Determining the Barriers of Inter-professional Relationships between Doctors and Pharmacists in Pakistan: A Mixed Methods Analysis

ABDUL NABEEL KHAN

A thesis submitted in partial fulfilment of the requirements of the University of Sunderland for the degree of Doctor of Philosophy

October 2021

DEDICATION

I declare that “Determining the perception and barriers of interprofessional relationships of doctors and pharmacists: A mixed-methods analysis” is my work. It has not been presented before for any degree or assessment in any other university. All the resources I have utilised or mentioned have been indicated and acknowledged as comprehensive references.

ACKNOWLEDGEMENT

Praise be to **Allah**, Lord of the Worlds. The beneficent, the merciful, and the entire source of knowledge and wisdom bestowed to humanity. **He** gave me the courage, motivation, determination, and wisdom to complete this thesis.

A special thank goes to my principal supervisor, **Dr. Ken McGarry,** for his due diligence and commitment to this project and my academic and professional development. His prompt replies to my emails, in addition to his detailed comments and feedback, were valuable in strengthening this thesis and shaping my research skills. For that and much more, I am forever indebted. I would also like to thank my second supervisor, **Dr Keith Holden**. His continuous support, constructive input, and guidance have kept me motivated throughout this journey.

My greatest appreciation goes to my family. To my **parents, siblings, in-laws,** and my dear wife, **Dr. Ambreen Khan**. From the fieldwork to the data analysis and writing process, you all were always there for me. I love you all dearly and would like to say a huge thanks to all of you.

Words are inadequate to express my gratitude to my colleagues and friends. **Dr. Atta Abbas Naqvi, Dr. Ifran Alam, Dr. Najla Yussuf, Dr. Zahra Batool, Mrs. Sarah Azeem, and Dr. Fakhar Abbas** for their continuous help and cooperation during my research work.

At last, I would also like to extend a huge thank you to everyone at the School of Pharmacy, the University of Sunderland. Both staff and research students in the research office welcomed me and helped me adjust to life away from home and support me in growing and developing.

ABSTRACT

The effort to enhance interprofessional cooperation in the healthcare environment has earned substantial traction in recent years. Increasing collaborative working between doctors and pharmacists has recently become a high priority within the health system. The study aims to discuss the barrier of interprofessional relations between doctors and pharmacists. The acceptability of the role for pharmacists within the healthcare system has been studied extensively. However, the existing published literature presents an insight into the transitioning of the pharmacist into the professional role and identity of a healthcare professional. The global drive towards improving interprofessional relationships in patient care is considering the increasing influence of medicines and complications of medicines regimens, particularly in chronically ill patients. Collaborative patient management by doctors and pharmacists has the potential to improve patient therapeutic outcomes in the healthcare environment.

This Ph.D. aimed to determine the interprofessional relationships of doctors and pharmacists practising within the hospital sector of Pakistan. In Pakistan, pharmacists face barriers towards their professional role. They struggle for their recognition widely in the health system of Pakistan. The profession lacks significant recognition from other health professions and faces significant barriers to execute their role fully.

A mixed-method approach was used in this study to provide valuable insights into the barriers of interprofessional relations between doctors and pharmacists. Following ethical approvals, the first phase was a cross-sectional survey was undertaken between 1100 participants (doctors and pharmacists) practising within the hospital settings of Pakistan (85% response). Analysis of returned questionnaires identified that more than 70% of the doctors' participants reported interacting with pharmacists at least once daily. The interaction was mainly related to drug availability inquiry. Most doctors expected pharmacists to ensure the safe and appropriate use of medicines to patients. More than 90% of pharmacists mentioned their inadequate training as a reason for not being able to interact with doctors on clinical issues professionally. In-depth qualitative work was undertaken in the second phase, which further explored barriers of interprofessional relations. The interviews were conducted with a purposive sample of 22 participants (10 pharmacists, 12 doctors). Themes highlighting the main research questions have been established. Qualitative interviews provided insight into the processes of interaction between the two professional groups. Doctors in Pakistan consider pharmacists as experts in

drug-related information and are receptive to working in collaboration for the betterment of healthcare. However, barriers were hindering the development of this collaboration.

From this study, it can be concluded that pharmacists are perceived as an integral part of the healthcare team. Enhanced Interprofessional collaboration between doctors and pharmacists" can be possible in the future but barriers need to be eliminated for this to be achieved. For the advancement of the healthcare system, it is necessary to utilise the expertise of pharmacists and develop harmony between doctors and pharmacists. This improved collaboration will ultimately benefit the outcome of pharmaceutical care. Pharmacists should be concerned about their professional role and need to be proactive in improving their service delivery. They should move towards collaborative care in order to provide optimal health services. This will pave the way for the expansion of the concept of pharmaceutical care in Pakistan's healthcare system. The project highlighted the barriers of interprofessional relationships between doctors and pharmacists. This research has highlighted that attitudinal barriers of doctors, pharmacist's education, hospital policies towards collaborative work, and trust of doctors towards pharmacists need to be improved in order to accomplish effective collaborative working between doctors and pharmacists.

Keywords: Doctors, pharmacists, interprofessional relations, barriers, healthcare system, Pakistan.

EXTERNAL OUTPUT

Parts of the work has published in following journals and conference.

Publications

1. Khan, Nabeel, et al. “Doctors’ perceptions, expectations and experience regarding the role of pharmacist in hospital settings of Pakistan.” International journal of clinical pharmacy (2020): 1-18.
2. Khan, Nabeel, et al. “Pharmacists’ viewpoint towards their professional role in healthcare system: a survey of hospital settings of Pakistan.” BMC health services research 20.1 (2020): 1-15.

