the country's demand for bulk drugs, drug intermediates, pharmaceutical formulations, chemicals, tablets, capsules, orals, and injectable. There are approximately 250 large units and about 8000 Small Scale Units, which form the core of the pharmaceutical industry in India (including 5 Central Public Sector Units). The government has also played a vital role in the development of the Indian pharmaceutical industry currently tops the chart among India's science-based industries with wide ranging capabilities in the complex field

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of drug manufacture and technology. A highly organized sector, the Indian pharmaceutical industry is estimated to be worth \$4.5 billion, growing at about 8–9% annually.^[4,5] Due to the presence of low-cost manufacturing facilities, educated and skilled manpower and cheap labor force among others, the industry is set to scale new heights in the fields of production, development, manufacturing and research that's why it ranks very high among all over the world, in terms of technology, quality and the vast range of medicines that are manufactured.^[6] It ranges from simple headache pills to sophisticated antibiotics and complex cardiac compounds; almost every type of medicine is now made in the Indian pharmaceutical industry.

SECRET BEHIND THE SUCCESS OF INDIAN PHARMACEUTICAL COMPANY^[7-9]

- Cost-effective technology
- Strong and well-developed manufacturing base
- Clinical research and trials
- Knowledge based, low-cost manpower in science and technology
- Proficiency in path-breaking research
- High-quality formulations and drugs
- High standards of purity
- Noninfringing processes of active pharmaceutical ingredients (APIs)
- Future growth driver
- World-class Process Development (P and D) labs
- Excellent clinical trial centers
- Chemical and P and D competencies
- Competent workforce
- Legal and financial framework
- Liberalization, privatization and globalization have helped the Indian pharmaceutical companies to achieve international recognition.

WEAKNESSES OF PHARMACEUTICAL INDUSTRY^[7,8]

- Low Indian share in world pharmaceutical market (about 2%)
- Lack of strategic planning
- Fragmented capacities
- Low Research and Development (R&D) investments
- Absence of association between institutes and industry
- Low healthcare expenditure
- Production of duplicate drugs
- Small number of discoveries
- Competition from MNCs
- Transformation of process patent to product patent (TRIPS)
- Outdated sales and marketing methods
- Nontariff barriers imposed by developed countries.

OPPORTUNITIES IN PHARMACEUTICAL INDUSTRY^[7,8]

- Incredible Export Potential
- Increasing Health Consciousness
- New Innovative Therapeutic Products
- Globalization
- Drug Delivery System Management
- Increased Incomes
- Production of Generic Drugs
- Contract Manufacturing
- Clinical Trials and Research
- Drug Molecules.

CAREER OPPORTUNITY FOR PHARMACY PROFESSIONAL

Pharmacy is a part of the medicine field that relates the chemical science with the health sciences. The professionals working in this field are generally called as pharmacists. Pharmacy field is a very vast and a fast growing sector nowadays. Tremendous increase in the rise of various hospitals, pharmaceutical firms and nursing homes all over the country has gradually increased numerous opportunities for the pharmacy graduates. The pharmacy field provides a bright career in ways of both a good employment and in terms of beginning own business.^[3,4]

There are diverse employment areas for the pharmacy professionals such as in government departments, pharmaceutical companies, investigation, universities, research institutes, teaching, hospitals, etc. Within these industries, the pharmacy professionals are engaged in the various activities like formulation, production, development and distribution of various existing and new drugs for the dispensary uses. Another wide range of employment lies in the drug control administration and in armed forces. They can also work as medical representatives (MRs) with the responsibilities such as introducing new drugs to the medical professionals and pharmacy shops thus promoting the sales of their pharmaceutical firms.^[5]

The pharmacy professionals can work both in central government, state government departments and in private industries [Figure 1], and the government departments include Health Protection Branch, Pest Control Division of Agriculture, Provincial Departments of Environment or Agriculture, etc. There are opportunities also with the food and cosmetic industries and any industries which need the assurance of safety and effectiveness of new products.

In India, pharmacy education is two-tier system after higher secondary passed with PCM or PCB both types of students are eligible for any of the two courses, Diploma in

