In many countries, clinical pharmacy services have been established firmly, leading to a reduction in the incidence of adverse drug events, medication errors, length of patient's stay in a hospital, overall therapeutic cost, morbidity, and mortality.\(^1\) The core elements of clinical pharmacy services are to promote the use of quality pharmaceutical products and to influence rational prescribing. In many developing countries like Pakistan, the integration of clinical pharmacy in the healthcare system is still in its infancy stage. In accordance with an estimate of World Health Organization, more than half of all the medicines used by patients, are either prescribed or dispensed inappropriately.\(^1\) The role of a clinical pharmacist in a hospital is to ensure rational prescribing, prevent medication errors, and improve therapeutic outcomes. In Pakistan, during the last few years a significant development in the profession of pharmacy has been observed. The expansion is not limited to the delivery of pharmacy-based community and retail services, but has also been observed in its acceptance as a distinct profession.\(^2\) Unlike developed countries, clinical pharmacists in developing regions of the world are still underutilized members of the healthcare team. The role of a clinical pharmacist is not accepted to be important and distinct in the clinical setup of Pakistani healthcare system; with majority of the hospitals functioning without a clinical pharmacist. Clinical pharmacy was introduced in the curriculum of Pharm. D, in 2004, by the Higher Education Commission of Pakistan. The course with insufficient credit hours and no clinical exposure has limited efficacy in equipping students with sufficient knowledge and experience necessary to tackle daily cases posed in the clinical setup. The syllabus has been revised twice, but the aspect of lack of clinical exposure has still not been addressed. The aim of this paper is to address the issues hindering the growth of clinical pharmacists in Pakistan in an endeavor to achieve due attention of health governing authorities and to provide recommendations for its betterment.

In developed countries, the importance of the profession of pharmacy as a healthcare provider has long been recognized, but it is still underutilized in most developing countries. A significant role in delivery of pharmaceutical care services is undertaken by pharmacists in most developed countries. Additionally, it is a common belief that pharmacists can be significantly useful in provision of primary healthcare, especially in developing regions of the world. The role of a clinical pharmacist in Pakistan is limited and has not been recognized by both the healthcare system and the general public. The foremost reason for this lack of recognition is the limited interaction of pharmacists with both the hospital setup and public. This lack also stems from the limited job opportunities available in clinical setup.\(^3\) Thus, there is a shortage of clinical pharmacists in hospitals, resulting in limited interaction with both the healthcare providers and patients. Consequently, the recognition and evolution of clinical pharmacy falters.\(^4\)

In Pakistan, the pharmacy education curriculum has a predominant focus on preparing pharmacists with expertise for the pharmaceutical manufacturing industry and limited expertise on pharmacology and therapeutics.\(^3\) Thus, the emphasis of the current curriculum is mainly on chemistry and pharmaceutics as opposed to
the required balanced focus on therapeutics and pharmacology as well. This focus of pharmacy training curriculum pertinent to industrial sector is due to an increased demand and employment opportunities from the industrial side. As a result, the national pharmacy curriculum, followed in most pharmacy colleges and universities, mainly covers subjects relevant to pharmaceutical production. As such, the graduated pharmacists are not fully equipped with expertise required to provide and manage pharmaceutical care in a clinical setting.\textsuperscript{5-11}

Pharmacists in developing countries like Pakistan, prefer to work in cities which are more affluent than urban areas. This creates discrepancies between healthcare services provided in rural and urban areas. In developing countries, clinical pharmacists face certain specific challenges. Most developing countries, characteristically, face shortage of good quality pharmaceuticals, which is one of the major problems, encountered.\textsuperscript{12} Other serious issues include irrational use of drugs and non-stringent regulatory enforcement of pharmaceuticals.\textsuperscript{5} These are the major reasons why clinical pharmacists in Pakistan prefer to leave and seek job opportunities in developed countries, which promotes further degradation of the healthcare system.\textsuperscript{4} This is similar to that reported by a study conducted in a rural region of Ghana, where five pharmacies had retailers that had no or little pharmacy knowledge and training; the majority of the population purchased and used drugs without a prescription. The pharmacy shop sales staff provided misinformation about the medicines: thus, contributing significantly to drug misuse; and selling drugs primarily on the basis of popularity, in most cases, compromising on quality.\textsuperscript{4}