Conferences Poster:

- Nabeel Khan, et al. “Determining the barriers of Inter-professional relationships between doctors and pharmacists: A Mixed Methods Analysis.” (Poster presentation at North East Post Graduate Conference on 22nd Nov 2019).

LIST OF ABBREVIATIONS

WHO	World Health Organization
FIP	International Pharmaceutical Federation
CWR	Collaborative Working Relationship
US	United States
UK	United Kingdom
HIV	Human Immunodeficiency Virus
GDP	Gross Domestic Product
BHU	Basic Health Unit
RHC	Rural Health Center
PHC	Primary Health Center
THQ	Tehsil Head Quarter
DHQ	District Head Quarter
Pharm-D	Doctor of Pharmacy
GPP	Good Pharmacy Practice
PPA	Pakistan Pharmacists Association
UAE	United Arab Emirates
SD	Standard Deviation
MOH	Ministry of Health
MOF	Ministry of Finance
ADE	Adverse Drug Events
DRAP	Dug Regulatory Authority of Pakistan

LIST OF TABLES AND FIGURES

List of Figures

List of Tables

LIST OF APPENDICES

Table of Contents

1.0 CHAPTER ONE

1.1 Background of Study

The pharmacy profession has observed a marked paradigm of role allocation from a product-focus to patient-focus practice [1]. In general, pharmacists are primarily considered to be the custodians of drugs; they are an integral part of pharmaceutical care. The provision of pharmaceutical care in medicine therapy results in improvement of outcomes regarding patients' health and offers mortality benefits [2]. It is also known to provide financial and economic benefits to the state. At present, the pharmacists have been involved in conventional and administrative roles and have excluded themselves from clinical roles. [3]

In the case of Pakistan, the government has promised to introduce pharmaceutical care services within the healthcare system in order to achieve morbidity and mortality benefits [4]. In Pakistan, the pharmacy profession is facing various barriers in comparison to the developed nations of the world, among which the shortage of qualified pharmacists and absence of practice guidelines for pharmacy practices are noteworthy [5]. In the interest of the establishment of effective and efficient pharmaceutical care services, participation of the hospital pharmacists in the medical management of a patient is requisite. Clear outlines should define the role of pharmacists and reflect upon essential contributions with respect to other healthcare professionals within their institute. [6]

Interaction between healthcare representatives belonging to different areas of expertise is imperative. In the interest of provision of maximum benefit to the patients and adequate fulfilment of assigned duties, Pharmacist must effectively interact with doctors and other healthcare workers. A research paper gathered the important factors that affect pharmacist/physician relations and promote a healthy and effective work environment [7]. A research article concluded that poor communication between pharmacists and doctors is associated with more AEDs and can be addressed through the introduction of electronic health records [8]. A survey conducted in Pakistan concluded that most of the responding doctors favoured the extension of the currently designated role of pharmacists in the health care system and urged the concerned authorities to take measures to ensure this. [9]

The study aims to determine the interprofessional relationships of doctors and pharmacists practising within the hospital sector of Pakistan. In Pakistan, pharmacists face barriers towards their professional role. They struggle for their recognition widely in the health system of Pakistan. The profession lacks significant recognition from other health professions and faces substantial barriers to executing their role fully. Moreover, it is evident from the literature that

Pharmacist as a professional is in transition characterised by considerable ambiguity and uncertainty concerning its status as the health care professional [5]. Substantial modifications have occurred within the profession of pharmacy in the past few decades. The response of the profession has been an effort towards a patient-oriented clinical role for pharmacists.

1.2 Overview of The Thesis

Previous literature apprising the development of this study is presented in chapter 2. To start, chapter 2 first discusses the healthcare systems of developed and developing nations. The needs and demands of those systems and the importance of professionalism in the health system are highlighted. The chapter then mentioned the theories of professionalism and societal aspects of professionalism, followed by the professionalism in the healthcare system. In addition to that, the chapter also guided the professionalism and inter professionalism in the pharmacy sector. As the focus of this study is the interprofessional relationships, the chapter then features the overview of pharmacy practice in developing and developed nations. After discussing the importance of professionalism and pharmacy practice, the study then highlights the interprofessional relationship of pharmacists and doctors in the health care system. This is followed by the barriers of interprofessional relations between doctors and pharmacists. The chapter gives an insight into Pakistan's healthcare system, and the transition of pharmacy practice in the country is also discussed in this chapter. The chapter features pharmacy education and the opinions of doctors towards the role of Pharmacists in the health care system of Pakistan. The chapter concludes by presenting the problem statement of this study.

Chapter 3 focuses on the techniques used in the present study, and its methodology and research design are presented in this chapter. It highlights the aspects of the mixed-method approach and the rationale of utilising it. The study follows a sequential explanatory design. The aspect of this design is also discussing in this chapter. The chapter then highlights the phases of the study. As discussed above those mixed methods have been followed in this study. The data collection methods, sampling method, recruitment of participants and data analysis are also performed provided in this chapter. Phase one of the study is the quantitative phase, in this cross-sectional survey was conducted from doctors and pharmacists in Pakistan, practicing within the hospital sector of the country. Followed by that is phase two, in which the qualitative phase has been discussed. In this phase, face to face semi-structured interviews were conducted

with the two professionals, and the methodology of interviews has been highlighted in this chapter.