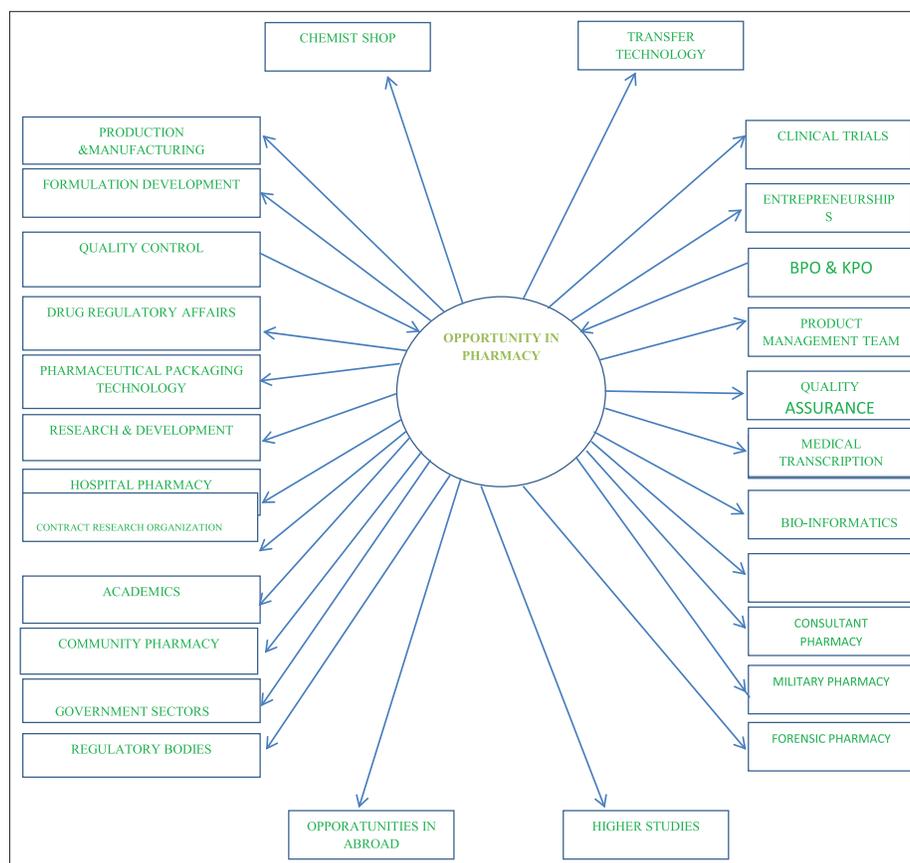


Figure 1: Graphical presentations of pharmacy scope

Pharmacy (D.Pharm) and Degree in Pharmacy (B.Pharm). All institutes conducting courses in Pharmacy are regulated by two bodies namely, the All India Council for Technical Education (AICTE) and the Pharmacy Council of India (PCI).^[4]

CARRIER OPPORTUNITIES AFTER DIPLOMA IN PHARMACY

Diploma in Pharmacy candidates have wide variety of career options ranging from drug store to pharm industry. Job opportunities for pharmacists in India as well as globally are increasing rapidly due to more focus now on the patient-oriented practice. Pharmacist can practice pharmacy profession as:^[3,4]

- Working as a drug store pharmacist
- Hospital pharmacist
- Assistant pharmacist in pharm production, quality control (QC) departments
- MR for a pharm company
- Self-employment opportunities (entrepreneurship) by opening own drug store, ayurveda or cosmetic manufacturing units
- Laboratory technician in pharmacy education institute
- Wholesale pharmacy
- Higher education-direct admission to B.Pharm II year (lateral entry).

SCOPE FOR PHARMACY GRADUATES

Graduate pharmacists have opportunities in the different field of the pharmaceutical industry as well as academia. Government and private sectors are open to excellent job opportunities with good pay packages.^[5]

CHEMIST SHOP

Pharmacists are small-business proprietors, owning the pharmacy in which they practice. Since pharmacists know about the mode of action of a particular drug, and its metabolism and physiological effects on the human body in great detail, they play an important role in optimization of a drug treatment for an individual.^[10,11] The environment depends on the type of career chosen. In a drug store set ups, the pharmacist is mainly involved in processing of prescriptions and sale of medicines and other related jobs such as billing, inventory, etc. Now with the changing scenario worldwide, Pharmacist is also expected to provide patient counseling about diseases/drugs and other patient care services.^[12,13]

HIGHER STUDIES

The study in pharmacy can be done at various levels like D.Pharm, B.Pharm, and M.Pharm and at doctoral levels.

D.Pharm is diploma awarded by many State Board of Technical Education/university in the country for the candidates who successfully complete their study in the field of Pharmacy. After the completion of the D.Pharm studies, one can apply direct admission to B.Pharm II year (lateral entry) and after competing B.Pharm degree, student go for higher studies for better job opportunities. Some of the higher study options in the field of pharmacy are as follows:^[14]

- Master of Business Management in pharm.tech
- Master of Pharmacy
- Master of Pharmacy in Biotechnology
- Master of Pharmacy in Clinical Pharmacy
- Master of Pharmacy in Pharmaceutical Analysis
- Master of Pharmacy in Pharmaceutical Management and Marketing
- Master of Pharmacy in Pharmaceutical Technology
- Master of Pharmacy in Pharmacology
- Master of Pharmacy in Quality Assurance (QA)
- Master of pharmacy in bulk drug
- Master of Pharmacy in Medicinal Chemistry
- Master of Pharmacy in Drug Regulatory Affair
- Master of Pharmacy in Industrial Pharmacy
- Master of Pharmacy in Pharmaceutics
- Master of Pharmacy in Bio-Pharmaceutics
- Master of Pharmacy in Pharmacognosy
- Master of Pharmacy in Photochemistry
- Master of Pharmacy in Medicinal Natural Products
- Master of Pharmacy in Pharmaceutical Administration
- Master of Pharmacy in Pharmacy Practices
- Master of Pharmacy in Phytopharmaceutical and Natural Products
- Master of Pharmacy in Drug Discovery and Drug Development
- MS in Pharmacy
- MBA in Pharmaceutical Management
- MBA in Operation Management
- MBA in Production Management
- MBA in Pharmaceutical Marketing Management
- MBA in Heath Care System
- MSc. in Analytical Chemistry
- MSc. in Medicinal Chemistry
- MSc. in Pharmaceutical Chemistry
- MSc. in Pharmacology
- MSc. in clinical research
- M.Pharm + MBA duration: 3 years (dual degree programmed)
- PharmD
- Ph.D. in Department of Pharmaceutical Sciences
- Pdf etc.

