



Original Article

A Systematic Review of the Current Status and Challenges of Pharmacy Education in Pakistan

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Abstract

With 225 million nations, Pakistan is the world's 5th most populous country and a major source of human assets. However, the status of pharmacy education in Pakistan is relatively less known to the world. By conducting a systemic review of international literature, the authors gave a brief introduction to the history of pharmacy education. They revealed the current status and challenges of pharmacy education, the pharmacy profession, and pharmacists in Pakistan. At the moment, pharmacy education in Pakistan is in a transitional stage. The Pakistani pharmacists and the establishment of pharmacy practice as a profession in Pakistan are facing numerous problems. These points of view will highlight these challenges to establish a good foundation for practicing pharmacists and develop strategies for pharmacy education that the HEC and the Pakistan Pharmacy Council (PPC) can interfere with to modify the Pakistani healthcare system. Pharm-D (Doctor of Pharmacy program), Pharmacy professionals, and pharmacists in Pakistan need additional terms of clinical practice by providing residencies and electives in health care settings. Therefore, the need for a pharmacy profession is highlighted in Pakistan, keeping in mind the continuing importance of the industrial perspective. We put forward some changes in pharmacy education and maybe the right approaches to improve the current status of pharmacy education in Pakistan.

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Introduction:

Pharmacy is a discipline of science that deals with the preparation, dosage, dispensing, and effects, i.e. safety of medicines. Pharmacy is a combination of health sciences and chemistry. Medicine, Biology, and Chemistry form a Love Triangle. Yes, it is just as overlapping and interconnected as Biomedical Sciences. A Pharmacist who possesses sufficient knowledge of Pharmacy should potentially know more about medicinal drugs than a Medical Doctor – drug composition, impacts on the biological system, physical and chemical nature, therapeutic doses, side effects, and interactions with other drugs[1]. Pharmacy dates back thousands of years. This skill was being conducted when the first individual extracted juice from a succulent leaf to put on a lesion. According to Greek myth, Asclepius, the god of medicine, assigned the task of combining his cures to Hygieia. She was maybe a pharmacist or maybe his apothecary. Egyptian physician-priests were categorized into two groups: those who addressed the afflicted and those who stayed in the temple and manufactured medicines for the suffering. The profession of curing recognized a distinction between the tasks of the physician and that of the apothecary, who provided the raw materials to the physician from which to synthesize remedies in ancient Greece and Rome, as well as during the Middle Ages in Europe. During the 8th century A.D., nevertheless, the Arabian impact on the Western-led practice of pharmacists and physicians had different responsibilities. In 1683, the municipal council of Bruges passed an ordinance prohibiting physicians from formulating drugs for their patients, further reinforcing the drive toward specialization. When he assigned an apothecary to the Pennsylvania Hospital in America, Benjamin Franklin took a crucial step in keeping the two professions segregated [2]. Pharmacy is also the oldest profession in the Subcontinent (India, Pakistan). Traditional and herbal medicines have been in practice since the time of the Mughal Emperors. Conversely, talking particularly in this perspective about developing a proper pharmacy profession, in 1870, the first initiative was taken to train students and gain skills in pharmacy practice in the Madras Medical College [3]. In Pakistan, there were 10 Pharmacy Institutes before the year 2000. Currently, in Pakistan, there are more than 101 pharmacy schools, and more than 10000 pharmacy students are graduating per year. [4]. However, the status of pharmacy education in Pakistan is still relatively less known to the world. This review aims to investigate the up-to-date status and challenges of pharmacy education, the scope of the pharmacy profession, and pharmacists in Pakistan.

Methodology:

A systemic review of international literature was conducted, and the Specified Methodologies Procedures for Systematic Reviews and Meta-Analysis (PRISMA) standards were applied in this systematic review [12]. It was decided that research articles published in the English language without any other restrictions on procedure or periods qualified for inclusion. From 28 Dec, 2021, until 6 Feb 2022, assessments were performed. Investigations were needed to demonstrate how pharmacy education was provided in Pakistan and how it improved knowledge or abilities aimed at assisting pharmacists to work in a general practice environment. Publications featuring history, the current status, the pharmacy education limitations, clinical Pharmacy, PPC intervention, undergraduates or pharmacists who only practice outside of primary care (such as community, hospital, and pharmaceutical industry) were all included.