Pakistan is the sixth most populous country with an approximate population of 207.8 million.\textsuperscript{6} Being one of the most populated countries, Pakistan has to continuously face enormous, social and economic challenges.\textsuperscript{7} The challenges faced by Pakistan healthcare system include lack of trained human capital, lack of sound financial investment, and increased patient burden in government hospitals. Thus, further hindering the development of clinical pharmacy profession.\textsuperscript{6} An annual growth of more than 5% is needed to reduce poverty in Pakistan and to improve the healthcare system. The innovation of national public health, resulting in the development and implementation of National Health Planning multiple year programs which have created a need for an improvement in clinical pharmacy profession.\textsuperscript{8} The handling of national planning and coordination matters comes under the responsibility of the Ministry of Health, Pakistan, which continues to dither in resource allocation for clinical programs. The Drug Regulatory Authority Pakistan (DRAP), which is a subsidiary of Ministry of Health, is responsible for facilitation and management of local units of pharmaceuticals, drug importer registration and license issuance; and in ensuring their representation and participation in various locally and internationally organized pharmacy events, also displays limited interest in promoting clinical pharmacy profession.\textsuperscript{9} Under the Constitution of Pakistan, it is the responsibility of the federal government to plan and formulate national policies pertinent to health. The provincial governments, on the other hand, are responsible for the implementation of such healthcare policies.\textsuperscript{2} Therefore, it is the responsibility of the federal government to pay due attention and focus on the empowerment of clinical pharmacy profession.

The private health sector of Pakistan provides coverage to almost 70% of the population. On the other hand, the public sector has in excess of 10,000 healthcare facilities. The primary health center units (PHUs) of Pakistan are composed of basic health units (BHUs), and rural health centers (RHCs). The BHUs, usually located in small rural areas, have the facility to provide services to 10,000 people; whereas, RUCs are capable of providing coverage to 30,000 - 450,000 people. The sub-district population is covered by the Tehsil Headquarters Hospital (THQ); whereas, the district population is covered by District Headquarters Hospital (DHQ).\textsuperscript{10} The PHUs, THQs, and DHQs can benefit immensely by utilizing the services of clinical pharmacists. In addition to medication-related problems, many multi-drug resistant microbes are becoming prevalent among hospitals in developing countries. This is a consequence of irrational prescribing of antibiotics. As a result, there is potent threat of superbug in such healthcare setups.\textsuperscript{11} For instance, a throat infection caused by Group A beta hemolytic streptococcus, is no longer treated with amoxicillin, but with azithromycin or worse still by levofloxacin.\textsuperscript{12} Therefore, it is immensely important to integrate clinical pharmacists in the healthcare team of developing countries in an effort to put an end to irrational prescribing. The generation of a superbug in underdeveloped countries will not be a contained problem; because of frequent air travel, the problem might just become a global one.

In Pakistan, a consistent lack of well demarcated long-term vision for developing resources is the major reason for the absence of federal and provincially governed health system functioning units. The fragmented health information system does not provide coverage to the public sector; and that provided, is segregated from department to department.\textsuperscript{5} The disease surveillance not only has limited capacity to demonstrate decisiveness through the use of provided information but also has a disorganized structure. The overall capacity of disease surveillance system in Pakistan has not fully evolved to reach a capacity to efficiently undertake research in endemic diseases and to implement health policies.\textsuperscript{10} Such reasons further hinder the growth of clinical pharmacy profession in Pakistan.
Pakistan's population is growing and so are the issues associated with it; poor health, pollution, malnutrition, deficient healthcare awareness, and increased incidence rate of endemic diseases, to name a few.\(^6\) Additionally, the healthcare system of Pakistan is plagued with integral issues including resource scarcity, inequity problems, unprofessional and inefficient human resources, gender biasness, and mismanagement of the entire structure. The existing precarious situation is in dire need of a stringent implementation of an innovative health reform.\(^13\) Health policies suffer a major upset with every government change, because each newly elected government implements newer ones. Consequently, health policies do not get the required time to be properly and effectively implemented. The military regimens offer limited priority to the healthcare sector, resulting in a consistent discrepancy between economic growth that is reasonable and government resource allocation for health sector.\(^4\) Conferring to the COMSTECH International Workshop on "Integrating Clinical Pharmacy Education, Practice and Research: Bridging the Gap", held in February, 2016, a set of goals were established to improve the current condition of clinical pharmacy in Pakistan.\(^14\) The goals, devised at the end, had a focus on presenting a framework which was directed to promote clinical setup enhancement in a forward direction. A year onward, a state of indecision still remains on whether to implement a year-long extension of Pharm D program with clerkships in hospitals or introduce residency programs. The government continues to dither in redirecting attention from other setups towards clinical research enhancement. Pakistan's population is rising each year, coupled with steadily deteriorating healthcare system. Such a scenario calls for more pharmacists to be integrated in healthcare hierarchy. The picture does not get better with a limited 2.8% of gross domestic product (GDP) allocated to health.\(^15\) Research scholars face absence of cooperation from hospital administration for research conducted to defect system flaws. The majority of private sector hospitals across Pakistan do not facilitate pharmacoeconomic research despite the fact that the escalating healthcare costs need to be controlled.