CONTRACT RESEARCH ORGANIZATION

Various Contract Research Organizations (CRO) are already established in different parts of India who are doing research for the big national and international pharmaceutical companies in the areas of New Drug Discovery, P and D, Formulation

and Development (F and D) and Clinical Research. There are lots of job opportunities for the Pharmacy professionals in this CRO at different level.^[15-18]

PRODUCTION MANAGEMENT

Pharmaceutical Production Management is a process that combines and transforms various resources (Raw material, Labour, Machine) used in the production subsystem of organization into value added product, in controlled manner, as per the policies of the organization. Therefore, it is that part of an organization that is concern with conversion a range of inputs into the required product having the required quality level. Production Manager is responsible for production schedule, staffing, procurement and maintenance of equipment and coordination of production activities among different departments. They also take care of economic efficiency and in-time delivery of the products. They are also aware, recent market trends and the resultant change in the demand pattern. Pharmacy professional has very good career opportunity in Production Management.

A pharmacy professional works in the production of bulk drugs (API) and intermediates and formulation as:

- Production Chemist
- Production Officer
- Production Executive
- Production Planner
- Production Manager
- Vice President - Production.

Pharmacy Professional also works in the production department of various other industries such as:

- Biological and Biotechnological Products
- Ayurvedic Product
- Homeopathic Medicines
- Unani System of Medicines
- Surgical Dressings
- Medical Devices and Equipment
- Veterinary Medicine
- Perfumery
- Pharmaceutical Flavors and Fragrances
- Nutraceuticals
- Cosmetics, Soaps, Toiletries segment
- Blood and Plasma Products - Blood of various groups, production of blood bags, hemoglobin, plasma, serum, clotting factors antigens, antibodies, etc.
- Dental medicines and dental products - Toothpaste, mouthwashes, dental cavity fillers, etc.

Required qualification

- B.Pharm, M.Pharm, PGDBM, MBA (production management and operation management), B.Pharm + MBA (Pharmaceutical management)

Knowledge and skill required

- Planning and organizing production schedules
- Assessing project and resources requirements
- Estimating, negotiating and agreeing budgets and timescales with clients and managers
- Determining QC standards
- Overseeing production processes
- Re-negotiating timescales or schedules as necessary
- Selecting, ordering, and purchasing materials
- Organizing the repair and routine maintenance of production equipment
- Liaison with buyers, marketing, and sales staff
- Supervising the work of junior staff
- Confidence
- Technical skills
- Organization
- Interpersonal skills
- Problem-solving skills
- IT skills
- Communication skills
- Team working skills
- Managers must also be able to handle responsibility and the pressure of meeting deadlines
- Through understanding of production processes
- Thorough knowledge of dosage form manufactured
- Knowledge of pharmaceutical machinery for production
- Knowledge of Critical Control Points of production processes
- Lucid understanding of Good Manufacturing Practice (GMP) requirements
- Extraordinary management skills.

QUALITY CONTROL

Quality control is the part of quality management focused on fulfilling quality requirements. They are dealing with sampling, inspecting, testing, monitoring, releasing/rejecting of starting materials, packaging materials, intermediates, bulk products, under process product, finished products. Highly specialized and trained staff is required to handle sensitive analytical procedures and sophisticated equipment (such as gas chromatography–mass spectrometry, high-performance liquid chromatography (HPLC) UV-VIS spectroscopy, Fourier transform infrared spectroscopy, titrometer, NMR etc.).

A pharmacy professional holds various posts in QC department such as:

- QC Chemist
- QC Executive
- Technical Manager – QC
- QC Manager.

Required qualification

- B.Pharm, M.Pharm, MSc. Pharmaceutical Chemistry, MSc. Analytical Chemistry, B.Pharm + diploma in instrumentation/certified course.

Knowledge and skill required

- Knowledge of Good Laboratory Practices norms
- Thorough knowledge of analytical chemistry
- Knowledge of the instrumental method of analysis - UV-VIS spectroscopy, HPLC, IR spectroscopy, NMR, mass spectroscopy, atomic absorption spectroscopy, etc.
- Thorough knowledge of microbiology for personnel working microbiological section of QC
- Thorough knowledge of packaging materials testing procedure for personnel working in packaging control section of QC
- Knowledge of pharmacopoeia's such as IP, BP, USP etc.
- Knowledge of analytical method validation
- Knowledge of basic statistical tools – Statically QC.

QUALITY ASSURANCE

Quality assurance is the part of the quality management focused on providing confidence that quality requirements will be fulfilled. QA is wide-ranging concept concerning all matters that individually or collectively influence the quality of the product. QA is the totality of the arrangements made with the object of ensuring that products are of the quality required for intended use. They ensure product quality starting from the procurement of raw materials up to the marketing of manufactured product. Their role is to implement and maintain Total Quality Management System needed for building the confidence that manufactured products are of standard quality with minimum risk of rejection and maximum customer satisfaction.^[19,20]

Pharmacy professionals working on various positions in QA department such as:^[21]

- QA Inspector
- QA Executive
- Document Controller
- QMS - coordinator
- Validation - coordinator
- QA Manager.

Degree required

- B.Pharm, M.Pharm, B.Pharm + diploma/certified course in QA

Knowledge and skill required

- Understanding of QMS - ISO 9001:2008 QMS requirements
- Thorough understanding of National GMP requirements
- Through knowledge of production processes
- Through knowledge of facility system, e.g., water system, HVAC system
- Through knowledge of analytical test methods/ pharmacopoeias
- Sampling plan
- Statistical Process Control
- Validation Approach
- Qualification of Equipment
- Calibration
- Documentation and Document Management System
- International Conference on Harmonization (ICH) guidelines
- Knowledge of Drug Rules and Act and other relevant regulatory affairs (RA)
- Auditing Technique.

