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Opportunities and challenges in pharmacy profession in developing countries like India: An overview

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Abstract

Pharmacy, a profession that is responsible for the interpretation of prescription orders compounding, labelling, dispensing of drugs for appropriate use of medication, devices and services to achieve optimal therapeutic outcomes. Patient monitoring and intervention and provision of cognitive services related to use of medications and devices are the other responsibilities. Pharmaceutical science is an inter-disciplinary science which is the base of the molecular biology, drug discovery and development science to healthcare delivery. While pharmacists are those who are educated and licensed to dispense drugs and to provide drug information and are experts in handling of medications. The pharmacist is no longer just a supplier of medicines and a concocter of medicinal products, but also a team member involved in the provision of health care whether in the hospital, the community pharmacy, the laboratory, the industry or in academic institutions. The pharmacy profession has exciting opportunities, as well as challenges, they have the potential to help our country in facing these challenges. The changing role of pharmacy in monitoring medication usage is subsumed under the term “pharmaceutical care.” Pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient’s quality of life i.e. pharmacist are also the primary health professionals. The gender shift that has occurred with the profession of pharmacy has sparked debate regarding the potential impact that this might have on the workforce shortage, pharmacist salaries, the impact of professional organizations, and the future of independent pharmacy ownership and proves specific position for females. This review deals with responsibility and services of pharmacists together with global opportunities to serve the society. Thus, there should be a close relationship among pharmacists, doctors and patients that may help improve patient’s use of medicines and simplifying various complexities.

Key words: Pharmaceutical science, pharmacists, pharmaceutical care, community pharmacy.

Science and technology are moving with great pace and imagination in a very efficient manner in 21st century. These changes influences human life (which is associated with health) and the society is experiencing a dynamic revolution. The healthcare sector comprising of hospitals and allied services such as medical education, equipment, diagnostics and pathological laboratories and medical insurance is a complex market, distinct from other sectors. Its distinct nature arises because of the asymmetries of information in this sector. Usually they are the doctors and pharmacists who are the final decision makers and not the consumer for the latter lacks medical knowledge. It is an age old profession which has transformed into a hub for “Global Healthcare” and evolved as a multidisciplinary and multifaceted field in recent times [1].

Health status and health expenditures

Indicators of health such as life expectancy and infant mortality reflect wide variations in health status across the countries of the World Health Organisation (WHO) of european region. Although life expectancy has been increasing steadily in western european countries since the 1970's, a drastic decline was observed in the countries of the former soviet union from the early 1990's due to the collapse of the health care system and social disruption/now life expectancy and health status in these newly independent states is slowly improving [2]. Similarly, infant mortality rates in the central asian republic are still well higher than in eastern european countries. As the number and complexity of prescription filled each year increases, the cost associated with medication misuse also increases. Thus, there is a strong need of the health care professional who will take care of these complexities. Pharmacy, a profession that is responsible for the appropriate use of medication, devices and services to achieve optimal therapeutic outcomes (American pharmaceutical association) to combat these complexities[3]. Pharmacy is defined as an

art and science of preparing and dispensing medications and the drug-related information to the public. It involves the interpretation of prescription orders compounding, labeling, and dispensing of drugs and devices drug product selection and drug utilization reviews patient monitoring and intervention and provision of cognitive services related to use of medications and devices[4].

What is health?

Pharmacy practice does not take place in a vacuum, but in the health care environment. It aims to improve health. Health is a broad concept which can embody a wide range of meanings from technical to moral and philosophical. It is perhaps the most important human resource. The most quoted definition of health was formulated in the constitution of WHO in 1946. It is a positive definition which stresses well-being. “Health is a state of complete physical, mental and social well-being, not merely the absence of disease or infirmity” (WHO). Over the years, WHO has taken forward the debate and has revised its definition of health. “Health is the extent to which an individual or group is able, on the one hand, to realise aspirations and satisfy needs; and, on the other hand, to change or cope with the environment. Health is therefore, seen as a resource for everyday life, not an object of living; it is a positive concept emphasizing social and personal resources, as well as physical capacities” [5]. There is no single definition that unifies the perceptions about health. Our understanding of it depends on the many different contexts in which life is lived and health is perceived. Medicinal therapy is the most frequently used form of treatment intervention in any health practice setting. Its use has grown dramatically as the population has aged, the prevalence of chronic disease has increased, new infectious diseases have emerged and the range of effective medications has broadened. Increasingly medicines can be purchased in new settings, and are

handled by non-pharmacists. Compounding has been largely replaced by the commercial manufacture of nearly all formulations. Medicines can be bought in supermarkets, in drug stores or at markets. They can also be obtained by mail order or over the internet; they are sold by medical practitioners and dispensed by computerized dispensing machines. Professions exist to serve society. Hence the mission of the pharmacy profession must address the needs of society and individual patients. According to Millis Report "pharmacy should be conceived basically as a knowledge system that renders a health service by concerning itself with understanding drugs and their effects". Thus, pharmaceutical care is a necessary element of total health care[6].