Frequent changes in healthcare professional practice are required to ensure integration of new recommendations and enhance the quality of patient care provided, which is a primary requisite in achieving improved therapeutic outcomes. Bringing about a change in a professional practice, requires a change in established human behavior. There are multiple reasons why making changes in established human behavior is often difficult, especially those that have been employed in a system of healthcare. Such reasons include an individual's personal capacity to accept and adapt change like individual attitudes, motivations, and perceptions, access to both financial and regulatory support, social environmental influences, to name a few. A key to early step in promoting change in a particular professional practice is to search, recognize, and understand the determinants that influence that practice. The awareness of determinants makes it possible to initiate the process of development of appropriate interventions targeted towards enforcement of behavioral change to eventually achieve desired adjustments in professional practice. The determinants of clinical pharmacy setup in Pakistan have been discussed in the preceding paragraphs.

Intervention mapping is a six-step systemic protocol for planning and implementing behavioral modification interventions. The protocol adopts three approaches which are applied throughout the process of healthcare program planning for the development of interventions that bring about behavioral change. The three approaches are: (a) theory and evidence-based approach, which makes use of current empirical evidence and theories to develop, implement, and evaluate behavioral alteration interventions; (b) collaborative approach, during which active decision-making participation at every aspect of planning process is required from the stakeholders, and (c) ecological approach, which involves an assessment of the complex healthcare systems towards which the interventions were targeted. It also involves addressing of the factors, pertinent to that particular practice, which either are capable of facilitating or hindering the outcomes of the applied interventions. Mapping works by stimulating the development of such interventions that are capable of promoting modifications in behavior at various vital levels of a particular practice not only to achieve health related aims, but to constitute a healthcare program which is based on implemented interventions. The success of mapping intervention in health programs has been reported in many countries, proving that it is an important framework in developing guidelines for healthcare programs.\(^17\) The approaches of mapping are required to be implemented at every step of planning protocol for clinical pharmacy programs in Pakistan. The determinants of clinical pharmacy programs have been highlighted in this study, which should be targeted step-wise in all concerned departments to promote recognition and acceptance of clinical pharmacists; to create more job opportunities; to make amendments in academic curriculum; to promote the healthcare professionals to recognize and accept clinical pharmacists; to promote the assimilation of empirical evidence-based latest research for both universities and clinical setups; to promote access to good quality low priced pharmaceuticals; and to target every issue faced by clinical pharmacists in Pakistan. In addition, instead of integrating clerkship or residency programs, a more practical approach can be utilized in the form of six-
month attachment programs of pharmacists with a consultant physician as a preceptor in hospitals. This approach will not only eliminate the issue of non-recognition of a pharmacist by the healthcare team and public, but will also provide the required clinical experience for a pharmacist. The curriculum needs a major change, with a balanced focus on pharmacology and chemistry to prepare a pharmacist which is readily adaptive to working in both clinical and industrial setting. The federal government should create job opportunities for clinical pharmacists at PHUs, THQs, and DHQs to eliminate health discrepancies between rural and urban areas. Lastly, continued educational conferences and continuing medical education (CMEs) courses, should be held at regular intervals at each major hospital or institution in a region for pharmacists. Evaluation of pharmacist performance should follow up with incentives for added credentials and expansion of the role, in an effort to facilitate much needed growth of clinical pharmacists in developing countries.

Establishing an objective-based clinical pharmacy program will help improve pharmacovigilance and pharmacoeconomic management. It will assist the government to reduce patient mortality and control budget expenditure on health in Pakistan and in other developing countries.

REFERENCES

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