RESEARCH AND DEVELOPMENT

Research and Development is the mind of the pharmaceutical industry, as it is the key to growth and nourishment of the industry. In R&D Pharmacy professional works in the following areas:^[22]

- New Drug Discovery Research
- P and D of API-development of viable processes for the manufacture of drugs and intermediates for their commercial production
- F and D of Conventional and Novel Drug Delivery Systems.

Pharmacy professional give their services on various position such as:

- R&D Chemist
- R&D Executive
- Research Scientist
- Research Associates
- Group Leader - R&D
- Head - R&D
- Vice President - R&D

Degree required

- B.Pharm + Many year research experience, M.Pharm, Ph.D. in pharmacy, Pharm.D.

Knowledge and skill required

- Sound knowledge of dosage forms and dosage form design
- Knowledge of scale-up of production processes
- Basic knowledge on Bio-Pharmaceutics

- Knowledge of analytical method development and validation
- Those who will be in drug discovery division they should have sound knowledge organic chemistry and synthesis.
- Knowledge of QSAR and computational chemistry
- Knowledge of handling software for drug development
- Statistical experimental design.
- Finally research mindset and capacity to think innovatively.

CLINICAL RESEARCH

Clinical research is a branch of healthcare science that determines the safety and effectiveness of medications, devices, diagnostic products and treatment regimens intended for human use. These may be used for prevention, treatment, diagnosis or for relieving symptoms of a disease. Clinical Research is different from clinical practice. In clinical practice, one uses established treatments while in clinical research evidence is collected to establish a treatment.^[23]

Pharmacy professionals have high job opportunity in the following area of clinical research:^[24]

- Clinical trials
- Bioequivalence study
- Pharmacokinetics study and
- Toxicological studies.

These are some of the areas of clinical research, which are in high demand as they are involved in the systematic evaluation of potential drug substances prior to getting them approved by the regulatory authorities.^[25,26]

Pharmacy professionals have job potential in the Clinical Research in the following position:^[27]

- Clinical Training Analyst
- Clinical Research Monitor
- Clinical Research Associate
- Clinical Affairs - Project Manager
- Clinical Trials Manager
- Clinical Research Coordinator
- Clinical Research Manager
- Patient Recruiter
- QC Manager
- QA Manager
- Manager Clinical Operation.

Degree required

- M.Pharm (Clinical Research), M.Pharm (any discipline) + diploma in clinical research, Ph.D. in clinical pharmacy/pharmacology

Knowledge and skill required

- Knowledge of Bio-pharmaceutics
- ICH-GCP guidelines

- Food and Drug Administration (FDA) and foreign regulatory requirements and
- Project management of clinical studies
- Role of statistics in designing clinical research protocols
- Multivariate statistics and/or Design of Experiments.

REGULATORY AFFAIRS AND INTELLECTUAL PROPERTY RIGHTS

With globalization process reaching out to India, the geographical barriers have become obsolete. Any country will have to compete and trade globally in order to progress and survive in the years to come. The major drugs and pharm companies have realized this fact and have stepped into the global area of competitive trade. If an Indian manufacturer wants to sell his drug or formulation to a foreign country, it is mandatory that he has to fulfill all the statutory requirements laid by the regulatory authorities of that country. Also, his product needs to be perfectly as per the specifications laid down by the concerned regulatory authority. Thus, in order to enter into trade with the foreign countries, it is mandatory to get the necessary approvals and sanctions as per the formats given by local regulatory authorities such as approvals to be obtained from US FDA for USA, Therapeutic Goods Administration (TGA). for Australia and N>Zeeland, MCA and MCM for UK and European countries and ICH guidelines going to be uniform for international levels.^[28-30]

At National level, the FDA (Foods and Drugs Control Administration) is the main regulatory body governing and implementing the rules and regulations for the Drug and Pharma industry. The FDA has state branches and sub-branches all over the country. The job opportunities for Pharmacy graduates are excellent and range from the levels of a Drug Inspector (DI), Sr. DI, Deputy Drug Controller, Asst. Drug Controller, Drug Controller and finally Drug Controller of India. This is highly respected and sought after profession. A graduate in pharmacy is the minimum eligibility. Every Pharmaceutical Industry has now set up RA department that's why regulatory experts are thus in great demand. Since, the field is highly technical Pharmacy professionals again fit in these positions. Similarly, patents and trademarks, Intellectual property rights (IPRs) experts are also in high demand as far as the Pharma Industry is concerned. Pharmacy professionals are the pivotal people in this department at different level and position. RA offer a lot of job opportunities at different level.^[31,32]

- They are required for Interaction with all departments of the company and based on this cooperation prepare a variety of documents necessary for research, development and production of drugs/medical devices
- Providing information and expertise in the latest changes in the regulatory requirements of national GMP, WHO - GMP, US FDA, TGA, ICH guidelines

- Preparing for regulatory inspection
- Interaction with government to obtain regulatory approval (licensing) for production of therapeutics
- Interaction with government to obtain regulatory approval for conducting clinical studies and for production of therapeutics
- WHO certification
- IPRs and Pharma Patents
- Preparation of Drug Master Files (DMF), New Drug Application (NDA)/Abbreviated NDA (ANDA)/Common Technical Document (CTD)
- Preparation of registration dossier for export.

These professionals will find employment in industry as:

- RA Assistants
- RA Associates
- Documentation Administrators and Medical Information Associates
- RA Consultants for Pharm/Biotechnology Industry
- Regulatory Food Safety Scientist
- Pharmaco-vigilance Manager
- Drug Safety Specialist.

Degree required

- M.Pharm, Ph.D., B.Pharm/M.Pharm + PG diploma in IPR.