Chapter 4 is divided into two segments. In phase one, the results of the quantitative study are presented, and the perception of doctors and pharmacists is highlighted. In this phase, the study mentioned the opinions of doctors and pharmacists regarding the role of pharmacists in the health sector. This highlights the key information on the relations of both professionals and how they perceive the role of pharmacists, as this will provide the foundation for the next phase. The survey highlighted the poor relations of doctors and pharmacists and the authority of doctors in the health system. Because of these issues, the study aims to achieve the goal of this study, which is to determine the barriers of professional relations between doctors and pharmacists. In phase two, the semi-structured face to face interviews provides detailed insight into professional ties. In this section, the study focuses on the attributes which were not evident during the quantitative phase. Both respondents emphasised the core issues of these relationships, and the suggestions for improving them have also emerged from this study.

Chapter 5 incorporates the findings of both quantitative and qualitative phases in terms of their implications for the interprofessional relationships of doctors and pharmacists.

Chapter 6 This chapter addresses the conclusions that were drawn from this research study. It discusses implications for practice and provides a series of recommendations for stakeholders and policymakers that may improve the interprofessional relationship of doctors and pharmacists within the healthcare system of Pakistan. Also, various limitations of the study are highlighted. Moreover, recommendations, in addition to proposals for upcoming areas of research, are provided; these considerations are based on the research conclusions.

2.0 CHAPTER TWO: INTRODUCTION AND LITERATURE REVIEW

2.1 Health Care Systems

Determining simple, practical, and understandable methods for assessing the complexity of the health system's work remains a difficult goal. Health systems are complex and can be considered as the sum of all organisations, institutions and resources designed to improve health with limited resources [10]. Entirely, health care systems differ due to the different combinations of mechanisms that can be considered. Arranging health systems is important to inform policymakers and to promote health systems as well as immediate attention to inequality between different populations [11]. It is also in the interest of the United Nations (UN) and the World Health Organization (WHO) that systems be evaluated and compared to the policies that will be developed in order to achieve the sustainable development goals that have been signed by the 193 Member States. Efficiency of the health system is often seen as the degree to which health system goals have been achieved given the resources used to achieve these goals [12]. The initial health system performance evaluation of 191 WHO members was held more than a decade ago, for the first time by WHO. It emphasised mainly on the efficient improvement of the health system performance that could be improved by countries through constructing guides on the basis of consequences and factors of the health system.

This was the basis for several classifications that focused on the performance of the health system. This arrangement was published in a series of discussion papers by the World Health Organization [13].

2.2 Worldview of Health Care Systems

In recent years, the issue of promoting health systems (HSS) has emerged on the agendas of many global health organisations. At a meeting in Japan in 2008, G8 leaders discussed this issue for the first time [14]. This issue has been considered and taken as top priority by The World Health Organization. It has been declared by consensual donors that, important resources have been assigned by them, in order to make the health systems stronger. Also, particular diseases have been focused by international health agencies, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), may be vigilant about these agendas because they worry that funds will be shifted from priorities-funds to strengthen health systems open the window. This focus among global health organisations is somewhat new. A number of healthcare firms have emphasised on particular infectious agents during the time period of mid-1990s to the mid-2000s Progress. The three leading vertical programs namely: The Global

Alliance for Vaccines and Immunisation (GAVI, established in 2000), the Global Fund (2002), and the US President's AIDS plan of emergency [15-17], were brought to life during this era in the history of international health.

An outline has been proposed by The World health organization (WHO) in order to construct an agreement on making the health systems stronger. The World health organization (WHO) views the health system as a group of organisations and participants who aim to promote, restore and preserve health. There are six constituents: providing of services, a well-operating health workforce staff, efficient health information systems, entrance to medical products and technologies, sponsoring, management and control to ensure and observe performance [18]. Global health players such as PEPFAR, JAVI and Global Fund have adopted the definition. Furthermore, primary healthcare and global reportage is promoted by WHO and others in charge as a foundation of bolstering the health systems. The WHO Director-General responded to the concerns of member states when he took office, using the idea of basic health care to align organisational priorities and make them the subject of the 2008 World Health Report [19]. The 62nd World Health Assembly issued a resolution in 2009 on "primary health care", including systems strengthening.

(A) Health care systems of Developed countries

Health and education are social sectors that require government support and funding. In developing countries, especially when most people are unable to afford expensive and exclusive medical services. Therefore, many developing country governments provide medical subsidies and social welfare orientation [20]. Of course, developed western countries also provide national medical services, which is common in Britain and Europe. Of particular note is that Cuba's health care system has set an example for all developing countries in the way the country provides world-class medical services to its citizens. Conversely, despite government support, India and South Asia's health systems have become popular with the public, and as a result, many have turned to private health services that are both efficient and expensive [21].

In most of the countries, the price of providing health care holds a major and growing load on its workers. The chief of health care needs to strengthen their performance gradually by compromising on costs and maintaining steady developments in excellence and admittance at the same time. Beneficial lessons might be extracted from international differences between health care systems in order to accomplish these challenging goals. In the light of this,

operational differences in the sector of health care, for instance, a combination of multiple resources can be connected as in belief to modifications in performances.

Until recently, the United States was providing a privatised healthcare system that was thoroughly reformed in 2010 through the Health Care Reform Act (also known as "Obama Health Care Reform"). Despite strong opposition from Republicans and many private health care providers, President Obama managed to pass a health care bill, which is seen as the first step toward a health-oriented healthcare system in USA [23]

(B) Role of Government In Health Care Systems

Health care is a sector in which the government plays a leadership role as it relates to aspects of public welfare and social justice. This is why almost all countries of the world take upon themselves the mandate of government support for health care. However, healthcare systems in many countries around the world are in disarray due to a variety of reasons [24]. These include an increased burden on health care systems such as what happens with the NHS or the UK National Health Service, where massive numbers of patients and the scarcity of NHS medical personnel have made it one of the most efficient healthcare systems in the world being one of the worst [25].

