



Advances in Pharmacy Practice

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ABSTRACT

In today's specialised and globalised world, pharmacy education in India faces significant challenges and shortcomings. There is an urgent need to start an academic activity to achieve curriculum revision that keeps up with current and upcoming developments in the pharmacy profession. Sadly, throughout the years, when developing curricula for teaching at the diploma and degree levels, not enough attention was placed on bolstering the components of community pharmacy, hospitals, and clinical pharmacy. The academic-practice relationship can create new and inventive practise innovations that will enhance patient outcomes with the right leadership and support, a change in present professional education and training processes, and a dedication to nurturing future innovators.

Keywords: Pharmacy Profession, Pharmacy Practices, Drivers and Barriers, Innovations.

1.0 INTRODUCTION

Pharmacy is the science and technique of preparing, dispensing, and review of drugs and providing additional clinical services. It is a health profession that links health sciences with pharmaceutical sciences and aims to ensure the safe, effective, and affordable use of drugs.

1.1 The pharmacy profession:

Pharmacy is practiced in a wide range of settings: community pharmacies, hospitals, long term care facilities, the pharmaceutical industry, mail service, managed care, and government (Department of Veterans Affairs, Public Health Service). A survey identified 112,000 pharmacists in community pharmacy, 40,000 in hospitals, and 21,000 in consulting, government, academic, industry, and other settings.

Pharmacist: Pharmacists are healthcare professionals with specialized education and training who perform various roles to ensure optimal health outcomes for their patients through the quality use of medicines. Pharmacists may also be small-business proprietors, owning the pharmacy in which they practice.^[1]

1.2 Seven-star pharmacist

The concept of the "Seven-star pharmacist" was introduced by the World Health Organization (WHO) in March 2014 and covered these roles: Caregiver, decision-maker, communicator, manager, life-long learner, teacher, and leader (Figure 1)^[2]



Figure 1: World Health Organization concept of seven-star pharmacist.

1.3 Scope of pharmacy

The scope of pharmacy practice includes more traditional roles such as compounding and dispensing medications, and it also includes more modern services related to health care, including clinical services, reviewing medications for safety and efficacy, and providing drug information.

The scope of pharmacy includes-

- ✓ Drug Inspector
- ✓ Pharmacist
- ✓ Scope in Pharmaceutical Marketing
- ✓ Scope In Production/ Manufacturing Sector, Medical Devices, and Quality Control
- ✓ Scope In Drug Regulatory Affairs
- ✓ Scope In Medical Underwriting
- ✓ Retail Pharmacy.

1.4 The role of pharmacists in a changing health care environment

Pharmacist's roles are evolving along with an ever-changing health care environment, spurred by advances in technology, greater patient involvement in their own care, and a greater focus on reducing costs and improving health outcomes. The role of pharmacists has been clinically proven to improve many outcomes regarding patient health, including greater patient safety, improved disease and drug therapy management, effective healthcare spending, improved adherence and improved quality of life.

1.5 Pharmacy education: strategies for a better future

Pharmaceutical education is a dynamic professional education for the development of the country, individual and with a view to protecting public health. In this world of specialization & globalization, pharmacy education is suffering from serious backdrops & flaws. The potential for growth of the pharmacy profession is enormous if we are prepared to upgrade our standards to international & global expectations.^[1]

2.0 GOOD PHARMACY PRACTICES

Good Pharmacy Practice (GPP) is an international standard for pharmacy services and was set forth by the World Health Organization (WHO) and the International Pharmaceutical Federation (FIP) in 1992.

Jointly, the WHO and FIP defined the Good Pharmacy Practice (GPP) as “the practice of pharmacy that responds to the needs of the people who use the pharmacists' services to provide optimal, evidence-based care”.^[3]

2.1 GOOD PHARMACY PRACTICE REQUIREMENTS

- A. Good Pharmacy Practice requires that a pharmacist's first concern must be the welfare of the patients in all settings.
- B. Good Pharmacy Practice requires that the core of the pharmacy activity is the supply of medication and other health care products, of assured quality, appropriate information and advice for the patient, and monitoring the effects of their use.
- C. Good Pharmacy Practice requires that an integral part of the pharmacist's contribution is the promotion of rational and economic prescribing and appropriate medicine use.
- D. Good Pharmacy Practice requires that the objective of each element of pharmacy service is relevant to the individual, is clearly defined and is effectively communicated to all those involved.^[4]