Knowledge and skill required^[33-36]

- Important aspects of Indian Drug Rules and Act
- GMP requirements
- Thorough knowledge of drug and cosmetic acts
- International RA and harmonization and ICH guidelines
- WHO guidelines on GMPs and WHO certification
- IPRs and Pharma Patents
- Preparation of DMF, New Drug Submission (NDS)/Abbreviated NDS/CTD.

SALES AND MARKETING

Medical sales representatives are a key link between pharmaceutical companies and medical and healthcare professionals. They work strategically to increase the awareness and usages of a company's pharmaceutical and medical products. They also promote products to the different organizations and government department as well.^[37] Based on a specific geographical location, and they usually specialize in a particular product or medical area viz. Cardiovascular Division, Diabetes Division, Gynecological Division, Psychiatric Division, Ayurveda Division, Neuro Division, Dermatological Division, etc. They may also make presentations and organize group events for healthcare professionals, as well as work with contacts on a one-to-one basis. Marketing is a result-oriented job, as the results

of marketing can be quantified both clearly and quickly. The Pharma sales and marketing are highly technical field and offers excellent opportunities for the pharmacy graduates. Pharmacy professional starts their career in sales and marketing career as MR and go up to the levels of:^[38]

- Sales Officer
- Area Sales Manager
- Regional Sales Manager
- Zonal Sales Manager
- General Marketing Manager
- Manager - International Marketing and Exports.

Qualification required

- B.Pharm, B.Pharm + MBA, MBA in pharm marketing, B.Pharm + PGDBM.

Knowledge and skill required

- Knowledge of pharmacology and medicinal chemistry
- Selling skills
- Communication skills-excellent verbal communication, excellent written communication
- Presentation skills
- Ability to think outside the box and be creative
- Effective organizational skills
- Ability to plan and formulate strategies
- Abilities to implement strategies using or adopting tactics
- Ability to adjust to and work with team
- Ability to drive and inspire
- Confident
- Ability to work under pressure and meet deadline
- Quick decision-making ability
- Ability to withstand criticism and irritating people
- Patience
- Planning
- Time management
- Query handling skills
- Soft skills for reporting.

PRODUCT MANAGEMENT

Degree in Pharmacy with MBA (marketing) after few years of experience in sales and marketing can work as a member of the Product Management Team.

Their responsibilities are:

- Market research
- Benchmarking
- Strategizing and positioning of product
- Give lead to next products to be developed at R&D
- Promotional activities, etc.
- Launching and withdrawal of product in market.

Qualification required

- B.Pharm + MBA (marketing), B.Pharm + marketing experience, MBA (pharmaceutical management) + marketing experience etc.

Knowledge and skill required

- Excellent verbal and written communication skills
- Ability to effectively communicate value proposition and technical information to a range of customer and MR
- Experience in developing and presenting technical materials
- Ability to lead people and management skills
- Clear vision about the business growth
- Positive attitude, creativity
- In recent time, bioinformatics and medical transcription are two major areas added to the scope of career opportunity for the pharmacy professional.

BIOINFORMATICS

Bioinformatics is the application of information technology to the field of molecular biology. The primary goal of bioinformatics is to increase our understanding of biological processes.

Major research efforts in the field include:

- Sequence alignment
- Genetic finding, genome assembly
- Protein structure alignment
- Protein structure prediction
- Prediction of gene expressions
- Protein-protein interactions
- Modeling of evolution.

Pharmacy professional with knowledge of computer application and software has job potential in the bioinformatics in the following position:

- Bioinformatics trainee
- Bioinformatics analyst
- Scientist/senior scientist – Bioinformatics
- Team leader – Bioinformatics
- Bioinformatics – Trainer
- Bioinformatics – Lecturer to professor.

Degree required

- B.Pharm, M.Pharm, Ph.D.

Knowledge and skill required

- Mastery in molecular cell biology
- Sound knowledge of biochemistry

- Statistical methods
- Expertise in computer application
- Knowledge of software development.

MEDICAL TRANSCRIPTION

Medical transcription also known as MT is an allied health profession, which deals in the process of transcription, or converting voice-recorded reports as read out by physicians and/or other healthcare professionals, into electronic format. A medical transcriptionist is the person responsible for converting the patient's medical records into electronic format.^[4,5]

Due to the increasing demand to document medical records, countries particularly USA started to outsource the services of medical transcription. Since India is several hours ahead of America and Europe, Indian medical transcription industries can offer the natural advantage of quicker turnaround time. That is why India is chosen as the one of the best source of outsourcing in MT.

In Typical MT firm, the pharmacy professional gives their services on various posts:^[3]

- Trained medical transcriptionist
- Senior medical transcriptionist
- Proof readers
- Sub editors
- Editors
- Supervisor
- Manager.

Degree required

- B.Pharm.

Knowledge and skill required

- Knowledge of medical terminology
- Above-average spelling, grammar knowledge
- Communication and memory skills
- Ability to sort, check, count, and verify numbers with accuracy
- Skill in the use and operation of basic office equipment/ computer
- Ability to follow verbal and written instructions
- Records maintenance skills or ability
- Good to above-average typing skills.

OPPORTUNITIES IN ABROAD

Pharmacy graduate of India may consider higher studies outside India to make their carrier even more interesting. One can enroll for master as well as Ph.D. in desired field

of studies after obtaining Graduate Degree of Pharmacy in India. Detail Information regarding get admission to pharmacy colleges in different countries are easily available on their respective websites. At a time of admission foreign countries colleges asking about some qualifying exam that's why firstly pharmacy graduates qualify one or more of the following exam.^[4,9]

- Graduate Record Exam
- Test of English as a Foreign Language
- International English Language Testing System

In order to work as a registered pharmacist in particular countries, one will have to answer registration exam which will be countries specifics.