Apart from that, the United States is another example (before the health care reform bill was passed) where the poor and needy were at the mercy of health care providers in companies whose ability to pay was more important than social care. This is the reason why many sociologists and health care experts often comment on the fact that healthcare should not be privatised and instead, the government should take over health care systems [26].

Factually staying healthy means improving work productivity, ensuring employee health care is in the business's best interests. Finally, health care is so important to the sector that it cannot be left to the private sector. Therefore, the main controversy or debate here is that the government should play an active and effective role in promoting social welfare and social justice [27].

2.3 Professionalism in Healthcare Systems

Professional concepts for healthcare providers and organisations can provide decision guidance in financially difficult, rapidly changing environments and ethical challenges. Professionalism is based on a specific set of principles and obligations that guide specific career ideas and actions. These principles were explained to doctors in the Charter for the Professional Care of

Doctors. Physicians have widely accepted this charter, but its impact on healthcare quality and patient experience is increasingly seen as intertwined with professional healthcare organisations [28].

In fact, structural factors in the health care system may prevent clinicians from fulfilling the charter. Today, the size of the healthcare industry is $ 3 trillion, which is estimated to be "system waste", including during major reforms in medical services and payment models, hospitals and healthcare systems should focus on their financial health; At the same time, they can ensure the priority of their tasks, their ethics, effective operations, and the well-being of patients and healthcare providers [29]. Professional ideology recognises that useful and necessary work and its social benefits are top priorities. It cannot avoid financial gain and only requires these awards and pays full attention to professional services and social responsibility [30].

With more hospitals and hospital systems hiring doctors, healthcare systems are increasingly deciding what healthcare professionals do. As a result, healthcare organisations have an opportunity to positively and negatively influence their behaviour associate to staff and doctors. Most health care team members are excited about doing the right thing. However, there are many opportunities for healthcare providers and organisations to participate in activities that do not conform to the principles of the medical profession [31].

Every day, many departments question the professionalism of healthcare professionals and organisations. The difference in the health care industry is that in any industry, the company's false claims law solutions in 2003 were the most numerous, and the vast majority were whistle-blowers of fraud and abuse [32]. In addition, the hospital has come under fire for charging full prices for patients who cannot afford them (uninsured or underinsured) and at the same time providing unnecessary care, and research reports say we are not sure giving aspirin to a acute myocardial infarction (AMI) patient. In this challenging context, we all have a responsibility to recommit ourselves to our main mission. An attitude (a certain outlook or approach of tackling with relationships, errands, and circumstances), abilities, information and manners [33] are consisted in this commitment.

Three integrated directions to provide services of prime quality are studied: skilled, scientific, and therapeutic. The foundation of this profession is included in the scientific position, consisting the science of anthropological communication and its disorders. A number of physicians might not consider their profession as scientist, but it is efficient not to detach

science from practice. . In 1984, Kamhi claimed that physicians should practice like clinical scientists. In Great Britain, the "clinical world" is an organised career. Among the goals, the Clinical Scientists Association of Great Britain aims to "promote, develop and encourage the study and practice of applying science to prevention, diagnosis and control of disease, disease and disability". All practitioners are suspected to promote this goal [34].

(A) Dutiful Responsibilities and Social Determination of The Pharmacy Profession

The most trustworthy and reachable healthcare professionals include pharmacist as top of the list, they are considered as the most essential part of the healthcare team. This convenience allows pharmacists to cater more patient care activities, comprising therapy, precautionary care checks and medication management. According to the National Pharmacist Manpower Survey, in 2014, 60% of pharmacists provided services in the drug treatment department, and 53% of immunisations were performed. Ten years ago, only 13% of pharmacists provided drug management, and only 15% of vaccines were provided [35].

As pharmacists have the accessibility and a chance of daily dealings with the patients, they are settled in an exclusive position to spot prospective medicine interactions beforehand and are able to educate patients regarding effective drug use. These efforts possess a great impact on the satisfaction of patients and the quality of care. It also helps in controlling medical costs. As per the assumptions of the Americans, additional financial accountability for their healthcare, demand for low cost from consumers, and suitable medical services is increasing [36]. A fundamental role can be played by Pharmacists as they meet the needs of people by providing access to high-quality and economical preventive screening and immunisation facility.

Pharmacist-run programs can help simplify the transition to care by reducing facilities like bedside prescription dealings, hospital discharge consultations of former hospital, telephone counselling to reduce adverse drug events, drug adherence, and hospital re-admission rates. In fact, a 2016 study by CVS Health Institute found that drug matchmaking programs could help patients review patient medications and provide compliance counselling during the transition from hospital to home, reduce hospitalisation by 50% and help to avoid unnecessary healthcare costs [37].

(B) Sociology of Inter-Professional Healthcare

The Interpersonal Practice (IPP) looks forward to introduce a group of healthcare experts from various disciplines in order to provide the patients with the highest quality of care by doing

this, the IPP requires stakeholders to acknowledge and appreciate the contribution and experience that other healthcare professionals can make to patient care. Healthcare services have been a main concern for health services management, decision makers and governments globally. Providing integrating services has been a part of this cross-border professional collaboration.