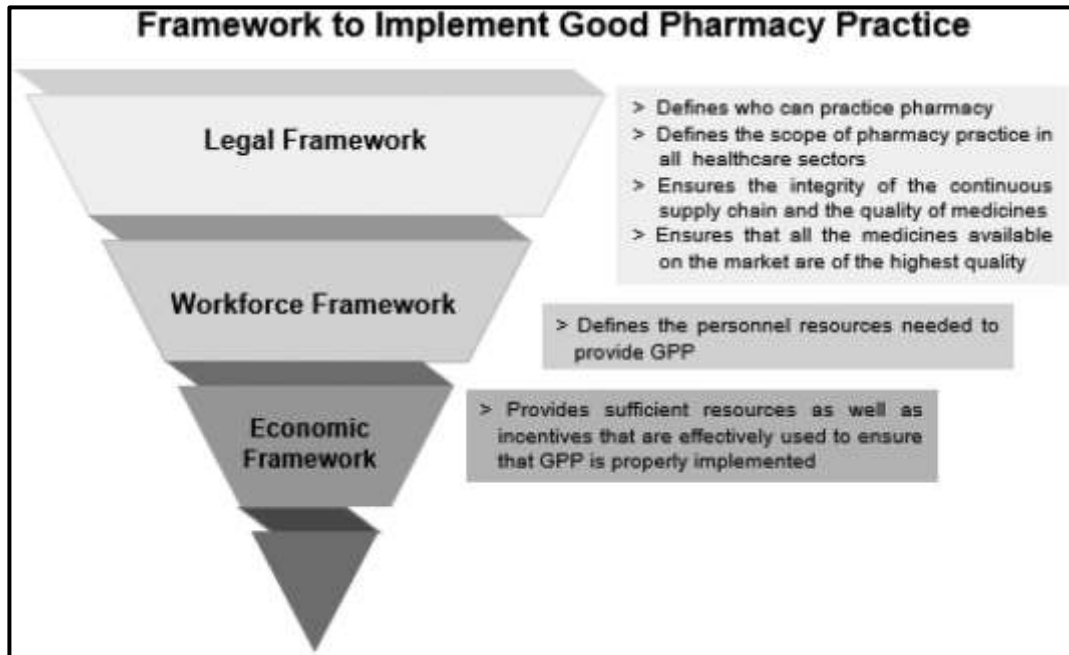


Fig. 2. Framework to implement Good Pharmacy Practice.^[4]

3.0 Drivers and barriers

Thematic coding of the data identified eight main areas that present barriers and/or drivers to formalised advanced and specialty practice: regulation and governmental strategies, educational institutions and academic capacity, human resources and logistical capabilities, professional leadership and support, the level of alignment with national health strategies, health system organisation factors, interprofessional collaboration, and multi-stakeholder engagement.

4.0 Future work

This is the first study of its kind to collect in depth data on advanced and specialty practice in pharmacy from around the world. More research is needed to examine the impact of needs-based extended

pharmacy roles, which would in turn catalyse local and global action and influence policymakers. While this analysis attempted to identify the current position of advanced practice internationally, there is a need to continue to monitor existing and emerging roles, possibly through a future longitudinal study.^[5]