Research strategy

Search terms

story of pharmacy OR pharmacy education OR course OR program OR development OR improvement OR exam OR limitation OR general practice OR GP OR primary care OR primary health care OR clinical care OR hospital care OR industrial sector OR family health OR practice-based OR non-dispensing OR medical practice OR clinical practice

Full terms Search

story of Pharmacy OR history of Pharmacy in Pakistan OR hpp OR "history of pharmacy in the subcontinent" OR "current status" OR "pharmacy education" OR "challenges to pharmacy profession" OR "clinical pharmacy" OR "hospital pharmacy" OR "clinical practice" OR "medical practitioner" OR "clinical pharmacist" OR "hospital pharmacist" OR up-to-date-status* OR crucial* OR course* OR program* OR clinical training OR up-graduation OR community pharmacy* OR clinical skill* OR medical store*

Initially, a complete literature review was conducted utilizing databases like PubMed, Google Scholar, Pharmacy Council, Ministry of Health, Research Gate, PMC, and Wikipedia up to 6 Feb 2022. A consensual discussion between the authors devised the following search criteria. They were refined according to each database's key terms: "pharmacy education," "Pharm-D program," "clinical pharmacy," "pharmacists," "pharmacy profession," "Pakistan," and "Subcontinent." The search turned up 3273 publications. Exclusions were defined before the search, driven by an initial scoping of the literature. Exclusions included duplicate articles, articles that were not in English, articles that were not focused on the history of Pharmacy in Pakistan, the history of Pharmacy in the Subcontinent, pharmacy professions, the Pharm-D program, pharmacy limitations, exam limitations, the role of the pharmacist in Pharmacy, hospitals, and outside of the health care setting.

Study Selection

Title and abstract screening were done on articles, and those determined inappropriate were omitted. Despite being the weakest level of proof, articles posted in peer-reviewed journals were included since they offer context from the viewpoint of a technical expert who is engaged in the field or setting. A conceptual strategy was utilized to analyze the data, as indicated by Whittemore and Knafl (2005), before the assessment was conducted. Braun and Clarke (2006) used a qualitative approach to focus on the evidence and address the review's objective. Being conversant with the data was the first step, and then the themes were coded, reviewed, identified, and generally categorized.

Results

The databases analyzed comprised a total of 3273 articles: PUBMED (n=1870), PMC (n=1302), Google Scholar (n=30), Research Gate (n=35), Pharmacy Council (n=10), Ministry of Health (n=8), and Wikipedia (n=18). Following the exclusion of replicas and screening and eligibility evaluation of the articles, 7 were found and included in this systematic review. (Khan, T., 2021; Muhammad Imran Sajid, P. D. (2018, March 9); Kahn TM. Challenges 2011; Malhi SM, Raza H, et al. 2017; Azhar S, Hassali MA, et al., 2009; Thomas D (November 2018); Hussain K et al., 2010). The search and review processes are highlighted in the PRISMA 2009 (Moher et al., 2009) flow diagram (Figure 1). Table 1 highlights the features of the selected research. All publications (n = 7) were conducted between 2009 and 2021, with the majority utilizing qualitative approaches (n = 5). These investigations were carried out in three states, including the KSA Saudi Arabia (Khan, T., 2021; Kahn TM. Challenges 2011;) Pakistan (Muhammad Imran Sajid, P. D. (2018, 9 Mar); Malhi SM, Raza H, et al. 2017; Azhar S, Hassali MA, et al., 2009; Hussain K et al., 2010) and USA (Thomas D (November 2018)). All the studies are listed in Table 1. The majority of the studies utilize the history of Pharmacy in Pakistan, a comparison of Pakistan's pharmacy scenario to the developed countries, and specifically about, the work of pharmacists in the health care system.

Figure. 1 PRISMA flow diagram for selected articles and strategy (Moher et al., 2009).