Pharmaceutical science is an interdisciplinary science which is the base of the molecular biology, drug discovery and development science to healthcare delivery. While pharmacists are those who are educated and licensed to dispense drugs and to provide drug information and are experts in handling of medications. As well as are most accessible member of today's health-care team, often are the first sources of assistance to add advice on many common ailments and health care matters. Pharmacists are true health care professionals whose professional responsibilities include seeking to ensure that people derive maximum therapeutic benefit from their treatments with medicines. They are said to be the most trusted professionals worldwide being the most widely accessible health care providers for nearly all segments of population. This requires them to keep abreast of developments and advances in knowledge and technology related to manufacture and use of medicines, professional standard requirements, laws governing pharmacy, etc. the scope of pharmacy practice continues to evolve into a positive and promising patient care practise [7]. The expanding role of

pharmacists in patient care and their overall contributions to health care are becoming more widely recognized by other health care professionals, health policy decision makers, and the general public[8]. The pharmacist's services and involvement in patient care have been associated with improved health and economics outcomes, reduced adverse drug events, improved quality of life and reduced morbidity and mortality[9]. According to the pharmaceutical group of the European Community (PGEC) and the European Proprietary Medicines Manufacturers' Association (AESGP) "Pharmacist is an adviser to the public on everyday health care and is a key figure in the supply and delivery of medicines to the consumer. He is a partner of the manufacturer of non-prescription medicines. Both share the common goals of service of high quality for the patient and encouragement of the rational use of medicines. The pharmacist in his professional capacity and in direct contact with patients is competent to provide sound advice on the medicines he supplies". The role of the pharmacist has been changing over the past two decades. The pharmacist is no longer just a supplier of medicines and a concocter of medicinal products, but also a team member involved in the provision of health care whether in the hospital, the community pharmacy, the laboratory, the industry or in academic institutions[10]. Pharmacist is the most common health professional whom people meet most commonly due to convenience and easiness. In case of community pharmacy, pharmacist can be met without any appointment. Nevertheless, the potential for pharmacists to effect dramatic improvements in public health remains largely untapped [10,11]. Pharmacists represent the 3rd largest healthcare professional group in the world, and in India today there are around 8 lakh pharmacists, working in various positions, applying their unique knowledge and

skills, contributing to the health of the nation. Pharmacists extemporaneously compounded most of the medicine needs of the people. They made various preparations like mixtures, ointments, pills, tinctures, syrups, elixirs, powders, etc. in their pharmacy, based on prescriptions given by physicians. They packed them suitably, labelled them and dispensed them along with appropriate advice for consuming them[12].

Role of pharmacist's in the healthcare system

Pharmacists work in a very delicacies manner in various fields as shown in Figure 1:

Pharmaceutical industrial hub: Pharmacists perform various tasks in the pharmaceutical industry. Their work is thus usually behind the scene, not in direct contact with the patients, yet largely contributing to the health care sector [14].

- Health promotional hub: Pharmacists perform various tasks in practice settings (community and hospital) and are generally in direct contact with the patients.
- Educational and regulatory hub: academics, regulatory (Govt.) and clinical research.

Pharmacists perform these various functions either by themselves, or take help of various personnel/technicians (skilled, unskilled), sales persons, and other support staff. Pharmacists are responsible for training and supervision of these personnel at different levels[14].

The pharmacy profession has exciting opportunities, as well as challenges. Accessibility to health care and essential medicines still remains a problem. One third of world's population does not have regular access to essential medicines[14]. Rising cost of healthcare, increasing disease burden (both communicable, and now non-communicable too) and advent of new diseases, irrational use of medicines, non-availability of health care providers in sufficient numbers especially in rural areas

are all challenges we have to overcome[14].