5.0 INNOVATIONS:

INNOVATION IN CLINICAL PHARMACY PRACTICE

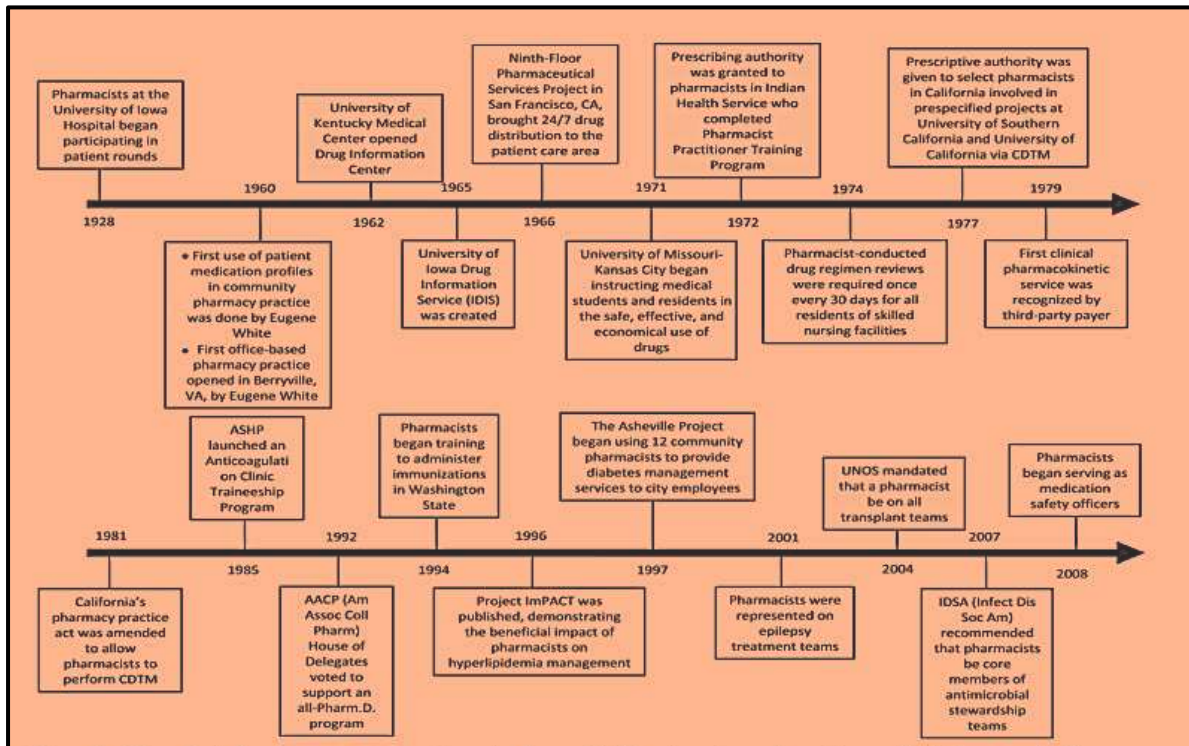


Figure 3. The clinical pharmacy innovation timeline. AACP = American Association of Colleges of Pharmacy; ASHP = American Society of Health-System Pharmacists; CDTM = Collaborative Drug Therapy Management; IDSA = Infectious Diseases Society of America; UNOS = United Network for Organ Sharing. [6]

5.1 Electronic Prescribing

Electronic Prescribing or E-Prescribing briefly defined as a system that enables electronic transmissions of prescriptions to pharmacies from the provider's office. E-Prescribing system provides prescribing drugs electronically. E-prescribing system can be a stand-alone system or be integrated with Electronic Health Records (EHRs) system. The EHR-integrated system, allowed providers to access all patient's data in EHR including patient's diagnosis, problem lists, clinical notes, also laboratory and radiology results that can be considered as a model to develop therapy safety. [7]

Pros of E-Prescribing

The proposed and confirmed benefits of e-prescribing include enhanced patient safety, reduced drug costs, increased access to patient prescription records, and improved pharmacy workflow.

Cons of E-Prescribing

Although e-prescribing eliminates certain errors, it potentiates new errors and reintroduces problems similar to those encountered with written prescriptions. Omitted or inaccurate information, such as incorrect drug selection, wrong patient, and incorrect directions, accounts for most errors associated with e-prescribing. Given the initial resistance and lack of acceptance on the part of providers and pharmacists, many studies have been conducted to determine the accuracy of e-prescribing. [8]

5.2 mHealth

The World Health Organization (WHO), in collaboration with the Global Observatory for eHealth, has defined mHealth as "medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices". Furthermore, mHealth is considered to be a component of eHealth (Figure 4). eHealth is a broad, umbrella term referring to the "health services and information delivered or enhanced through the Internet and related technologies".