Golden opportunities galore for qualified pharmacy professionals in various countries including the USA, Canada, and European Countries like UK. There are plenty of higher education and research opportunities in the developed western countries along with excellent job openings. The pharmaceutical career is one of the highest rewarding careers in many countries. The monetary job benefits abroad are highly exciting, job profiles in African Countries like Nigeria, Yemen and Gulf Countries like Saudi Arabia, it mainly as pharmacists in drug stores and hospitals. In developed western countries, the job opportunities are multifarious and almost in every department which is discussed in this paper.

CONSULTANCY

This is an ideal opportunity for highly technical and experienced pharmacy professionals to earn handsomely as self-employed entrepreneurs, even after the age of retirement. Consultancy services in Pharmacy are offered in various fields against very attractive financial fees:^[4,6]

- RA
- Documentation
- Approvals
- Manufacturing processes
- Analytical series
- Research
- Market surveys and sales promotion
- Information retrieval
- Data management
- Turn key projects, etc.

DOCUMENTATION, LIBRARY INFORMATION SERVICES AND PHARMACY JOURNALISM

The RA as well as patenting processes and issues involves a lot of documentation work to be done and submitted to the concerned regulatory authorities in a highly specialized and technical manner. Pharmacy professionals are again fitting

in the bill. Most of the major Indian Pharma companies have established separate documentation departments with a highly technical and skilled staff for this purpose.

Similarly, the R&D and QC departments of the Pharma Companies need a wealth of Technical information, which needs to be regularly updated in order to match the pace of global competition. Therefore, Library Information services are another field in much demand as far as the Pharma. Industry is concerned. In addition, with the advent and boom of the Information Technology, Bio-Informatics, and Electronic Data Retrieval Systems, this field is already scaling new heights.^[49]

Pharma - Journalism is another area filled with great potentialities. This requires specialist technical personnel like pharmacy graduates on the editorial staff to cover the various aspects. There is already a very lucrative business in this field.

ACADEMICS

Excellent opportunities for the pharmacy professionals are available in teaching profession also. As per the AICTE norms the minimum entry-level qualification as Assistant Professor is M.Pharm. This is a profession associated with job satisfaction and social status as teaching is considered to be noble profession. The higher posts in the hierarchy are Sr. Assistant Professor, Associate Professor, Professor, Principal, etc. The emoluments are satisfactory.^[3,4] After 6th pay scale and AICTE rules and regulation, most of the postgraduate candidates are choosing academic field as profession because of job satisfaction, facility for higher education and research, social status and comfort. Promotion scheme in academia is well-defined by the regulatory bodies with a definite service length that is, Assistant Professor, Associate Professor, Professor, Head of Department, Dean, Registrar, vice chancellor,^[49] etc.

COMMUNITY PHARMACY

This concept, which is already very old in developed Western countries, is rapidly catching up the Healthcare service in our country. Through the services of community pharmacy, a Pharmacist becomes a vital link between the patients and the products that is, drugs. The pharmacist also serves a vital link between the patients and other healthcare professionals, especially the medical experts.^[3]

RESPONSIBILITIES^[4,5]

- Counseling the patients regarding the use of the drugs and dosage forms
- Providing up-to-date information on drugs/dosage forms to the patients, as well as, medical staff

- Maintaining patient records and history
- Involved in the usage of self-diagnostic kits by the patients for disorders such as diabetes, hypertension, etc.
- Providing supply of Homecare dosage forms.

HOSPITAL PHARMACY

Another opening for a pharmacy professional is as a "Registered Pharmacist" in the hospitals or drug stores. This is a very sought after professional especially in countries like the USA and Canada.^[5] The trend is already set in many hospitals in the country. This is a key position, and the Pharmacist plays an important role from preparing prescription to the patient's medical history after the Medical doctor has diagnosed the disease. The Pharmacist is the best-informed qualified drug expert whose advice is sought by everybody regarding the dosage, incompatibilities and side effects of drugs.^[49]

TECHNOLOGY TRANSFER

Technology transfer is the practice of transferring scientific findings from one organization to another for further development, so that new products such as medicines, educational tool, electronic devices, safety equipment and health services can become available to the public. Technology transfer is the intersection between business, science, engineering, law and government.^[3,4] Technology transfer is both integral and critical to the drug discovery and development process for the new medicinal product. This process is important for to elucidate necessary information for technology transfer from R&D to the product development laboratory and for the development of existing products to the production for commercialization.^[5] Technology Transfer is helpful to develop dosage forms in various ways like it provides efficiency in process, helps to maintain quality of product, helps to achieve standardized process, which in turn facilitates timely and cost-effective production. In pharmaceutical industry, technology transfer means action to transfer of information and technologies necessary to realize the quality of design of drugs during manufacturing. The three primary considerations to be addressed during an effective technology transfer are the plan, the persons involved, and the process. A plan must be devised to organize the personnel and the process steps.^[49] Once prepared, the plan must be communicated to the involved parties in research, at the corporate level and at the production site. The technology transfer does not mean one-time actions taken by the transferring party toward the transferred party but means continuous information exchange between both the parties to maintain the product manufacturing. To assure the drug quality, it is desire to make sure that is what, when, and why information should be transferred to where and by whom and how to transfer, then share knowledge and information of the technology transfer each other between stakeholders

related to drug manufacturing. In this department pharmacy, professional play a major role at different level as a:

- Principle Scientist
- Assistant Manager
- Manager
- Sr. Officer
- Officer
- Research Scientist
- Sr. Research Scientist
- Team Member
- Analytical Manager
- Manager Technical Services
- General Manager
- Vice President.

