

Pharmacists at the Frontiers of Public Health

Type: Short Communication

Received: May 16, 2025

Published: July 01, 2025

Citation:

Vishakha Surve. "Pharmacists at the Frontiers of Public Health". PriMera Scientific Medicine and Public Health 7.1 (2025): 30-34.

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Vishakha Surve*

Asst. Professor; Aparajita Patil, Asst. Professor Oriental College of Pharmacy, Sanpada, Navi Mumbai, India

***Corresponding Author:** Vishakha Surve, Asst. Professor; Aparajita Patil, Asst. Professor Oriental College of Pharmacy, Sanpada, Navi Mumbai, India.

Introduction

"Scientists discover, pharmacists deliver!" Across different eras, pharmacists have played a notable role in translating scientific breakthroughs into accessible healthcare solutions. From the laboratory to the local pharmacy, they ensure that medical innovations reach patients safely and effectively, playing a crucial role in bridging the gap between doctors and the public. Beyond dispensing medicines, pharmacists educate communities, contribute to health campaigns, and safeguard the rational use of medicines, embodying a commitment to healthier lives across the nation.

Evolution of Pharmacy in India

Ancient Roots

India's pharmacy history is rooted in traditional systems of medicine like Ayurveda. From the wisdom of Lord Dhanvantari, the teachings of Charaka, and the surgical expertise of Sushruta to the modern-day pharmacist, the journey of healing reflects a seamless blend of ancient tradition and contemporary science, dedicated to improving lives [1].

Colonial Influence

Pharmacy began to formalize as a profession during the 19th century under British colonial rule. In 1842, a pharmacy course was introduced alongside a medical curriculum at the "Escola Medica" in Goa by the Portuguese [2]. This marked the start of integrating Western pharmaceutical practices into Indian healthcare. Additional advancements, including the founding of Banaras Hindu University in 1937, helped to professionalize pharmacy education in India [3].

Post-Independence Developments

Post-1947, the need for self-reliance in healthcare spurred the rapid growth of the pharmaceutical industry. The Pharmacy Act of 1948 was a pivotal step, establishing qualifications and licensing requirements for pharmacists [4]. Over time, the profession expanded to include diverse roles such as clinical pharmacists, community pharmacists, and industrial pharmacists, contributing to a robust healthcare ecosystem [5].

Pharmacists in Different Roles

Pharmaceutical Research and Development

Pharmaceutical R&D serves as the backbone of medical progress, driving the development of life-saving treatments. During the COVID-19 pandemic, Indian pharmaceutical companies showcased their ability to innovate rapidly. Bharat Biotech developed Covaxin, an indigenous vaccine, in collaboration with the Indian Council of Medical Research (ICMR), while the Serum Institute of India manufactured Covishield, based on the Oxford-AstraZeneca vaccine. Despite being the world's second-most populous country, India managed large-scale vaccine manufacturing, delivering over 300 million doses domestically and exporting millions globally to aid low-income nations [7]. Few of the myriad significant contributions by R&D across various domains during the COVID-19 pandemic are listed below.

- **Diagnostics:** Companies like Mylab Discovery Solutions developed RT-PCR and antigen tests, facilitating large-scale testing [6].
- **Therapeutics:** Indian research explored monoclonal antibody therapies like Casirivimab and Imdevimab for emergency use [7].
- **Medical Devices:** Organizations like Dräger India ramped up production of oxygen concentrators and ventilators to combat shortages [8, 9].

This era of R&D not only enhanced India's global standing but also bolstered public confidence in healthcare innovation.

Community Pharmacists

Community pharmacists, often referred to as retail pharmacists, are vital in connecting patients with essential medications and healthcare advice. A Community Pharmacist is a liaison between the Physician and the Patient.

- **Medication Management:** They counsel patients on dosage, side effects, and drug interactions, ensuring adherence to treatment regimens [10, 11].
- **Screening and Prevention:** Many pharmacies now offer health screenings services, such as measuring blood pressure, blood sugar levels, and cholesterol, aiding in early detection of chronic diseases [12].
- **Access to Medicines:** Especially in rural areas, community pharmacies ensure the availability of essential medicines, bridging gaps in healthcare access [13].

By collaborating with healthcare providers, community pharmacists significantly enhance the quality of patient care.

Clinical Pharmacy Services

The launch of the Doctor of Pharmacy (Pharm.D.) program has emphasized the importance of clinical pharmacists in India. Their hospital-based activities include:

- Monitoring adverse drug reactions (ADRs).
- Therapeutic drug monitoring (TDM).
- Participating in ward rounds to optimize therapy [14].