Pharmacists have the potential to help our country in facing these challenges. Pharmacists with their knowledge and expertise can help in production, distribution, storage and dispensing of quality medicines, and also promoting rational medicine use, health promotion, managing medicines and drug therapy, providing patient instructions and counselling to patients to improve compliance to therapy, assisting patients in making effective self medicine choices and decisions for their health etc[15].

Over the past 40 years, the pharmacist's role has changed from that of compounder and dispenser to one of "drug therapy manager". This involves responsibilities to ensure that wherever medicines are provided and used, quality products are selected, procured, stored, distributed, dispensed and administered so that they contribute to the health of patients, and not to their harm [10].

The scope of pharmacy practice now includes patient-centred care with all the cognitive functions of counselling, providing drug information and monitoring drug therapy, as well as technical aspects of pharmaceutical services, including medicines supply management[16]. It is in the additional role of managing drug therapy that pharmacists can now make a vital contribution to patient care [17].

In the coming years, there will be an increasing demand for qualified pharmacists in all sectors, namely research (Research and development (R&D); Quality control (Q.C); Quality assurance (Q.A), regulatory affairs, manufacturing, marketing, clinical, community, academics, etc. both in our country as well as across the world [10]. Pharmacy is a rewarding career, in terms of personal satisfaction and financial compensation, as well as service to the people. Figure. 1 Illustrates various defined and established potential roles of pharmacists.

The changing role of pharmacy in monitoring medication usage is subsumed under the term “pharmaceutical care.” It can be defined as “a responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient’s quality of life.” Pharmacists have been shown to decrease prescribing errors in an intensive care unit [18].

Current scenario of pharmaceutical field:

Pharma industry in India is playing a vital role in the healthcare area of the nation. As

we are moving towards globalization, there is a need for strategic planning to meet the challenges posed by the modern era[7].

The Indian pharmaceutical industry currently tops the chart amongst India's science-based industries with wide ranging capabilities in the complex field 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 to 9 percent annually [13].