Qualification required

- UG - B.Pharm
- PG - M.Sc. in pharmaceutical chemistry, M.Pharma

Skill and responsibilities requirement

- To facilitate the development and scale-up batches of products for regulated market (US, UK MHRA, WHO)
- Strategy making with respect to patents to develop a noninfringing formulation
- Have expertise of generic drug product including immediate release, sustained/modified release, colon drug delivery dosage, multi-unit particulate systems (pellets compressed into tablets) for regulated/global market
- Should possess hands on experience on development, scale up and execution of fluid bed process
- To monitor the FD groups so that they undertake quality scientific experimentation to develop robust formulations and processes
- Setting priorities for assigned tasks to FD managers
- To carry out innovator characterization with help of reverse engineering
- Interprets *in-vitro* and *in-vivo* data to derive clear conclusions and provide direction for future work
- Monitor the designs and conducting of compatibility studies and stability studies
- Responsible for process optimization, scale-up, technology transfers and process validation
- Supervise the manufacturing of pre-exhibit/exhibit batches to support ANDA filings
- Prepare product development reports (PDR as per QBD principles)
- Communicates effectively to project coordinator and development team and presents data at team meetings and departmental technical meetings
- Review the formulation of existing products from the point of view of improvement of quality and deduction of cost
- To prepare and review system SOP's for implementation of GMP

- To review specifications for active ingredients, inactive ingredients, and finished product
- To co-ordinate with various other departments like ADL, Commercial Services, PPIC and Packaging Development to ensure smooth functioning
- Other responsibilities as assigned.

PHARMACEUTICAL PACKAGING TECHNOLOGY

The pharmaceutical packaging market is constantly advancing and has experienced annual growth of at least 5% per annum in the past few years.^[39] The market is now reckoned to be worth over \$20 billion a year. As with most other packaged goods, pharmaceuticals need reliable and speedy packaging solutions that deliver a combination of product protection, quality, tamper evidence, patient comfort and security needs.^[40] Constant innovations in the pharmaceuticals themselves such as blow fill seal vials, anti-counterfeit measures, plasma impulse chemical vapor deposition coating technology, snap off ampoules, unit dose vials, two-in-one pre-filled vial design, pre-filled syringes and child-resistant packs have a direct impact on the packaging.^[41] The review details several of the recent pharmaceutical packaging trends that are impacting packaging industry and offers some predictions for the future.^[42]

FORMULATION DEVELOPMENT

Pharmaceutical formulation is the development of a bioavailable, stable and optimal dosage form for a specific administration route. Formulation department goal is to assist its clients in identifying the best form of delivery and the most viable manufacturing strategy for their lead candidate. To lead and oversee the formulation department to conduct R&D for drug formulation, to make technical innovations in the field of formulation and to provide technical support to manufacturing, to manage department employees and work closely with other departments to advance product development within the organization. There is lot of possibilities for pharmacy professionals at various levels as:

- Manager
- Assistant Manager
- Project Assistant
- Research Scientist
- Formulation development ANDA-emerging market scientific manager
- Junior Research Scientist
- Packing Development Scientist
- Analytical Method Development Scientist
- Associate Pharmacist - Drug Delivery Research Laboratory
- Documentation Officer.

Required qualifications

- Ph.D in pharmaceutical chemistry, pharmaceutical sciences or another related discipline
- At least 5 years of R&D experience in the field of drug formulation
- Solid formulation theory, familiar with new dosage forms, new technologies of drug delivery system; skilled in design and development of new drug dosage forms using pharmacokinetic knowledge
- Track record of developing products from bench to market, familiar with drug discovery and development technology and processes, policies, and regulations
- Demonstrated supervisor ability to lead a group of scientists to conduct formulation studies
- Good leadership and management skills
- Good interpersonal and communication skills
- Good knowledge in project management
- Good oral and written communication in English.

Responsibilities

- Responsible for planning and execution of department projects, management of department staff.
- To recruit and train scientific staff, to evaluate employee's performance
- To build a strong scientific team to conduct R&D related to formulation projects
- To review and approve research projects, to negotiate contracts with CROs, to allocate department resources so that tasks can be completed per schedule
- To supervise group leaders, to make sure that all tasks are completed per schedule in each development stage
- To solve any problems within the department and make new proposals to the President of the Institute to improve R&D process
- To write summary report on each project and to provide support to regularly affairs
- To analyze data submitted by group leaders and scientists
- To guide group leaders on technology upgrade program
- Responsible for keeping an open communication with other departments and external companies or academic labs or government agencies
- Oversee and coordinate technology transfer from R&D to manufacturing, to provide technical support related to formulation to the whole company
- Responsible for management and maintenance of laboratory equipment.

GOVERNMENT SECTOR

The government sector is providing the more job opportunities for all the education completed candidates. So the candidates who have completed B.Pharm can also apply for various jobs in Government sector. Before applying for

any government job, you must get minimum of 60% in your B. Pharm, registered in PCI, and your age limit is between 21 and 30 years. In government sector Pharmacy professional work as:^[43]

- Army Pharmacist, drug squad of the Police Department, UPSC, IBPS, RRB, SSC, etc.
- State Drug Testing and Research Laboratory, Hospital Pharmacist, Railway Pharmacist
- Assistant Chemical Engineers in Prohibition and Excise subordinate service
- Government Indian Medicine Pharmacy
- Government Ayurvedic Pharmacy, Research Institute in Indian System of Medicine
- Drug Analyst
- Food Inspector
- Assistant DI
- DI
- Assistant Drug Controller
- Drug Controller
- Scientist in CSIR/ICMR etc.