Clinical pharmacists also contribute to research and community service, enhancing healthcare outcomes for patients and institutions alike.

Allied Pharmacy Services

- **Medical Coding**

Medical coding converts medical diagnoses into standardized codes used for statistical analysis, reimbursement, and healthcare management. India is a key player in this domain, with numerous companies providing coding services aligned with international standards [15].

- **Medical Billing**

Medical billing ensures the accurate translation of healthcare services into billing claims, supporting patient reimbursement and provider payment. Indian health insurance companies streamline this process to improve patient experiences [16].

- **Medical Transcription**

India has emerged as a hub for medical transcription, converting doctors' audio reports into written documents. Skilled professionals like a pharmacist, ensures accuracy in transcriptions, bolstering healthcare communication [17].

- **Pharmacovigilance**

Pharmacovigilance involves the documentation and prevention of ADRs to ensure patient safety. Pharmacists play a key role by analysing pharmacological data and supporting epidemiological studies [18].

Regulatory Pharmacist

The Regulatory pharmacist ensures that pharmaceutical products are developed, marketed, and distributed in a manner that prioritizes patient safety, drug efficacy, and compliance with regulatory standards. They are key players in the lifecycle of pharmaceutical products, from initial development to post-market surveillance. These professionals work at the intersection of healthcare, law, and pharmacy, ensuring the safety, efficacy, and quality of drugs and medical devices.

Academic Pharmacist

Just as teachers shape the lives of students by imparting knowledge and guiding them towards success, pharmacists shape the lives of patients by ensuring safe, effective, and optimal use of medications. Academic pharmacists in India may not always engage directly with patients, but their impact through teaching, research, policy development, public health initiatives, and healthcare system management has always been essential in enhancing the broader healthcare environment and patient outcomes. Their efforts ensure that pharmacists, healthcare professionals, and policymakers are well-prepared to improve patient care, thereby indirectly fostering better health results for the population. Institutes have been involved in different social campaigns with the help of the students like Blood donation camps, Organ donation Awareness which play a significant role in ensuring the availability of life-saving resources and improving overall health outcomes thereby contributing to patient health.

Advancements in Pharmacy Practice in India

India has embraced digitalization, AI, and online platforms, revolutionizing pharmacy practice. Platforms like Netmeds and PharmEasy provide doorstep delivery, enhancing medicine access in remote areas. AI-driven tools, such as symptom trackers and online consultations, empower patients to manage their health from home. This digital transformation addresses India's unique challenges, such as high population density and geographical disparities, offering solutions that are often absent in developed nations.

Government handholding

The Indian government has introduced several schemes and initiatives to strengthen the pharmacy sector and pharmacists, aiming to improve access to medicines, promote the growth of the pharmaceutical industry, and ensure better healthcare delivery across the country. These schemes range from regulatory support to skill development and entrepreneurship opportunities.

<i>Schemes</i>	<i>Year Introduced</i>	<i>Progress till date</i>
Jan Aushadhi Yojana	2008	9000 Jan Aushadhi Kendras established across India
Ayushman Bharat Jan Arogya Yojana	2018	Health Insurance of 5 lakhs/family. Over 12 crore families covered till date.
National Pharmaceutical Pricing Authority (NLEM)	1996	384 drugs listed under National List of essential medicines for price capping in NLEM 2022.

Challenges and Future Prospects

Indian pharmacists face challenges like limited clinical practice opportunities, regulatory hurdles, and underutilization in public health initiatives. However, expanding roles in personalized medicine, tele-pharmacy, and pharmacovigilance present significant opportunities. By advancing clinical skills and embracing technology, pharmacists can transform India's healthcare landscape. Also, Government initiatives like Jan Aushadhi Yojana, Pharma Vision 2020 etc. will enable pharmacists to provide better, affordable, and timely care to patients, improving access to essential medicines and overall health outcomes.

Conclusion

"Behind every prescription lies a pharmacist, the unsung hero of healthcare." From ancient apothecaries to modern clinical and industrial pharmacists, their evolving role underscores their importance in fostering healthier communities. By championing education, innovation, and personalized care, pharmacists ensure that healthcare remains accessible, safe, and effective for all. In India, health has traditionally been synonymous with doctors and the medical profession, but the narrative is gradually shifting as pharmacists are increasingly recognized for their pivotal role in healthcare, mirroring global trends.

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