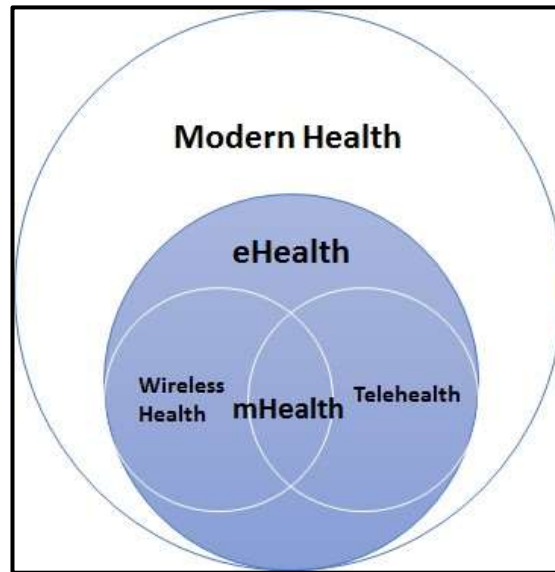


Figure 4. eHealth and mHealth Relationship

5.2.1 Barriers to mHealth

1. Lack of interoperability of systems
2. Lack of coverage of and access to technologies
3. Limited technology literacy
4. Limited capacity to invest in technology (e.g. small businesses, governments, institutions)

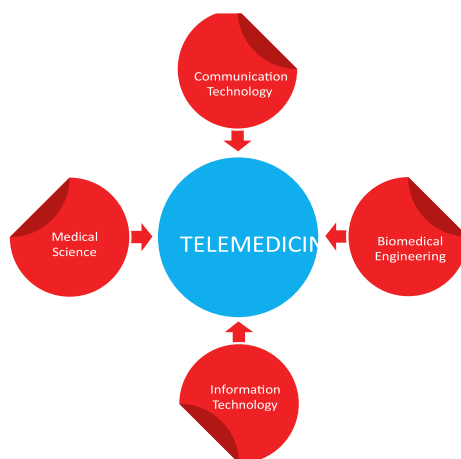
5.2.2 Enablers of mHealth

1. Engagement of end users during design phase
2. Informed clinical decision making
3. Utilisation of mHealth evidence
4. Employers' tolerance of some personal use of devices
5. Automation of tasks
6. User-friendliness of application
7. Consumer demand ^[9]

5.3 Telemedicine

Telemedicine facilitates the provision of medical aid from a distance. It is an effective solution for providing specialty healthcare in the form of improved access and reduced cost to the rural patients and the reduced professional.

Telemedicine may be defined as “The delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities”.



Telemedicine benefits

Telemedicine is most beneficial for populations living in isolated communities and remote regions and is currently being applied in virtually all medical domains. Telemedicine is also useful as a communication tool between a general practitioner and a specialist available at a remote location. Monitoring a patient at home using known devices like blood pressure monitors and transferring the information to a caregiver is a fast growing emerging service.

Major areas of telemedicine technology adopted ^[10]

Tele-consultation Tele-diagnosis Tele-treatment	<i>The patient with the local doctor consults the specialist, obtains the line of treatment.</i>
Tele-education Tele-training	<i>For Continuing Medical Education, Training for doctors & paramedics from a higher level Hospital/Institution</i>
Tele-monitoring	<i>Regular monitoring for intensive care & emergency care</i>
Tele-support	<i>Support during disaster management</i>

Table 1. Telemedicine Technology

5.4 Creative Innovations in Pharmaceutical Packaging

There is a well-known saying “Don’t judge a book by its cover”; however first and foremost it is basically the appearance which grabs the attention of customers. When customers go out for shopping, initially they would be attracted towards the interior of shop; if it is lavish and aristocratic, surely the things and stuff showcases would be worth buying and of high quality as well, in the same way a face is the index of mind; the characters, ideas and thoughts are reflected by the face. Therefore, hard work and lots of creativity goes into great packaging. A creative package can sometimes be the driving force of an item. For e.g.; if a significant and beneficial product is wrapped up in a paper and twine, but it wouldn’t be able to sold in the market. The appearance counts a lot, when it comes to the packaging of a product.

5.4.1 Innovations in Packaging Materials

Package design and construction plays a significant role in determining the shelf life of a food as well as pharmaceutical product. The right selection of packaging materials maintains product quality, stability and freshness during distribution and storage. New organic compounds such as epoxy amines, acrylics, polyesters, organosols etc. have been developed in response to the requirements of packaging innovations and a more exigent market. Developments in the following areas are covered: metals, such as tin-free steel and the combination of aluminium and plastics; paperboard, such as tubs and oven able board; glass, such as 'Plastishield', and plastics etc.