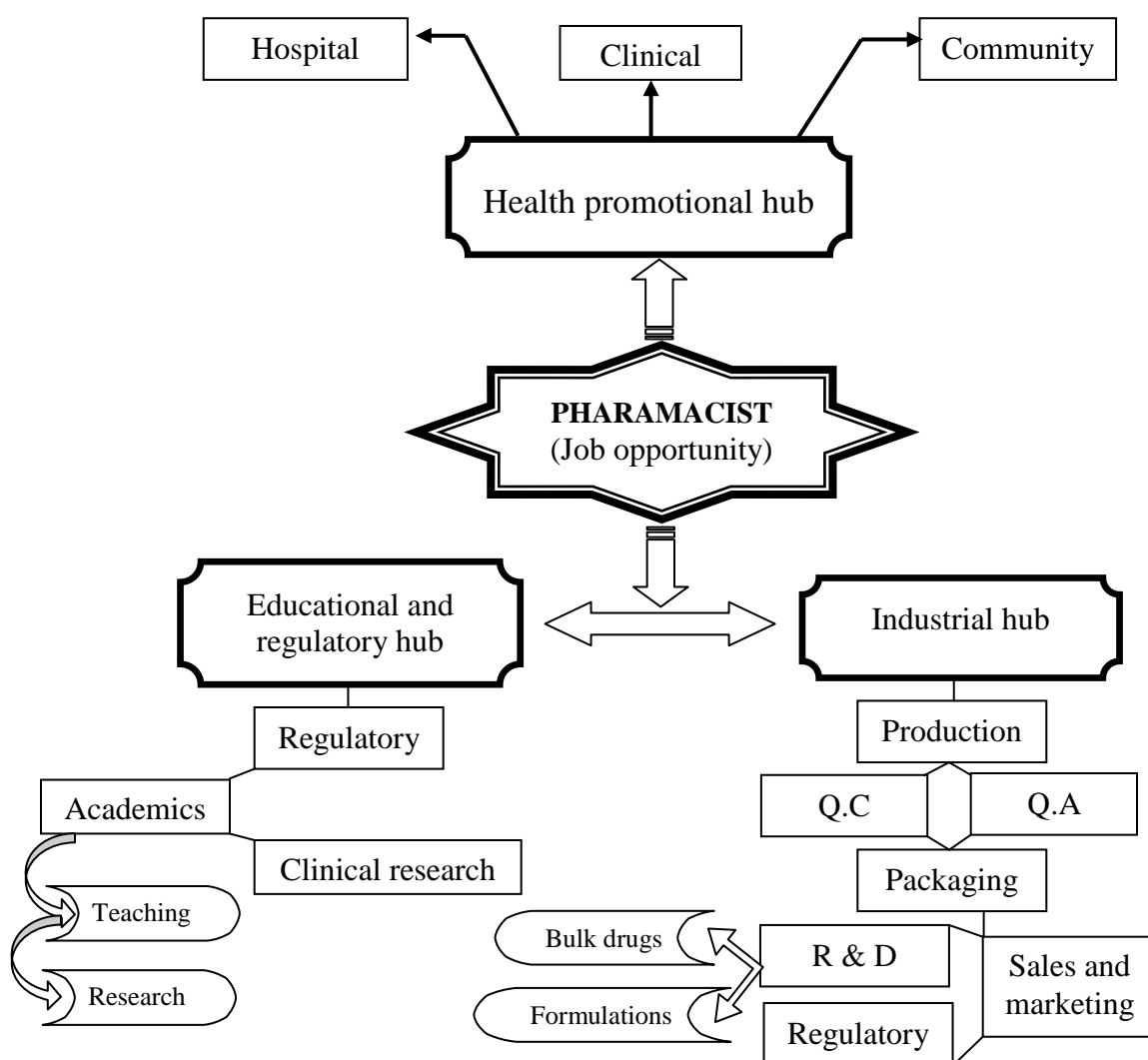


Figure-1: Various roles of pharmacists

It ranks very high amongst all the third world countries, in terms of technology,