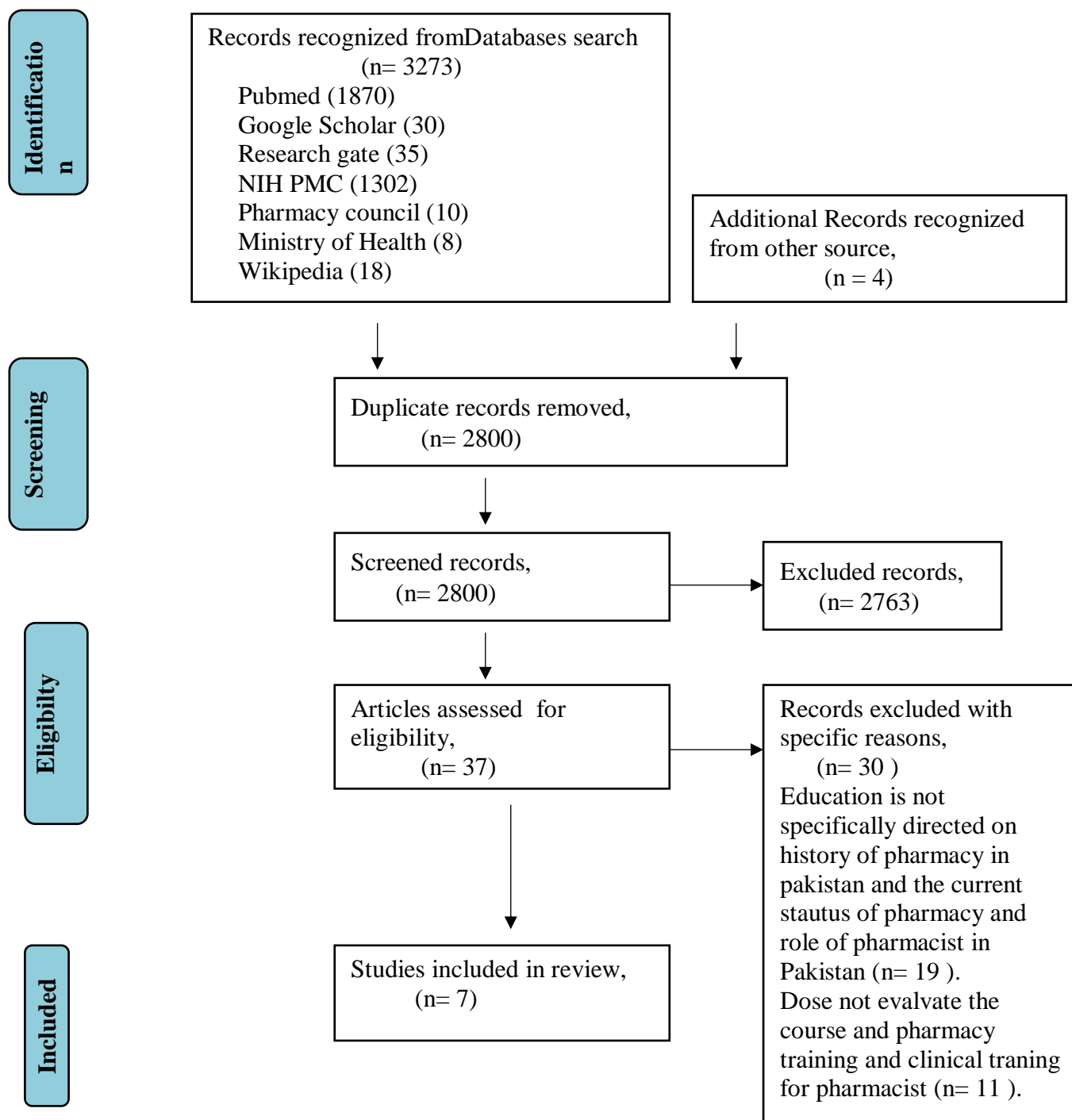


Table 1. Summaries of the studies

Studies	Country	Study objectives	Methods	Participants	Conclusion relating to the history of Pharmacy in Pakistan and current status
Khan, T., 2021	KSA Saudi Arabia	Glimpse of Pharmacy Education in Pakistan and Current Challenges to Pharmacy Education	General and Qualitative study	pharmacists with no previous experience in primary care pharmacy practice	develop such programs in order to provide specialized professionals for both the development of clinical Pharmacy and the propagation of the traditional role of pharmacists in the Pakistani pharmaceutical sector.
Khan TM. Challenges 2011	KSA Saudi Arabia	To assess the Challenges to the pharmacy profession and pharmacy practice in Pakistan	Qualitative study and comparative study	Pharmacists experienced within a general practice setting	the role of the pharmacist as a member of the healthcare team and in direct patient care does not exist in Pakistan, which will be a major challenge for the graduating pharmacist
(Muhammad Imran Sajid, P. D. (2018, March 9)	Pakistan	To explore Pharmacy Profession in Pakistan's Current Status, Future Challenges, and Opportunities	General study and survey of the Pakistan pharmacy profession	pharmacists with no previous experience in primary care pharmacy practice and Pharmacists experienced within a general practice setting	a pharmacist really wishes to become financially prosperous, the good news is pharmacy profession has the potential to make one satiate this desire.

Malhi SM, Raza H, et al. 2017	Pakistan	To evaluate the Current Status and Future Suggestions for Improving the Pharm. D Curriculum towards Clinical Pharmacy Practice in Pakistan=	Peer review reports The educational and Longitudinal qualitative study	pharmacists with no previous experience in primary care pharmacy practice	Pharm. D curriculum needs additions in terms of clinical practice by providing residencies and electives in health care settings. Accordingly, the need for a clinically oriented curriculum is highlighted in Pakistan.
Azhar S, Hassali MA, et al, 2009	Pakistan	The role of pharmacists in developing countries: the current scenario in Pakistan	Longitudinal qualitative study	Include both experienced and experienced pharmacists in primary care pharmacy practice	pharmacists in developing countries are not fully executing their potential role. They are still struggling for the recognition of their role that can help improve the health care system.
Hussain K, et al, 2010).	Pakistan	Unstandardized and Defective Evaluation Practices in the Examination System in Pharmacy Institutes of Pakistan	Multi-site, cross-sectional observational study	Include both experienced and experienced pharmacists in primary care pharmacy practice.	Standardized record-keeping for each part of the examination is crucial for critical evaluation, standardization, and to improve teaching and learning.