The motivation for IPP accreditation stems partly from the recognition that chronic case management requires skills and input from an extensive number of health careers. However, although professional knowledge and IPP have been supported, conversed, and studied over a considerable period of time, translation into the workplace has produced different results. Once successful, it can be determined that inspection planners can reduce service duplication, improve patient outcomes, and increase employee satisfaction and hospital efficiency. However, it was also found that the inspectors caused inconsistencies, information concealment, and poor team performance [38-40].

Keeping the outline of social identity theory [41], professional identity theory and its extension in mind, biased conduct of professional crowds has been considered as threats to professional identity, dissimilar professional values, accommodation, offensive or abusive behaviour it is claimed that it is caused due to single contact. Coming in terms with the techniques that support the occurrence of identity threats, we claim to provide in depth analysis into a number of consequences of IPP transitions at the workplace. IPP or collaboration is referred as a collaborative, patient-centric attitude towards health service delivery that makes full use of the skills and expertise of some medical professionals to help patients to get the best possible care. Although, IPP has been chosen as a technique to figure out a number of issues in the domain of health sector. An example consists, the Government of Australia, 2009; Australian Government Productivity Commission, 2005),

A breakthrough, the implementation of such a medical team, has been shown to enhance innovation, reduce healthcare costs and wait times, and improve patient clinical conditions and use resources more efficiently. Concealment of information, conflicts, blocked innovation, and destruction of poor team results. The biggest factor in the failure of IPP is considered due to professional issues structured upon differences in terms with personal and professional identity threats Professional identification was found to play a major role in the success of the IP teams, as the teams reported poorly performing high-level identity threats. The critical plan towards

the success of IPP consists of getting to know the factors that will cause threats to professional identity.

Keeping the outline of social identity and its extended theory in mind [41], it has come in light that it possesses a great threat to professional identity because of the bias treatment towards different professional individuals, dissimilar values between professions, accommodation, unpleasant or degrading work, and simple misconduct of communication. An insight into the query that why IPP translation in the workplace has produced different results was figured out by coming in terms with the underlying techniques for the growth of identity threats. Health workers include a large number of independent professions, who are usually educated separately from each other, thus creating different ideological and practical frameworks. The process of socialization and vocational education means that individuals may get to know their professional groups strongly and realize significant differences from other health professions. When reforms are a threat to traditional occupational groups and identities, professionals' clarity can be increased in the context of introducing these reforms [42-44]. When valuable social identities are threatened by different professional groups, differences, trends toward social classifications, and stereotypes can worsen, leading to defensive and conflict actions. Professional identity can be interpreted as a threat when there is a high risk of marginalization or the risk of a professional role or experience devaluation. In professional teams, opinions about the roles, values, and motivations of other professions may be incompatible with their own establishment of the profession or even reach an unfair or unfair negative attitude, while the simplification and revisionist structure of other professions hostile and uncooperative occupations, poor interactivity, and performance [45].

2.4 Pharmacy Practice World View

Today, curative medicine has become the cornerstone of many health cares around the world. In fact, it is described as the "personal technology" of our time. They play an important role in reducing pain and suppressing pain, and they bring hope for treatment to millions of people. Today, there are many pharmaceutical developments, manufacturing, and sales industries worldwide. However, there are huge differences between drug use in developed and developing countries. Although pharmaceutical spending accounts for less than 10 percent of health expenditure in most developed countries, it is 15 to 30 percent in transition economies, while in developing countries, it is 25 to 60 percent. [46].

It is the pharmacist’s responsibility to ensure that the drug is safe and effective and that the drug is used correctly. In a diverse manner, pharmacists take position in between medicine developers and producers, whereas consumers of drugs at the same time. They are rightly termed as the medicine experts of the community. Pharmacy is a health profession related to medicinal drugs. Under the Drugs Act of 1967, a therapeutic substance is "any substance or substance (not a device, device or device) given to humans or animals for medical purposes." This purpose may include "permanent or temporary diagnosis, treatment or prevention of the disease, and prevention or intervention of normal body functions". A vast range of components consisting not just over the counter and recommendation drugs, but also vitamins and blood products are also covered under this definition. In recent times, it has been stretched out to take in homoeopathic goods and herbs.

Pharmacists' participation in therapeutic drugs ranges from the initial development of new chemical entities, their synthesis to drugs, their testing, sale, distribution, supply of patients, and ultimately the monitoring of patients who take these drugs. Nowadays, pharmacists are in a state of rapid development. As patients themselves increasingly use the information on the Internet to visit doctors, and the consequences of mistakes are getting larger, it is difficult for healthcare professionals to keep up to date. Pharmacy, not only medicine or nursing, is a profession where lack of care can harm patients or even die. For example, this could be due to the failure to detect the wrong dose or to provide the wrong medication [47].

Promotion of safe, effective, and balanced usage of drugs is the prime role of every pharmacist. However, this role is executed in different ways in different parts of the world. In recent years, pharmacists' status has shifted from products to patients in many countries. Now, the focus is firmly on the patient's drug needs rather than preparing a beautiful product. These patient-centric activities have evolved into the concept of "drug care", which has been defined as "responsible drug provision to achieve clear results that improve patients' quality of life" [48]. Medical care implies that the pharmacist is directly responsible for the outcome of the drug to the patient.

The most interesting and exciting development in the recent times consists of the progressive clinical role of pharmacists. The prime focus of pharmacists has been transferred to emphasis on allocating pharmaceutical knowledge and skills with doctors, nurses, and patients instead of just preparing and delivering medicines. This reflects on the clinical training of the pharmacists and proves that they are the utmost contribution to the balanced use of drugs. It has been

recognized in few countries that this task is In some countries, it is recognised that this responsibility is distributed with other health professionals, and the word “drug management” is preferred. [49] Despite these advances, drug care and drug management remain ambitious in many parts of the world.