REGULATORY BODIES

In the present scenario, pharmaceuticals are considered as the most highly regulated industries worldwide. The regulatory body ensures compliances in various legal and regulatory aspects of a drug.^[28-30] Every country has its own regulatory authority, which is responsible to enforce the rules and regulations and issue the guidelines to regulate drug development process, licensing, registration, manufacturing, marketing and labeling of pharmaceutical products. Some of the international or national regulatory agencies and organizations which also play essential role in all aspects of pharmaceutical regulations related to drug product registration, manufacturing, distribution; price control, marketing, R&D, and intellectual property protection are as follows:^[31,32]

- National Bodies
 - Central Drug Standard Control Organization
 - Government of India Directory of Health and Family Welfare
 - Indian Council of Medical Research
 - Minister of Health and Family Welfare
 - PCI
 - AICTE.
- International Bodies
 - ICH
 - United Nation Health Care Organization
 - World Health Organization
 - World Trade Organization.

Pharmacy professionals are the vital people in all above regulatory bodies at different level and position. Different regulatory bodies offer a lot of job opportunities for pharmacy personals.

ENTREPRENEURSHIPS

Individual in this world has two options to earn his bread and butter; one to have his own enterprise and provide employment^[44] and to be an employee of existing enterprises. It is left to the individual to decide whether he would only earn his bread and butter by being an employee of an enterprise or would provide employment to others to earn their bread and butter by establishing an enterprise.^[45] Entrepreneur is the one who has initiated a business and owns an enterprise. Who can forget Bill Gates, one of the best-known entrepreneurs of the personal computer revolution? However, there are just a few entrepreneurs who made a big name in Pharma business.^[46] Some notable entrepreneurs include, to name a few, Acharya Prafulla Chandra Ray, Bengal Chemicals and Pharmaceutical Works (1901), Khwaja Abdul Hamied, Cipla (1935), Ranbir Singh and Gurbax Singh, Ranbaxy (1937) later bought by Bhai Mohan Singh in 1952, Ramanbhai B. Patel, Zydus (1952), Dr. Desh Bandhu Gupta, Lupin (1968), Kiran Mazumdar Shah, Biocon (1978), Dilip S. Sanghvi (He won Ernst and Young Entrepreneur of the year 2010 award), Sun Pharmaceuticals (1983), Dr. Kallam Anji Reddy, Dr. Reddy's (1984), Jagadish Saxena, Elder Pharmaceuticals (1987), K. Raghavendra Rao, Orchid (1992).^[47]

FORENSIC PHARMACY

Forensic pharmacists are pharmacists who specialize in legal cases. They combine the science of pharmaceutical drug research with criminal justice and legal practice. They may be called upon to testify about the side effects of a drug, or they may perform research to determine the effect that a drug had in a person's death. Most forensic pharmacists work full-time in regular pharmacy jobs and provide legal consultancy or expert witness services on a part-time basis. A forensic pharmacist might also testify about a medication error made by a hospital and how it contributed to a person's injury. Forensic pharmacists can work for the defendant or the plaintiff.^[48]

Required qualification

- Master's level, in forensic science or forensic pharmacy.
- Doctorate in Pharmacy along with master's degrees in relevant specializations, such as clinical nutrition.

Knowledge and skill required

- Biological analysis
- Trace evidence analysis
- Toxicology
- Pattern evidence and drug chemistry.

BUSINESS PROCESS OUTSOURCING AND KNOWLEDGE PROCESS OUTSOURCING

Business Process Outsourcing and Knowledge Process Outsourcing (KPO) industry is recognized as one of the highly paid and good career options for many candidates with high knowledge and skills in different fields of expertise including medicine, pharmacy, etc. KPO is referred as a form of outsourcing which performs jobs with adequate knowledge and skills in an organization.^[49] If any candidates having full and thorough knowledge and have good educational qualifications in this sector, then he/she can earn a good salary package, have a bright future and growth, good positions as well as Designation. This sector provides long-term jobs for desired candidates only. They are more demand in the field of Pharmaceutical Sector field in KPO Companies in India. To get a suitable job or a role in KPO companies, a person should be qualified either (UG - B. Pharm - Pharmacy) or (PG - M.Pharm - Pharmacy). As I stated above, there are lots of jobs in this field, but I have specified the ones which are important and get paid handsomely. These jobs are outlined below for your noting:

- KPO - Pharma Division – Co-vigilance Executive
- KPO - Pharma and Health Care Division – Customer Care Supervisor
- KPO - Pharma Division – Medical Reviewer or Analyst
- KPO - Pharma Division – MR/Technical Sales Executive or Officer
- KPO - Pharma Division – Hospital Administration and a lot of chances are also there for pharmacy specialists in private as well as government sector.

CONCLUSIONS

The main extract of the above discussion is that in India there are a lot of opportunities for skilled and well-educated pharmacy professional. Many private as well as government registered pharmaceutical industry or many government departments those regulate the pharmaceutical industry in India are providing great opportunity for capable pharmacy professional. One English idiom (where there's a will there's a way) best fit in pharmacy field which means if you truly want to get good job, you will find a way to get good job in spite of obstacles because there is no scope for incompetent or downhearted pharmacy professional. At a time, there are surplus job opportunities, carrier advancement and job securities for pharmacy professionals in pharmaceutical industry in India because global recession has no impact on pharmaceutical industry in comparison to other industries (IT Industry).

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