Thomas D (November 2018).	<u>USA</u>	Clinical Pharmacy Education, Practice and Research	Professional Framework	General primary care pharmacy practice includes all experienced and non- experienced pharmacists.	This book stresses educational approaches that empower pharmacists with patient care and research competencies and serves as a basis to standardize and coordinate learning to practice, explaining basics and using self- learning strategies through online resources or other advanced texts.
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History of Pharmacy

Without realizing the contribution of Muslim scientists, the discussion of modern medicine is incomplete. Caliph Walid Ibn-e-Abdul-Malik in Damascus formed the first hospital. Similarly, the credit goes to the Muslim scientists for the world's oldest apothecary shops and pharmacy schools[5]. The Pharmacy attained the shape of a profession in the civilized world of Baghdad later in the 9th century. This preface form of pharmacy spread to Egypt, China, and Europe. New methods were designed for chemical analysis and the manufacturing of products with time[3]. In light of this shift, Benjamin Franklin legally barred doctors from producing drugs by recruiting the very first pharmacist in America's Pennsylvania Hospital in 1683 [6]. Finally, the first organized professional school of Pharmacy was established in the U.S. in Philadelphia in 1821 AD. The Bachelor of Pharmacy (B-Pharm), a two-year professional, was later upgraded to four years [7]. However, in 1904, A.D. Manchester University started its first degree in Pharmacy in Europe [8]. Eventually, within the semi of 19th century, the United States took measures to reform a pharmacist's position within healthcare. So in the 1960s, the Pharm-D program was present as a post-degree bachelor's in the United States. Most with a B-Pharm degree would be able to practice clinically, mainly if they already hold a Pharm-D degree with 1 to 3 years of mandatory training. The American Association of Colleges of Pharmacy and the Accreditation Council for Pharmacy Education specified in 1990 that a doctor with a pharmacy degree would be the official first professional degree necessary for practice within the United States[9].

History of Pharmacy in Sub-Continent (India, Pakistan)

Before the partition of the Subcontinent (India, Pakistan), Pharmacy was known as the oldest profession in the Subcontinent. Traditional and herbal medicines were in practice from the time of the Mughal Emperors. Many Apothecary shops were present where apothecaries (Hakims) practiced and prescribed herbal drugs and foods to treat/cure minor and major diseases. Conversely, talking particularly in this perspective about developing a proper pharmacy profession, in 1870, the first initiative was taken to train students and gain skills in pharmacy practice in the Madras Medical College [3]. In Bengal

(Current Bangladesh), an official training of compounders/dispensers was initiated in 1881 and the Banaras Hindu University started the first pharmacy professional Bachelor program in 1937. To learn more about the history of Pharmacy in Pakistan, the University of Punjab became the primary institution to start a 3-year bachelor's program in 1948. The first pharmacy degree program was a three-year bachelor's program in Pakistan, which was extended to four years in 1978-1979[10]. This program's main goal was to meet the needs of the pharmaceutical units that existed at the time. More than ten public universities did not offer the Bachelor of Pharmacy (B-Pharm) program up to 2000. Also, the annual numbers of graduates were not enough to carry out the needs of the pharmaceutical industry. But later, by the year 2003, the annual number of pharmacists doubled due to the establishment of private universities.

Furthermore, to establish faculties and modify the curriculum according to international standards during this time, massive funds were granted to the Higher education commission of Pakistan. The four-year B-Pharm Program was upgraded to a year's Doctor of Pharmacy (Pharm-D) program to fulfill the international standards. The goals of this program were to integrate the role of the pharmacist in clinical setup, which is bare to be seen in any public and private hospital except a few like Shoukat Khanum Memorial Hospital and Agha Khan University Hospital. In contrast, the level of implementation of rules and regulations and job prospects for a future pharmacist was not taken into consideration, so it would not be wrong to say that this upgrade of the Pharm-D program was to fulfill global needs[11].

The up-to-date status and challenges to the pharmacy profession in Pakistan

In Pakistan, there were 10 Pharmacy Institutes before the year 2000. The number of pharmacists is only a few, not merely in Pakistan but globally, after graduation, they were in demand. Those pharmacists who migrated to developed countries, like the USA, Canada, and the U.K., and to the Middle East settled themselves easily. Those who preferred to reside in Pakistan started their pharmacies, distribution setups, or industries. Before, the year 2000 in Pakistan, private pharmacy institutes were rare. HEC approved the syllabus, and the 4 years B-Pharm degree was upgraded to a 5-year Pharm-D degree in 2003. The prefix Dr. increased the demand for the Pharm-d degree as, seeing the opportunity, the private sector jumped into the market, and a rapid increase was observed in pharmacy institutes across all of Pakistan. This was a pivotal event in Pakistan's pharmacy profession's history. Up to 2010, in Pakistan, there was more than 53 Pharmacy institutes and more than 5000 pharmacists were producing annually [4]. Currently, in Pakistan, there are more than 101 pharmacy schools, and more than 10000 pharmacy students are graduating per year.