quality and the vast range of medicines that are manufactured. It ranges from

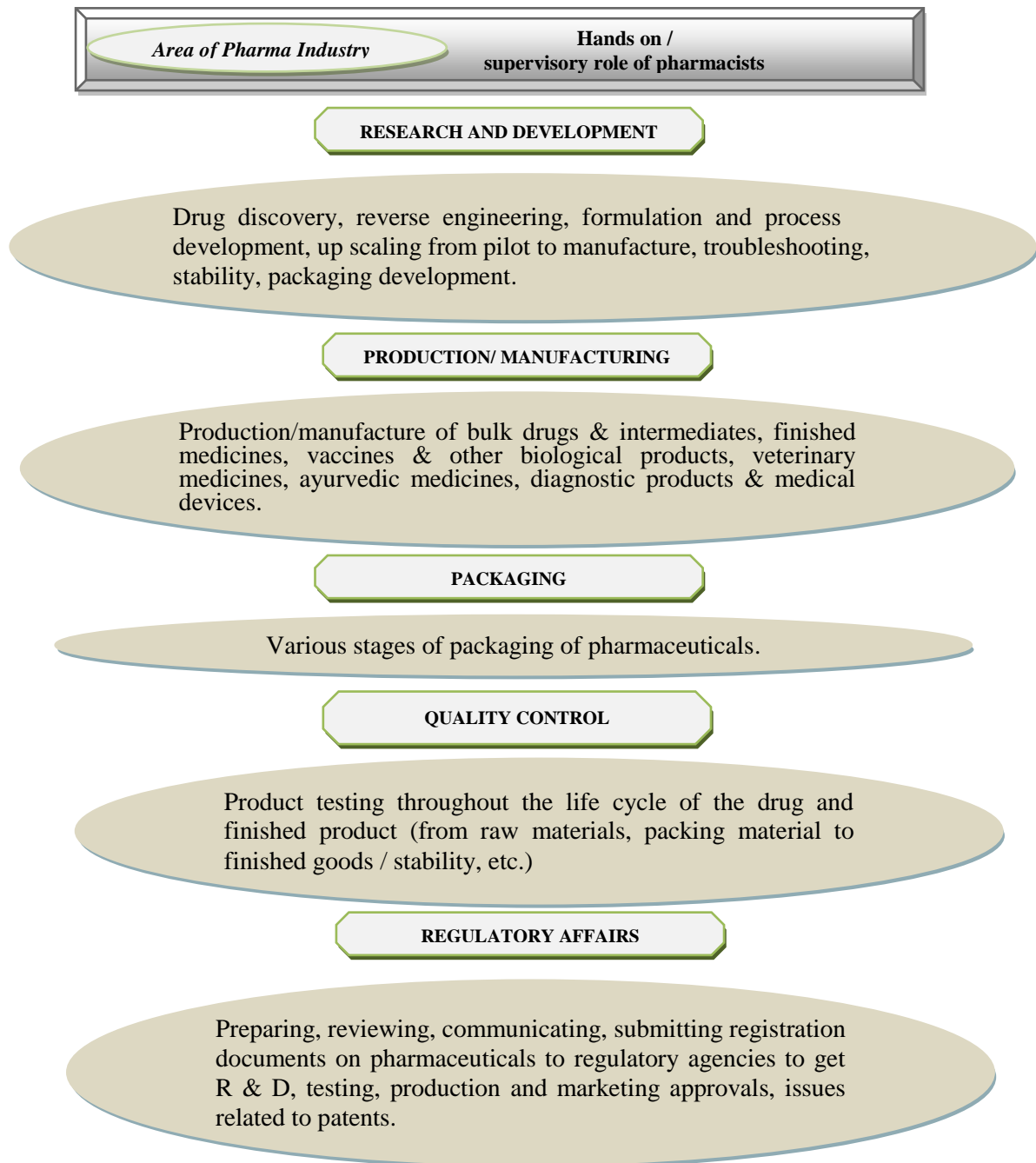


Figure-2: Potential aspects of pharma

simple headache pills to sophisticated antibiotics and complex cardiac compounds; almost every type of medicine is now made in the Indian pharmaceutical industry [19-21]. The Indian pharmaceutical industry is the world's second-largest by volume and is likely to lead the manufacturing sector of India. This industry has gained significant attraction in the last few years. It is currently on a high growth trajectory and rapidly integrating with the global industry. This integration is opening up tremendous new opportunities for Indian pharma across all segments including generics, research and development of new chemical entities (NCE) and contract research and manufacturing services (CRAMS). Indian companies are now well positioned to explore these opportunities as they adopt effective and efficient business models that are spread across one or more of each of these segments[22]. The pharmaceutical industry is a knowledge driven industry and is heavily dependent on research and development for new products and growth. However, basic research (discovering new molecules) is a time consuming and expensive process and is thus, dominated by large global multinationals. In India, the pharmaceutical industry is regulated by the Drugs and Cosmetics Act 1940 (DCA), and the Drugs and Cosmetics Rules (DCR) made there under [23]. "The Indian pharmaceutical industry is a success story providing employment for millions and ensuring that essential drugs at affordable prices are available to the vast population of this sub-continent"-**Richard Gerster**

Where is the pharmaceutical industry today?

In terms of medical progress: undeniably, research-based pharmaceutical companies have made enormous progress in the treatment of many illnesses, including infectious diseases, childhood diseases, and some types of cancer, cardiovascular disease, diabetes and hepatitis. Looking back over the past century, it is clear that

medical science has made breathtaking advances. This is shown, for instance, by the fact that life expectancy has risen enormously to around 80 years, compared with 55 in the late nineteenth/early twentieth century. Even so, it is still not possible to treat the causes of most diseases[3].

In terms of cost of research and development; however, remaining at the cutting edge of technology in the face of such rapid advancement is becoming increasingly expensive. Despite the enormous progress that has been made, developing a new drug is still a bit like looking for a needle in a haystack only one in 10,000 substances screened eventually becomes a fully fledged product that can be used to treat patients [24].

Although the pharmaceutical industry faced these situations which have to be overcome [17].

1. The impacts of emerging markets on the global pharmaceutical industry appear to be significantly underestimated at the present time.
2. If new science does not bring innovative therapies to market quickly the risk of downward valuation of the industry and societal pressure for change are likely to continue.
3. The industry faces a period of transition that requires a step change to more adaptive, flexible and open-minded leadership.

Scenarios are alternative environments in which today's decisions may be played out. They are not predictions, nor are they strategies. Instead they are descriptions of different possible futures designed to highlight the risks and opportunities inherent in each one. These can help to overcome anxiety about the lack of hard data regarding the future [25]. The point is not to gather evidence for some induction about a most probable future. The point is rather to explore and understand more deeply a number of different possibilities in order to make better reasoned choices among them[26]. In a community