The specific role of the pharmacist in society depends to a large extent on the economic, organizational, and organizational framework in which he operates, and therefore varies from country to country. An example states that, pharmaceutical companies are greatly affected by the method drugs are controlled, this enables free availability of medicines through any medium. However, some medicines are not allowed for sale through registered pharmacies, and some are permissible only to be bought by means of prescription. These rules differ widely. The foremost determinant of the nature of the practice of pharmacists is in the economic framework for health care Most countries provide a mix of public and private health care, as shown in pharmacy services.

There are also fundamental differences in the way you pay for medicines. Specifically, whether the patient pays for all or part of the drug or not who can own a pharmacy varies greatly from one country to other.

Some countries allow possession of organizations that lead towards chain and multiples, some limit the possession of pharmacy to pharmacists only, whereas others give permission to sole pharmacies to have only single pharmacy. In accordance to these constraints, the contribution of pharmacists in the domain of health care is focused on five common themes, prescription drug administration, just because the patients can benefit more and take part in all phases of the chain, from the development of the drug to the provision and manufacturing process including information and support, pharmacists work to ensure that this is all provided. In long-term condition management, they not only provide and support medications that patients need but are also increasingly involved in developing community-accepted common medical protocols, helping patients make the most of prescription medications and treatment outcomes that help ensure improvement.

Pharmacists play an extremely important role in the controlling of common diseases, through providing accountable self-medication, giving guidance and assurance to individuals, presenting over-the-counter medications when suitable, and suggesting other health care to people when required. Specialized care. Through promotion and uplifting the flag of healthy lifestyle pharmacists are of great help to people in letting them maintain their health by

proffering health screenings, healthy life guidance and other facilities. A variety of services like blood pressure measurements, body fluid tests, cholesterol tests, pregnancy checks, smoking termination advice, and diabetes supervision involve the role of pharmacists. At last, contribution of knowledge on medicines and their utilization in terms of benefit of other healthcare professionals, including doctors and nurses are carried out by pharmacists.

There are a large number of pharmacists in hospitals around the world. Although the core of the services provided here is still providing the necessary medicines to inpatients, the services here are increasingly focused on the patient. Many will also provide outpatient medications, as well as advice and information about their use. Large hospital pharmacy departments often have production units for sterile and non-sterile products and have facilities for manufacturing those commercially available products. Maintenance services like excellence control laboratories and computer facilities are provided by others. The role of hospital pharmacists has tend to become highly professional as they get indulged in the production of new drugs and the rational and effective usage of present drugs. Individual pharmacists now focus on areas such as drug information, prescription development and clinical trials [52].

One of the most important events in developing a hospital pharmacy is to transfer the practice from the pharmacy to the ward or clinic. The pharmacist started going to the ward to check up the prescription form and began to supply to avoid the need to send the prescription to the pharmacy, so the ward was not always available. This ward pharmacy has evolved into a clinical pharmacy intended for patients with increased pharmacist involvement in the ward, providing physicians with possible medical advice and assisting nurses in drug management problems. In fact, almost all pharmacies in developed countries have gradually moved from product-oriented products to patient-oriented [53].

Just the way pharmaceutical industries are diverse, an even more diverse range of opportunities are being provided to pharmacists. A number of fresh graduates stepping in the industry have selected a job in which the abilities and knowledge of the pharmacist are unswervingly appropriate and valuable [54]. Research, expansion, construction, quality control and invention have been included in this. Following, some individuals, after acquiring experience and self-assurance choose to transfer to domains such as registration of product, medical information, and clinical experience, whereas a limited number move to commercial, sales, and marketing.

(A) Pharmacy Practice in Developed Countries

It is a common notion that the pharmaceutical services in the developing countries are carried out from the institutions or areas where the workers are based. The domiciliary services are near to absent and minimal efforts have been made to improve the situation. World Health Organisation has a significant say on this matter as it supervises the health standards globally and promotes well-being [55]. If US alone is considered today, pharmacists are allowed to administer the immunisation protocols in 44 states. Collaborative practice in this scenario points out towards the pharmacist who has been contracted with a physician to service the physician's patients [56].

The World Health Organization also played an important role in highlighting the importance of pharmaceutical education and ensuring that it aims to provide pharmacists with a future role in hospitals and the local community. The World Health Organization rolled out a descriptive document which encompasses the pharmaceutical standards to revolutionize the health sector. The opportunities in developed countries for pharmacists are growing exponentially as the concerns like disease growth, usage of drugs continue to rise [57]. The contribution of these pharmacists in developed states cannot be denied as WHO continues to invest in more and more practitioners by opening up vacancies worldwide.

In practice, pharmacies are internationally renowned for their diversity . In fulfilling their mandate under the World Health Organization, the states look to create a balance between the services and infrastructure provided to developing countries. There is a huge difference between the number of pharmacists per 100,000 people in developed and developing countries. The number of practicing pharmacists are not constant across the globe, it is evident from the demographics as well. Lunde and Dukes, in a detailed review of the roles and functions of community and hospital pharmacists in the European healthcare system, found that both were completely different [58]. Pharmaceutical practices in the European countries have evolved rapidly, World Health Organisation enlists the developed countries in the region and the quality of their pharmacy profession [59]. The main drivers of change are business pressure, progress in government policies and remedies.