Pakistani Pharm-D program in assessment with provincial and international programs

The ACCP 2000 took the first step toward the establishment of a Pharm-D program. The B-Pharm program was upgraded to a Pharm-D 5-year program by many Asian and European countries. Currently, the Pharm-D program has been started by Pakistan, India, the Philippines, and Thailand and also by the Kingdom of Saudi Arabia, Lebanon, the United Arab Emirates, and Qatar. Pakistani Pharm-D program, in comparison with some Asian and Middle East Pharm-D programs. Starting with the Subcontinent, the B-Pharm degree is continued with the Pharm-D degree in India at the moment[13]. In addition, for the B-Pharm graduates to make their qualifications equivalent to the Pharm-D graduates, a course has been initiated.

Moreover, an additional degree, the Masters in Clinical Pharmacy, is also in practice[14]. In India, the first step was taken in 2007 to start the Pharm-D program, and the first batch of Indian Pharm-D graduated in 2014 [13]. A senior professor in the College of Pharmacy in Karnataka acknowledged that in India at the moment, there is a limited scope of the Pharm-D. Still, it will be continued until it is in India to fulfill the needs of industry. As in Pakistan, the Indian Pharm-D program is likewise dealing with criticism in phrases of program design and content of the curriculum.

Moreover, Shazia et al. (2007) additionally disclosed that the Indian Pharm-D is designed through enormously non-technical employees who've no concept of clinical pharmacy or pharmacy practice[15]. The main focus is on pharmaceutical technology in India, while the focus on clinical Pharmacy is inadequate [16]. The involvement of the pharmacist in direct patient care and clinical components in the Pharm-D syllabus is also limited as in Pakistan is at a preface level in India [17].

In terms of clinical content, the curriculum in the Pakistani Pharm-D program possesses various deficiencies that need to be covered. For, the educational and practical exposure for students to feel, see, and apprehend their future role in the health sector is limited. In addition, the subjects assigned for therapeutics, community pharmacy, and pharmaceutical care are also inadequate to equip future graduates with the knowledge to allow them to play an effective role in direct patient care. However, the Pakistani Pharm-D program is the only program that fulfills the criteria of “The Bologna Declaration” with all these limitations. The vision of “The Bologna Declaration” was to synchronize the same curriculum throughout the European pharmacy colleges to ensure the same quality of graduating pharmacists in every region in 1999 in Barcelona[18].

The main basic summons to the pharmacy profession in Pakistan

Pharm-D programme inspiration

This program was developed for two significant reasons. Initially, to complete all the international needs so that Pakistani pharmacists would not face any problems in continuing their higher education and applying for jobs throughout the world. The B-Pharm program in Canada has been upgraded to a Pharm-D program. This upgrade was done not only to bring pharmacy education standards in line with those in the United States but also to allow future graduates to practice in the United States[17]. The second reason was the shortage of pharmacist jobs in the pharmaceutical industry. According to the HEC, the curriculum report developed by the National Curriculum Revision Committee reported that job saturation had been raised to about 75% in the pharmaceutical industry [19]. In addition, keeping the international need in view, it was crucial to categorize the Pakistani pharmacists to play their role in well-organized clinical setups like hospitals and pharmacies, i.e. retail, and community pharmacies.

Pharm-D program syllabus limitations

No consultation with institutions around the world offered the Pharm-D program before the final syllabus was approved, while the motivation and the intention to develop the program were excellent. An improved program free from serious criticism would have emerged if there had been consultation at the start. By sharing knowledge, skills, and updates in clinical Pharmacy with other universities to counter some deficiencies, many Pakistani universities have adopted the alternative of signing a Memorandum of Understanding (MOU). Many Pakistani universities have signed an MOU with University Sains Malaysia (USM). USM is the number one research university in Malaysia based on its recent APEX status and also a well-established clinical pharmacy syllabus. However, Malaysian universities have never taken the step to develop a Pharm-D program until now. However, it is a splendid decision to seek consultancy from USM for a program that is not in practice in Malaysia.

Examination system limitations

The examination system is another crucial issue in Pakistan. The old annual examination system is continued to be implemented by many universities in Pakistan. It's articulated that the Pharm-D program is running under a twofold examination system that is an annual or a semester system in Pakistan. Different institutes in Pakistan process the same examination system but their grading is not uniform. In Pakistan, the candidates are short-listed based on their grades in pharmacy school; therefore, they face difficulty in getting a job, both in the government and the private sectors. As a result, there is a pressing need to standardize the examination system in all Pakistani pharmacy schools[20].

