

DESCRIPTION OF PHARMACY

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Pharmacy is a core discipline within health sciences that focuses on the discovery, development, production, preparation, dispensing, and safe use of medications. It integrates knowledge from chemistry, biology, medicine, and pharmacology to ensure effective patient treatment. Over time, pharmacy has evolved from traditional herbal medicine practices into a modern, research-based, and technology-driven profession. Today, pharmacists are essential healthcare professionals involved not only in dispensing medicines but also in clinical decision-making, patient counseling, drug research, and healthcare system management. This article provides a detailed overview of pharmacy, including its history, branches, functions, education system, modern developments, challenges, and future perspectives.

Introduction

Pharmacy is one of the most important and oldest branches of medical science. It is defined as the science and profession concerned with the preparation, formulation, dispensing, and appropriate use of medicines. The word “pharmacy” comes from the Greek term *pharmakon*, meaning “drug” or “medicine.”

In modern healthcare systems, pharmacy is not limited to drug preparation. It also includes scientific research, clinical services, industrial production, and patient-centered healthcare. Pharmacists serve as a critical link between physicians and patients, ensuring that medications are used safely and effectively.

With the increasing complexity of diseases and the development of new drugs, pharmacy has become more important than ever. It plays a key role in improving patient outcomes, preventing medication errors, and ensuring rational drug use.

2. Historical Development of Pharmacy

The history of pharmacy can be traced back thousands of years.

2.1 Ancient Period

In ancient civilizations such as Egypt, Mesopotamia, China, and India, medicines were mainly derived from plants, minerals, and animal products. Early healers and priests acted as pharmacists.

2.2 Islamic Golden Age

During this period, pharmacy developed significantly. Scholars such as Avicenna (Ibn Sina) contributed greatly to medicine and pharmacy. The first pharmacies (drugstores) were established in Baghdad in the 8th century.

2.3 Middle Ages in Europe

Pharmacy became separated from medicine as a profession. Apothecaries prepared and sold medicines.

2.4 Modern Era

In the 19th and 20th centuries, pharmacy became more scientific with the rise of organic chemistry and pharmaceutical manufacturing.

2.5 Contemporary Period

Today, pharmacy is a highly advanced scientific discipline supported by biotechnology, nanotechnology, and digital health systems.

3. Branches of Pharmacy

Pharmacy is a multidisciplinary field consisting of several branches:

3.1 Pharmaceutical Chemistry

Focuses on chemical aspects of drug design, synthesis, and analysis.

3.2 Pharmaceutics

Concerned with formulation of drugs into dosage forms such as tablets, capsules, injections, creams, and syrups.

3.3 Pharmacology

Studies how drugs interact with biological systems and their therapeutic effects.

3.4 Clinical Pharmacy

Focuses on patient care, medication therapy management, and collaboration with healthcare teams in hospitals.

3.5 Pharmacognosy

Studies natural drugs obtained from plants, animals, and microorganisms.

3.6 Pharmaceutical Biotechnology

Uses biological systems and organisms to develop new medicines such as vaccines and monoclonal antibodies.

3.7 Pharmaceutical Technology

Deals with industrial production, packaging, and quality control of medicines.

4. Role of Pharmacists in Healthcare

Pharmacists are essential healthcare professionals with multiple responsibilities:

- Dispensing medications accurately
- Checking prescriptions for errors
- Educating patients about drug use
- Monitoring side effects and drug interactions
- Supporting doctors in treatment decisions
- Conducting research and clinical trials
- Ensuring rational use of medicines

Modern pharmacists are no longer just dispensers of drugs but active members of healthcare teams.

5. Pharmacy Education and Training

Pharmacy education varies by country but generally includes:

5.1 Undergraduate Level

Bachelor of Pharmacy (B.Pharm) – focuses on basic pharmaceutical sciences.

5.2 Graduate Level

Master of Pharmacy (M.Pharm) – specialization in clinical pharmacy, pharmacology, or industrial pharmacy.

5.3 Doctoral Level

PhD in Pharmacy – research-based advanced studies.

5.4 Practical Training

Students undergo hospital training, laboratory work, and industrial internships.

Education emphasizes both theoretical knowledge and practical skills.

6. Pharmaceutical Industry

The pharmaceutical industry is responsible for drug discovery, production, and distribution.

Key activities:

- Drug research and development
- Clinical trials
- Manufacturing medicines
- Quality assurance
- Marketing and distribution

Global pharmaceutical companies invest billions in developing new drugs to treat diseases such as cancer, diabetes, and cardiovascular disorders.

7. Clinical Pharmacy

Clinical pharmacy is a patient-oriented field that focuses on optimizing medication therapy.

Responsibilities:

- Reviewing prescriptions
- Preventing medication errors
- Adjusting drug doses
- Counseling patients
- Collaborating with doctors and nurses

Clinical pharmacy improves treatment outcomes and reduces hospital costs.

8. Importance of Pharmacy in Healthcare

Pharmacy contributes significantly to global healthcare:

- Ensures safe and effective drug use
- Reduces medication errors
- Improves patient quality of life
- Supports disease prevention
- Enhances healthcare efficiency

According to the World Health Organization, rational use of medicines is essential for sustainable healthcare systems.

9. Modern Developments in Pharmacy

Pharmacy is rapidly evolving due to technology:

9.1 Digital Pharmacy

Use of electronic prescriptions, telepharmacy, and online consultations.

9.2 Artificial Intelligence

AI helps in drug discovery and predicting treatment outcomes.

9.3 Nanotechnology

Used for targeted drug delivery systems.

9.4 Personalized Medicine

Treatment based on genetic profiles of patients.

9.5 Biopharmaceuticals

Development of vaccines and protein-based drugs.

10. Ethics in Pharmacy

Pharmacists must follow ethical principles:

- Patient confidentiality
- Honesty in dispensing medicines
- Avoiding drug abuse promotion
- Ensuring patient safety
- Professional responsibility

Ethical practice is essential for trust in healthcare systems.

11. Challenges in Pharmacy

Despite progress, pharmacy faces challenges:

- Antibiotic resistance
- Fake and counterfeit medicines
- High cost of drug development
- Medication non-adherence
- Regulatory issues
- Unequal access to medicines in developing countries

12. Future of Pharmacy

The future of pharmacy is highly promising:

- AI-based drug discovery
- Robotic dispensing systems
- Gene therapy and precision medicine
- Advanced vaccine technologies
- Global digital healthcare systems

Pharmacists will play an even more important role in personalized healthcare.

Conclusion

Pharmacy is a dynamic and essential healthcare discipline that ensures the safe, effective, and rational use of medicines. It has evolved from traditional herbal practices to a highly

scientific and technology-driven profession. Pharmacists are key healthcare providers contributing to patient care, drug research, and public health improvement. The future of pharmacy will continue to evolve with innovations in biotechnology, artificial intelligence, and personalized medicine.

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