pharmacy setting, pharmacists are able to provide a variety of pharmaceutical care services. This includes reviewing prescription for appropriateness for each individual patients according to the patient's age, other medical conditions, concurrent medication and other relevant factors [27]. Pharmacists are also able to track refill patterns and counsel patients, when necessary, on the importance of compliance with their medication regimen. Additionally, pharmacists are in the position to monitor the medications effectiveness by performing blood pressure readings, cholesterol checks, blood glucose checks etc. and to detect the potential side effects by discussing with the patients any concerns that he/she might have [28,29]. Pharmacists are in a unique position to affect medication related morbidity and mortality in the ambulatory setting. They have substantial contact with patients as most are seen monthly for prescription refills [30]. Also, pharmacist provide the final review of the prescription before a patient receives a new medication often have greatest knowledge of all the prescription medications a patient is taking and can screen for drug interacting and potential problems [31]. Although, pharmacists are in an optimal position to provide pharmaceutical care, but currently feasible opportunities are limited. Pharmacies are reimbursed only for dispensing prescriptions and not for providing medication management services[15]. This focus on filling prescriptions often does not allow time to fully review a patient's medication history and refill patterns and to counsel the patient on the importance of compliance and potential side effect[17]. Additionally, if a pharmacist reviews a prescription and considers it potentially inappropriate and the consultation with the prescriber results in the discontinuation of that prescription,

the pharmacist receives no compensation for the services provided and has also lost the reimbursement for the dispensing of that medication. Pharmaceutical care has been found to decrease overall hospitalization by 2.8% [32]. Figure. 2 explain the potential aspects of pharma profession [2, 33].

Expectations from pharma profession

Indian pharmaceutical sector is mounting up the value chain. From being a pure reverse engineering industry focused on the domestic market, the industry is moving towards basic research driven, export oriented global presence, providing wide range of value added quality products and services, innovation, product life cycle management and enlarging their market reach [34]. This sector is continually proving its existence in the global market and contributes a very vital role in the world's economy some of the contribution [20] shown in Figure.3. The Indian companies are putting their act together to tap the generic drugs markets in the regulated high margin markets of the developed countries. The pharmaceutical companies in India are growing at the rate of \$ 4.5 billion, registering further growth of 8-9 % annually [35]. In which more than 20,000 registered units are fragmented across the country and 250 leading Indian pharmaceutical companies control 70% of the market share with stark price competition and government price regulations. Over the past few decades, the Indian pharmaceutical industry has attained widely ranging capabilities in the complex field of drug manufacture and technology, and almost every type of drug is now made indigenously [36, 37].

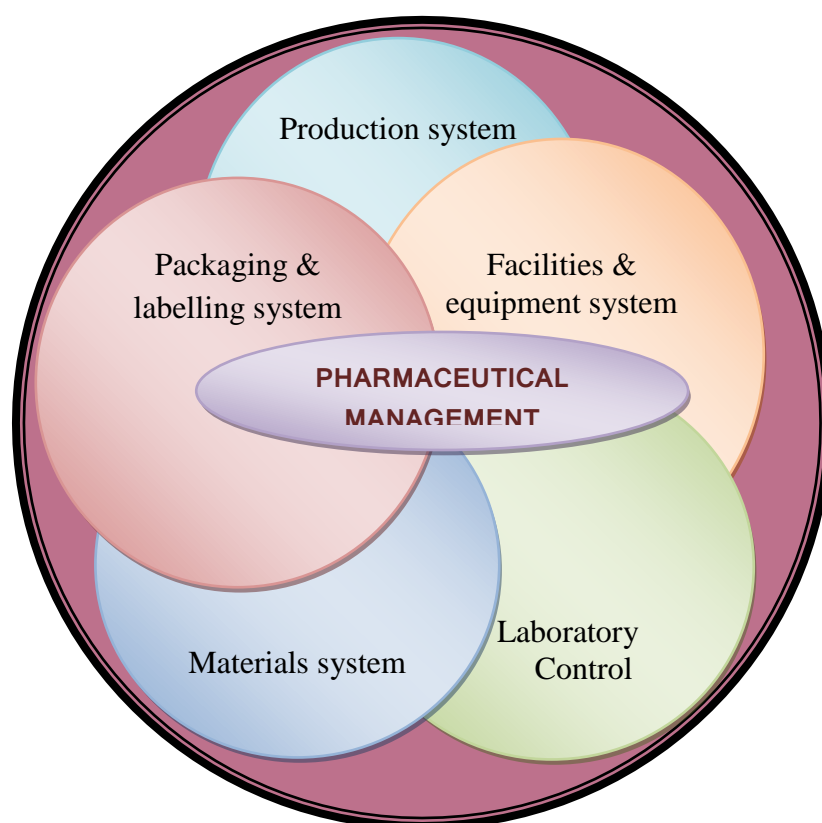


Figure-3: Opportunities of pharmacy

Potential of the Indian pharma companies [38]:

- **Competent workforce:** India has a pool of personnel with high managerial and technical competence as also skilled workforce.
- **Cost-effective chemical synthesis:** Its track record of development, particularly in the area of improved cost-beneficial chemical synthesis for various drug molecules and provides a wide variety of bulk drugs and exports sophisticated bulk drugs.
- **Legal and financial framework:** India has a 53 year old democracy and hence has a solid legal framework and strong financial markets.
- **Information and technology:** It has a good network of world-class educational institutions and established strengths in information technology.
- **Globalisation:** The country is committed to a free market economy and globalization by accepting the current advanced trends and development.
- **Consolidation:** For the first time in many years, the international pharmaceutical industry is finding great opportunities in India. The process of consolidation, which has become a generalized phenomenon in the world pharmaceutical industry, has started taking place in India.