Table2. *The limitations of pharmacy education in Pakistan and the unavailability of pharmacists in many health sector areas.*

Limitations	Comments
Syllabus of Clinical Pharmacy.	Therapeutics, clinical pharmacology, molecular pharmacology, clinical microbiology, and pharmacogenetics should be treated as separate disciplines rather than topics in the syllabus. Students will be able to compete on a global scale because they will have been equipped with the necessary applied knowledge by the standards [21].
Lack of clinical teaching.	The identical old-fashioned style of teaching clinical Pharmacy in Pakistan has been followed, which does not cope with the realistic abilities students will want in practice. Pharm-D students can't analyze essential clinical capabilities via this conventional technique alone. As has been emphasized in different studies, current strategies of training that are suitable for the subject have to be used [22].
Clinical practice.	The HEC and the Pakistan Pharmacy Council (PPC) can intervene to reconfigure the Pakistani healthcare system by laying a solid base for practicing pharmacists and developing strategies for pharmacy education. In terms of clinical practice, the pharmacy profession and pharmacists require additional residencies and electives in healthcare settings [17].
Dose adjustment in special populations.	At these facilities, pharmacists are required to adjust dosages in patients with renal failure and other allied issues. In addition, hospitals with a high patient load of hepatic failure patients, children, and the aged should have pharmacists on staff to ensure that prescribed medications are dosed properly [23].
Drug information services.	In Pakistan, there are no drug information services. Pharmacists who are proficient in providing drug information services are required [24].
Drug-drug interactions.	Clinical pharmacists are capable of assisting in the identification of possible DDIs and their prevention in patients [25].
Drug utilization.	Drug utilization research can help hospitals improve their drug-use progression. Clinical pharmacists can begin by focusing on drug utilization in hospitals and specialty medicine use [26].
Emergency department service.	In Pakistan, no clinical pharmacists are working in hospital emergencies. As a result, the clinical pharmacist has a major role in the emergency unit.
Medication error assessment.	In Pakistan, the occurrence of medication errors is at its peak. Medication errors can be reduced to a greater extent when trained clinical pharmacists are involved in assessing and addressing them.
Patient counseling services.	In Pakistan, there's no quiet counseling in each hospital. Typically, the gap created by all hospitals, pharmacists will be in charge of completing the task.

Clinical Pharmacy in Pakistan

In Pakistan, the wide variety of pharmacy schools has lately increased, the B-Pharm degree has been elevated to Pharm-D, and there is a lot of communication about “clinical pharmacy.” However, whether or not this alteration has led to a widespread development inside the drug use scenario remains a moot factor for academics and policymakers. The authors agree that earlier than embarking on clinical Pharmacy at an institutional level, a primary pharmacy system must be in place. As a result, a sturdy tradition in social pharmacy or pharmaceutical policy studies will no longer assist in setting up clinical Pharmacy into practice; however may also guide the country's proposed drug regulatory authority by offering human resources [27]. Until now, the same old-fashioned style of teaching clinical Pharmacy in Pakistan has been followed, which does not address the practical skills students will need in practice. Traditional teaching methods are not preparing students to handle real-life situations, which raises concerns about pharmacist competence and the credibility of the Pharm-D degree. The traditional method of delivering lectures using bulleted PowerPoint slides was once thought to be the best method of teaching. However, Pharm-D students cannot learn the necessary clinical skills through this traditional method alone. As has been emphasized in other studies, modern methods of instruction that are appropriate for the subject should be used [22].

Initially, the clinical pharmacy faction commenced in hospitals and health centers. To raise pharmaceutical care, clinical pharmacists frequently cooperate with physicians and other healthcare experts. Clinical pharmacists are now an essential part of the multidisciplinary patient care team. They frequently take part in patient care rounds where drug products are selected. After carrying out a non-clinical prescriber course to turn into an Independent Prescriber in the United Kingdom, clinical pharmacists can recommend many medications to patients on the NHS or privately[28]. The role of the clinical pharmacist engaged in creating a widespread drug therapy plan for explicit patient problems, making out treatment goals, and assessing all prescribed medications before provision and administering to the patient. The assessment process frequently includes a review of the adequacy of drug therapy, e.g., drug selection, dosage, route, rate, period of treatment, and its effectiveness. The pharmacist should also consider the patient's possible drug interactions, ADRS, and drug aversion when designing and implementing a drug therapy plan[29]. As summarized in Table 2.

Availability of hospital jobs

One of the most important demanding situations graduating Pharm-D pharmacists need to face is the accessibility of hospital jobs and the reputation of pharmacists in medical settings. Muhammad (2008) has praised the sports and effectiveness of the pharmacy residency programs at the Agha Khan University Hospital (AKUH), Karachi, Pakistan[30]. AKUH is absolutely a source of motivation for pharmacists inclined to exercise and beautify their abilities in medical exercise; it's miles likely the most effective organization that has taken early projects to set up health center pharmacy exercise in the 1990s. Furthermore, AKUH has a well-installed drug information center and general parental nutrients and aseptic training. The motive is that it draws pharmacy graduates to decorate their know-how inside the subject of hospital pharmacy. However, AKUH no longer exemplifies a normal medical pharmacy exercise in Pakistan due to the shortage of a certified workforce, that's one of the predominant demanding situations that restrict the improvement of the appropriate pharmacy exercise setup. Although the authorities of the Punjab Province, Pakistan, have introduced jobs for pharmacists in government hospitals, the pharmacist plays a clinical role. In many public hospitals, there's one vacancy for a pharmacist. Often, the individual in the price of the medical store keep is an MBBS medical doctor with the pharmacist appearing as a clerical function in its management. When we communicate approximately the Pharm-D, we must be speaking approximately the position of pharmacists in clinical practice. However, in Pakistan, their function in patient care and the rational use of medicine stays in doubt.