5.4.2 Patient Compliance Packaging

Pack design can use colour coding to help identify the medicines dosage clearly to consumers. However, the greatest opportunity now is for packaging designers to use new technologies to help consumers remember to take the right dose of the right drug at the right time. [11]



Fig.6: Different Dosage Forms of Gaviscon



Fig. 7: Stability and Shelf life to the Product

5.5 Home delivery programme

A workflow adapted to the care environment was drawn up based on this analysis for telematic patient care (figure 8). Incidents identified in the process by the logistics operator were communicated to the responsible pharmacist by telephone at the time. In the same way, the patient -contacted the PS if an issue occurred. In light of the pandemic situation, a patient home delivery model was chosen. Transport services were provided by an external provider. This transport model was determined by the financing model, which was chosen by the hospital centre's management.

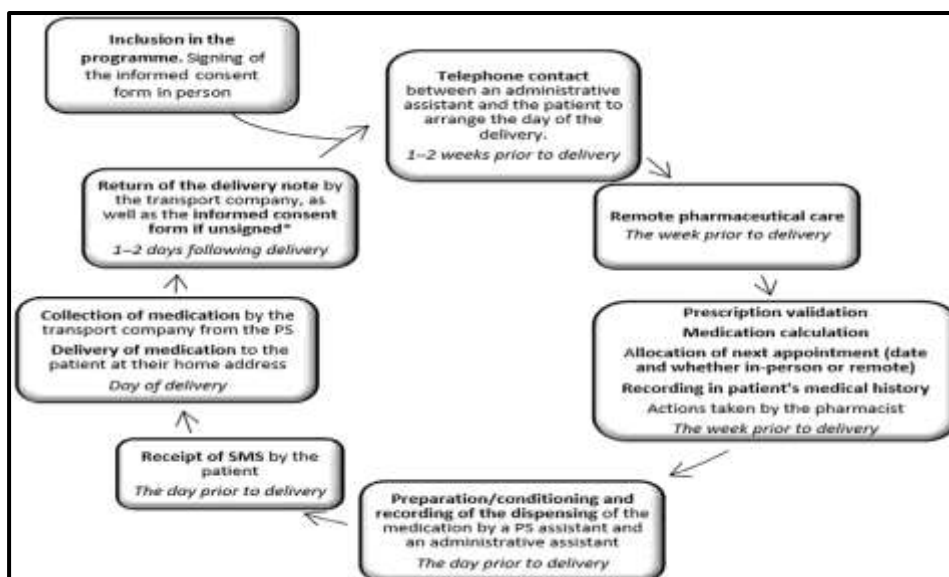


Figure 8. Workflow for medication dispensing and informed delivery for telepharmacy assistance. PS: pharmacy service; SMS: short message service/text. [12]

5.6 Artificial Intelligence (AI) in Pharmacy

The first application of a computer in a pharmacy presumably dates back to the 1980s and since then, computers have been utilized in everything from data collection, retail pharmacy management, clinical research, drug storage, pharmacy education, clinical pharmacy, and lots more, and with the emergence of artificial intelligence, there is no telling just how much the Pharmacy sector will evolve in the long run. There are many aspects of pharmacy that AI can have an impact on and the pharmacists to consider these possibilities because they may someday become a reality in pharmacy practice. The term AI (also known as machine intelligence) is very commonly confused and used interchangeably with robotics and automation.

Applications of AI

In retail pharmacy, this principle can be applied. The chatbots can be programmed to mimic pharmacist-patient interaction.

Although, there are existing inventory management software and application that are used in retail pharmacy stock management like Mckessons; Liberty; Winpharm; PrimeRx; and WinRx, not all of them utilize AI or machine learning.

AI can be of real help in analyzing data and presenting results that would support decision making, saving human effort, time, and money, and thus helps save lives. Medical and technological advancements that have helped the healthcare-related development of AI include the overall evolution of computers, resulting in faster data collection and more powerful data processing, Growth in the availability of health-related data from personal and healthcare-related devices and records, and the development of pharmacogenomics and gene databases, Expansion and industry adoption of electronic health records and natural language processing and other advancements in computing that have enabled machines to replicate human certain processes. ^[13]

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