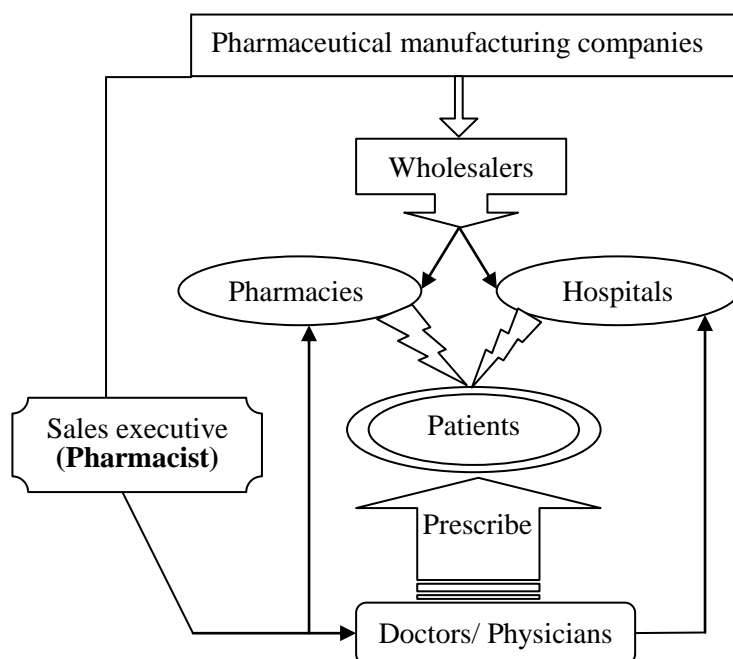


Figure-4: Streamline flow pharma services

While appropriate drug therapy is safer and more cost-effective than other treatment alternatives, there is no doubt that the personal and economic consequences of inappropriate drug therapy are enormous [39]. It is important for society to be assured that spending on pharmaceuticals represents good value for money. In view of their extensive academic background and their traditional role in preparing and providing medicines and informing patients about their use, pharmacists are well positioned to assume responsibility for the management of drug therapy [17]. Table 1 shows activity performance by the pharmacists.

The accountability of health professionals for their actions is another major issue in health care provision. In the traditional relationship between the doctor as prescriber and the pharmacist as dispenser, the prescriber was accountable for the results of pharmacotherapy [40]. That situation is changing in rapidly evolving health systems. The practice of pharmaceutical care assumes the pharmacist to be responsible for patients

under their care, and society will not only accept that assumption but hold the profession to it [41,42]. Like other countries, in India too, pharmacy was part of medicine in our Ayurvedic and Siddha system of medical practice. The physician himself was philosopher, physician and pharmacist all combined in one. The revolution in the development of science and technology in and advancements occurs since from many decades' shows a drastic change in the pharmacy profession [43]. Medicines of good quality at economical rates were made available through large scale production. The pharmacists were no longer required to prepare and supply medicines on the basis of a prescription to an individual patient or at the latter's request [44]. The pharmaceutical industry has made giant strides in manufacturing medicines of the highest quality, and of world class standards. Streamline flow of pharmacy profession which shows the events to occur for the efficient practice of pharmacy profession (Figure. 4).