Governments are increasingly seeking ways to control the cost of medicines and pass them on to consumers. For example, in the UK, hundreds of prescription drugs have been released to pharmacies in recent years alone. Patients can now buy things themselves that were previously only available under a doctor's prescription. Most European countries have repeated this policy.

The impact it has on pharmacy practice is significant: Patients are increasingly asking pharmacists for advice on the medical conditions they have been previously being prescribed. [59]

The implementation of the competing instructions also had an effect. Over the counter drugs in many developed countries like US and UK are now sold at same prices at all outlets due to the price maintenance initiatives. Besides the fact that many of the drugs listed in the general sales list can be sold through any retail store, this places financial pressure on small independent pharmacies, and the number of these drugs may decrease. Other countries are moving in a similar direction. As of October 2001, a list of 250 medicines was available at many retail stores in Denmark, including gas stations. German pharmacists are fortunate to have almost a monopoly on the supply of medicines. Only 3% of the drug transaction value comes from outside the pharmacy, and there are no dispensing doctors. Germany is known for stringent policies to counter unethical practices in pharmaceutical field, the complications are deemed to reduce in upcoming times as a result of protective measures [60].

Today, pharmacy practice in the United States is distinguished by its diversity [61]. In the United States, community pharmacies are a small but important part of a comprehensive healthcare system, and their latest developments have been affected by the rapid growth in the use of medicinal drugs. A number of pharmacies operate in the US under the label of prescription medication. The drugs without the professional suggestions are easily accessible everywhere, in a service station or a normal vending machine. However, independent pharmacies in the United States continue to thrive due to the gaps in existing laws regarding medications.

Every region has its own standards of pharmacy medicine, these standards are affected by a number of factors like the political outlook, or the economic strength and even social classes and cultures. This trend is observed in majority states in North America as well. Independent pharmacies too have to undergo rigorous struggle to get themselves registered or even exist in the mainstream industry. Both have found it difficult to get paid by providing care rather than products, and both face fierce retail competition. These pharmacies face the threats lower profit margin and more obstacles in their way too. The growing demand of the general public and increased public flux overshadows the efforts already made and is a big challenge for pharmacists [62].

(B) Pharmacy Practice in Developing Countries

Health care in most developing countries is a mixture of public and private services. Pharmacists are usually small businessmen who make a living selling medicine. In developing countries, the urban population is often richer than people who live in rural areas. This has a significant impact on the business outlook as pharmacists now prefer urban localities while the private sector prefers to settle in the rural areas [63]. There are many retail pharmacies in many urban areas in developing countries. Pharmacists play an important role in promoting product safety and proper use. Proven pharmacy features include easy access, to medicines, affordable products, and access to credit.

In many rural areas, pharmacists are scarce, and these groups do not have access to drug services. Many African countries do not have access to the pharmaceutical facilities. East Africa too suffers from the same concerns, the demographics suggest that there is only one pharmacist for 60,000 people in the region. The shortage of pharmacists is a troubling concern as WHO reports suggest alarming figures in the African countries like Ghana. With the increase in health demands and new diseases, there have been wide range of chronic medicines and the poor adherence to the prescribed medicines lead to health complications as well. The Urban population in developing countries is more affluent therefore there is a drought of skilled professionals in the rural areas. Many countries use traditional therapies extensively, and a large number of traditional therapists are involved in the production and supply of medicines. Of course, the number of registered pharmacists does not reflect these [64].

In many developing countries, pharmacists play a vital role in purchasing medicines. The WHO Department of Essential Medicines and Medicines Policy has stressed the importance of appropriate procurement practices, and the administration has shown that some developing countries usually pay for essential medicines at 150% to 250% of global market prices [65]. In the developing countries, the pharmacy training is focused more on the industrial sector due to the increased demand. Abandonment of weak regulatory frameworks for pharmaceutical sector and a focus on improved healthcare infrastructure will aid in dealing with the existing shortage of supply.

Compared to other groups, the poor have a higher proportion of their income. By providing appropriate advice to promote rational drug use, pharmacists can reduce unnecessary and inappropriate product purchases. Unethical practices still prevail in healthcare sector, therefore the implementation of regulatory laws is empirical in ensuring the strict compliance. These

issues are existing more in the underdeveloped regions predominantly due to issues like inflation.

2.5 Inter-professional Relationship of Pharmacists in Health Care Systems

Health systems are moving towards more professional approaches to primary care. This team-based model has a significant impact on the role of pharmacists in the primary health care system. Over the past decade, cheap clinical pharmacists have been integrated into many primary care funds in the UK, primary care teams in North America regions and similar medical institutions worldwide [66] Improve drug use through individual patient assessments and population interventions, provide education and drug information to other team members, and implement system-level improvements [67].

Pharmacists often face barriers to integration with these primary care teams. For example, many people lack a clear role, and the expectations of other team members about pharmacists' duties are often unclear. Additionally, patients often do not understand the pharmacist's role in this condition. Often pharmacists are unfamiliar with the roles of other team members and create difficulties in successful collaboration [68]. In the early stages, pharmacists often rely on other team members to help them integrate and create more jobs for nurses. Other frequently reported barriers to include physician resistance, lack of pharmacist confidence, insufficient support from pharmacists, insufficient space, and insufficient training of pharmacists [69].