Physician compliance to accept the position of pharmacist in the hospital

Another stumbling block is the nurse's attitude toward the pharmacist's clinical function. The nurses think that pharmacists only perform managerial duties in supervising the distribution of medicine in hospitals. They have recommended that the presence of the pharmacist at the hospital around the clock may improve patient care. However, Pakistani nurses believe that, and they would prefer pharmacists to focus on the management of pharmacies rather than patient care, pharmacists

being allowed to be a part of patient care will be an intrusion in their affairs[31]. Briefly, pharmacists will have to face resistance to enhancing their functional role in patient care not only from medical doctors but also from the paramedical staff, especially nurses, for the development of an effective pharmacy practice setup in Pakistan.

In contrast, physicians in Pakistan were also feeling uncomfortable with the role of the pharmacist in direct patient care. Siara et al. (2010) stated that doctors also believe that pharmacists are only drug information experts. However, their expectation of pharmacists as providers of quality clinically- concentrated pharmacy services was very low. The doctors were also feeling uncomfortable with pharmacists providing direct patient care [32]. The pharmacist now faces a new challenge. In pharmacies, especially in government hospitals, a dispenser is frequently available to perform the job of the pharmacist in dispensing extemporaneous preparations. The vast majority of these dispensers are members of Pakistan's Army Medical Corps (AMC), who serve as pharmacists' substitutes. According to two pharmacists with prior hospital pharmacy experience (personal communication), the active ingredients used in extemporaneous preparations are frequently out of stock or have passed their expiry date. As a result, in the majority of cases, the innocent Pakistani public is given a placebo or a blank extemporaneous preparation. These dispensers frequently introduce themselves as pharmacists, although they are not licensed pharmacists. Without proper knowledge or training, they will almost certainly be unwilling to relinquish the job functions they are currently performing.

General practitioner and non-professional provision rights

A medical doctor can open a medical store where patients can obtain their prescribed medicines according to the guidelines and rules of Pakistan's Ministry of Health. The individual in the rate of filling the prescription no longer should be a pharmacist: the simplest has to have enrolled with 10 years of look equal to the British GCSE or have an intermediate qualification of 12 years of taking a look equal to the British A-level. The rights of those non-experts and physicians to run their very own clinical shops are a large assignment to the practical position of pharmacists in retail and pharmacy practice.

Duty of pharmacists in pharmacy practice

The situation in Pakistan poses a noteworthy challenge to pharmacy practice. The mainstream pharmacists rent out their category license to practice in Pakistan to the general public for a monthly fee. As a result, the person in charge of the medical store/retail/community pharmacy is a non-professional who is unfamiliar with drug interactions and medication dosages[33]. In addition, the general public is frequently unaware of the pharmacist's role in medical/patient care. I have personally witnessed people describing their symptoms to these non-professionals, who then give them medicine to treat their medical condition while purchasing some prescribed medicine. Given this scenario, the question here is whether or not the Pakistani pharmacist is willing to practice in a community/retail pharmacy.

Table 3. The responsibility of a pharmacist in different countries of the world

Countries	Responsibility of pharmacists
In Australia	Pharmacists are compensated by the government for doing full Home Medicines Reviews[34].
In Canada	Pharmacists in some regions of Canada possess constrained dispensing authority (like in Alberta and British Columbia) or are compensated via the regional governments for additional services such as drug evaluations (Medschecks in Ontario)[34].
In the U.K	Pharmacists who accomplish advanced training within the U.k. were granted prescribing authority. Regarding drug utilization assessments, they are indeed compensated by the government[34].
In the U.S	A Doctor of Pharmacy (Pharm-D) degree has become mandatory before practicing, as well as some pharmacists currently pursue either 1 or 2 years of internship training after

graduation. Additionally, under the label of "long-term care pharmacy," expert pharmacists, who previously only worked in care homes, are currently extending toward direct patient consultation[34].

In China

The responsibilities of clinical pharmacists and pharmacists are different. Pharmacists who work in drugstores provide medication consultation, drug information, and suggestions for the selection of drugs, and clinical pharmacists who work in hospital pharmacies provide comprehensive medication management for patients. However, clinical pharmacists experience problems with role ambiguity and role conflict, which will affect the fulfillment of their responsibilities [35].