Type of activities	Responsibilities of pharmacists
A. Ensuring appropriate therapy and outcomes	<ul style="list-style-type: none"> • Ensuring appropriate pharmacotherapy • Ensuring patient's understanding/adherence to his or her treatment plan
B. Dispensing medications and devices	<ul style="list-style-type: none"> • Monitoring and reporting outcomes • Processing the prescription or medicine order • Preparing the pharmaceutical product • Delivering the medication or device
C. Health promotion and disease prevention	<ul style="list-style-type: none"> • Delivering clinical preventive services • Surveillance and reporting of public health issues • Promoting safe medication use in society
D. Health systems management	<ul style="list-style-type: none"> • Managing the practice • Managing medications throughout the health system • Managing the use of medications within the health system • Participating in research activities • Engaging in interdisciplinary collaboration

Table-1: The pharmacy practice activity classification¹⁸

The impact of a gender shift on a profession: women in pharmacy

Over the last two decades, a gender shift has occurred within the practice of pharmacy. A profession that was once dominated by men has become a profession that has increasingly attracted women into its fold [45]. The changing demographics of the profession have significant implications for the potential impact on the workforce shortage. It has been suggested that women will be less likely to work full-time, and that this may negatively impact the number of professionals willing to own and operate their own stores, serve in management roles, and be involved in organizations that lead change within the profession [46]. The face of pharmacy is changing as more women make up the ranks of the pharmacy profession. Women have been graduating from colleges and schools of pharmacy at a higher rate than men for over 20 years and men are retiring at a faster rate than women. These two trends combined have resulted in a practicing profession comprised of a greater percentage of women. Workforce shortages have been reported for nine years and are forecasted

to continue for the next five to ten years. The impact of the gender shift offers threats and opportunities for a healthcare profession at the forefront of patient access. Threats resulting from this gender shift have been proposed resulting in decreased pharmacy ownership, diminished political advocacy, and decreased academic leadership [47]. However, with this gender shift the potential for transformational changes in the profession are in full view. The evolution of the practice to one that is more based in the provision of cognitive services through the delivery of direct patient care may offer advantages to new practitioners [48]. Some data indicate that women have a greater interest in the direct patient care aspects of their practice over that of their male counterparts. In addition, as more women enter the practice and advance into leadership roles the traditional views of girls and young women will change. Finally, policy changes are more likely to occur to facilitate and support women in the profession. Rethinking traditional models and infusing change through innovative policies can propel the impact of this

gender shift down a positive path resulting in increased job satisfaction and advancement of the profession [28]. Increased number of women in the profession has raised concerns regarding the number of graduates interested in buying independent pharmacies in the future. Professional pharmacy organizations are also challenged to involve more women than has traditionally been the case [49]. Female pharmacists may be less likely to be involved in professional/volunteer organizations because of time commitments divided between work and family responsibilities. Moreover, female pharmacists have seen few female role models in leadership positions at a state and national level in pharmacy organizations. Women have also been underrepresented in receiving national awards from pharmacy organizations [15]. If female pharmacists do not feel valued or included among the leaders of these associations, the gender shift may have a negative impact on the influence that these organizations may have in the future. People should not assume that pharmacist's job is only standing behind the counter at the local drugstore/chemist-druggist shop to hand over bags of medication day in and day out. In fact, the pharmacist behind the counter of your local drugstore actually has a Doctor of Pharmacy (Pharm D) degree or equivalent pharmacy degree which meets the requirement for Pharmacist's registration.

Conclusion:

According to recent studies conducted, the customer's (patient) aspirants are fast changing, customer are going more aware of their health needs, demands quick response; less waiting times and above all demands nearness of health care unit to them. Customer now demands better quality care and attention towards health prospects at an easy approach. This shows

that the trend is on a steep rise towards the actual existence of pharma care. The gender shift that has occurred with the profession of pharmacy has sparked debate regarding the potential impact that this might have on the workforce shortage, pharmacist salaries, the impact of professional organizations, and the future of independent pharmacy ownership. Leaders in colleges of pharmacy, national and state pharmacy organizations, corporate pharmacies, and boards of pharmacy need to consider policies that might positively affect the influx of female pharmacists [50]. Rethinking traditional models and infusing change through innovative policies can allow this gender shift to have positive implications on pharmacist satisfaction, advancement of the profession, and improvements in patient care. As we are the healthcare professional, we have the capability to transform the healthcare system, so that information is captured using intelligent devices, shared across the complete spectrum of healthcare practitioners through the integration of secure network and available on demands to patients, families, clinicians, researcher's, insurers and other stake holders [12]. Both individually and collectively pharmacists have the unique opportunity to harness the changing environment and create more value focused healthcare. This approach not only help to derive efficiency, reduce the risk of medical errors, save money and lives, but it would also ensures the country maintains a public healthcare system which is the envy of many and a significant step forward evolving a healthy planet [51]. Healthcare system shows the potential growth and development in 360 degree prospective of healthcare sector, there will be an increase in health care jobs, which will arise demands of trained and skilled manpower for the entire segment.

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