Ministry of Health Pakistan and PPC duty and responsibility

The PPC and the Ministry of Health Pakistan are liable for ensuring the existence of a practicing person. i.e., the pharmacist at the Pharmacy around the clock. Furthermore, the PPC should enforce the pharmacy law: retail/community pharmacies operating under the supervision of non-professionals (i.e., non-pharmacists) should be closed, and the licenses of pharmacists renting out their licenses should be canceled if they are unable to fulfill their social responsibility and supervise the medical store themselves. In addition, the PPC should stop registering category C diploma holders in Pharmacy. These category C holders are allowed to register with the PPC and operate a medical store/retail pharmacy in their communities. With the implementation of the Pharm-D program, the PPC is responsible for taking strict initiatives at the grassroots level to ensure that future pharmacists have a favorable environment in which to play their role freely and effectively in strengthening Pakistan's healthcare system.

The PPC and the Ministry of Health Pakistan assessment to improve pharmacy education

The government of Pakistan has been taking some measures to upgrade the pharmacy education and pharmacist role in clinical patient care in Pakistan. However, these rules are still not implemented. That's why the pharmacist's outlook is still in the dark. The government of Pakistan has announced the availability of pharmacists in the hospital, on every 50 beds, then every 20 beds, but these rules are not implemented. The government of Pakistan also upgrades the rules and make sure that pharmacist will be available in every Pharmacy or medical store. Still, except in the capital Islamabad, these rules are not implemented in the whole of Pakistan. The government of Pakistan also upgraded the schedule-G list to ensure the presence of pharmacists in pharmacies and medical stores. Those medical stores or pharmacies can keep and sell these medications that have category-A licensed pharmacists available. The same as the above, these rules are also not implemented. That's why the government of Pakistan and PPC needed on an urgent basis to implement these regulations and take more action to strengthen the health care system.

Future of Pharmacy and Pharmacist

Over the next decades, pharmacists should become more integrated within the health system. Pharmacists are progressively being reimbursed for their patient care abilities moderately than just giving out medication [36]. Medication Therapy Management (MTM) is a term that refers to the clinical services that pharmacists can offer to their patients. A detailed examination of all medications prescription, over-the-counter, and herbal products presently being taken by an individual is one of these services. As an outcome, medication and patient education have been reconciled, resulting in improved patient health outcomes and lower healthcare costs. In various countries, this change has already begun; for example, pharmacists in Australia are compensated by the government for doing full Home Medicines Reviews. Pharmacists in some regions of Canada possess constrained dispensing authority (like in Alberta and British Columbia) or are compensated via the regional governments for additional services such as drug evaluations (Medschecks in Ontario). Due to " pharmacy education, pharmacists who accomplish advanced training within the U.K. were granted prescribing authority.

Regarding drug utilization assessments, they are indeed compensated by the government. Whenever a client has been unable to consult his physician, such as if they are outdoors or even if the physician is inaccessible, a pharmacist in Scotland may prescribe medication for his routine medications for most of the medicines, excluding prohibited drugs. Pharmaceutical care, commonly known as clinical Pharmacy, has had rising popularity in pharmacy practice in the U.s. In contrast, a Doctor of Pharmacy (Pharm-D) degree has become mandatory before practicing, as well as some pharmacists currently pursue either 1 or 2 years of internship training after graduation. Additionally, under the label of "long-term care pharmacy," expert pharmacists, who previously only worked in care homes, are currently extending toward direct patient consultation[34]. Pharmacies will serve as a hub for clinical adherence campaigns in addition to providing patient safety. There is ample research to suggest that pharmacy-based efforts that are integrated have a considerable influence on persistent patient adherence. According to research published by the National Institutes of Health, "pharmacy-based therapies enhanced patients' prescription adherence rates up 2.1% and practitioners' start levels up 38 %, a contrast to the control group[37]. The evolution in pharmacy practice suggests that the focus is shifting away from products and toward patients. The pharmacist's function has evolved from that of a typical pharmacy to that of a holistic part of the health care system that participated in patient safety. As a result of this dilemma, clinical Pharmacy has been a part of the syllabus, and the Doctor of Pharmacy (Pharm-D) program has been established to teach specific clinical pharmacists who might make available appropriate pharmacological solutions. Therefore, the PPC and Ministry of Health Pakistan needed to review pharmacy education in Pakistan and upgrade it based on emergency.

Conclusion

In terms of curriculum, pharmacy education in Pakistan is in a transitional stage. A lack of skilled and certified personnel is the primary mission that the education section is dealing with after improving the B-Pharm program to a Pharm-D program. This is one of the major motives for the deficiencies in the clinical contents of the Pharm-D program. Furthermore, the function of the pharmacist as a member of the healthcare crew and indirect patient care has not been fully realized yet in Pakistan, which will be a prime mission for the graduating pharmacist and a probable cause for the shortage of appreciation through the clinical and paramedical personnel for the function of the pharmacist as a healthcare provider.

Declarations

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