(A) Intra-Professional Divisions

Worldwide, health care services are increasingly being formed in groups rather than individually [70]. However, collaborative, interpretive professional practice is often interpreted as a clinical institution without mentioning the administrator. For example, Gilbert (2005), in a presentation on professional education in patient-centered practice, outlines 15 occupations that facilitate collaborative professional learning [71]. All of these are clinical majors, from counselling psychology to nutrition and dietetics to midwives, as well as core majors in medicine, pharmacy, dentistry, and nursing. Drinka and Clark (2000) pointed out the diversity and differences in the educational and empirical background of each team member in the article on interdisciplinary medical teams, but the description of the team. These figures clearly depict the role of health care practitioners in delivering high quality health services [72]. Perhaps the best concept for contemporary healthcare providers is almost the professional bureaucratic model Mintzberg. In this form, clinical professionals can freely control the operation of service providers and have administrative and support functions to protect and maintain clinical

professionals. Services are organized around traditional occupational boundaries, not to the comprehensive care needs of individual patients, and the political power balance between different professions determines the allocation of resources, usually refers to doctors, nurses, social workers and other clinical professionals' discipline [73]. The hierarchies are developed in such a way that these clinical practitioners report to their superiors to coordinate on existing practices. Moreover, a system of accountability also deals with professional and human errors and their resulting consequences [74].

Figure 1: Triad of Health care System

(B) History of Doctor-Pharmacist Relationship

Due to poor drug adherence and inadequate patient understanding of treatment plans, the growing problem faced by healthcare professionals today is the adverse consequences of patients. In 2010, 3.8 million inpatients and 3.3 million outpatients were related to serious preventable drug errors, costing the US $ 21 billion [75]. Additionally, a baseline review of the Virginia Medical Center in the District of Columbia showed that a discharge rate close to 75% indicates a drug difference. It is estimated that only 10% to 20% of patients fully comply with the drug. The stages of disease also have impact over the treatment procedures, therefore the patients with even mild symptoms are advised to consult their doctors in order to avoid health complications [76]. This is the responsibility of pharmacists as well to ensure a well-documented treatment plan taking into account the history of patient as well. A graphical representation of triad of health care system is mentioned in figure 1.

All these factors suggest the critical importance of this doctor-pharmacist relation. Doctors are directly involved in dealing with the patients, they document the information customer provides therefore the initially screening should be absolutely transparent and adequate [77]. Once the treatment plans are devised, the pharmacists are involved who use their pharmaceutical expertise and provide accurate medication as per the treatment plan. In addition, unclear patient

expectations of physicians impose a culture focused on self-reliance and independent physicians [78]. This culture changes, but cooperation with pharmacists may remain unattractive. The use of unsafe drugs at the same time needs to be mitigated, check and balance regarding patient's compliance with the treatment plan is significant too. If it is clear that the patient did not take the medication as recommended, the person concerned can consult a doctor directly. The doctor will then know if there is a problem with the commitment and can treat the problem at the next patient visit. When the communication is only by phone or fax, the delays on both sides are frustrating because these professionals have easy access to each other and have established a symbiotic relationship, so they can quickly identify and resolve patient problems. Although this form of coordination is useful, it usually does not exist [80].

A strategy to address poor coordination between doctors and pharmacists can begin with the education and training stages.. It has been found that although pharmacy and medicine students have a similar understanding of pharmacy, pharmacy students usually demonstrate stronger knowledge of pharmacology, while medical students are better at prescription [81]. Based on these results, a physician's discomfort with the underlying pharmacy can lead to medication errors, for example, because drug interactions cannot be determined at the time of the prescription. Likewise, the pharmacist's failure to determine the prescription error can disrupt the system of checks and balances. In a full-featured system, pharmacists must be able to analyse patient data and written prescriptions to determine if they match properly. Combining undergraduate pharmacology courses or expanding joint clinical pharmacology training can provide two professionals with the opportunity to reduce the knowledge gap. Each group of students has advantages and disadvantages, so collaborative learning will be complementary [82], and in addition, early communication between doctors and future pharmacists will begin to demonstrate how another group of students can provide value in patient care.

(C) Barriers of Inter-Professional Relations Among Doctors and Pharmacists

Management literature identifies several potential challenges in fostering collaborative practice. There may be systemic determinants that can determine whether the cooperative practice is possible and to what extents [83], such as compensation plans, organization of professional practice, institutional policies, and physical environmental factors that may be beyond the control of the team. Within the team they may be dominant, members may have different interests, goals, expectations, methods, and experiences, which may complicate communication and create conflicts [84]. Team leaders must manage these different benefits

and take advantage of team formation. Differences between professionals may also include different levels of membership, prestige, salary, and other factors that add another challenge to management and negotiation of power arrangements.

Doctors are reluctant to share the necessary patient information but are more interested in working with community pharmacists. If a community pharmacist can access a patient's health history and basic diagnostic data, recommending medications to physicians and patients who advise will be more specific and more relevant. In order to achieve effective cooperation, an effective two-way communication system must be implemented globally [85]. Interestingly, many doctors and patients oppose this solution.

2.6 General Overview of Pakistan

(A) Pakistan's Health Care System

The role of pharmacists is evolving rapidly to keep pace with the needs of advanced healthcare systems. Pakistan is one of the most populous countries in the world with economic and social crises in the recent times as well. Pharmacists play a key role in dealing with the health concerns in the country [86]. The life expectancy in Pakistan is 64 years for men and 66 years for women; an alarming concern is the 50% illiteracy rate. In addition, they still face a challenge in the prescription process and the improvement and control of drug use, becoming key players. Normally the professional collaboration between the prescribers and the pharmacists is exemplary however this trend has been lacking in the developing countries [87]. The severe lack of standard operating procedures and guidelines makes it tough for the pharmacists to practice accordingly. Pharmacists also prefer to work in cities due to the availability of excess resources and support from the federal government in urban centers [88].

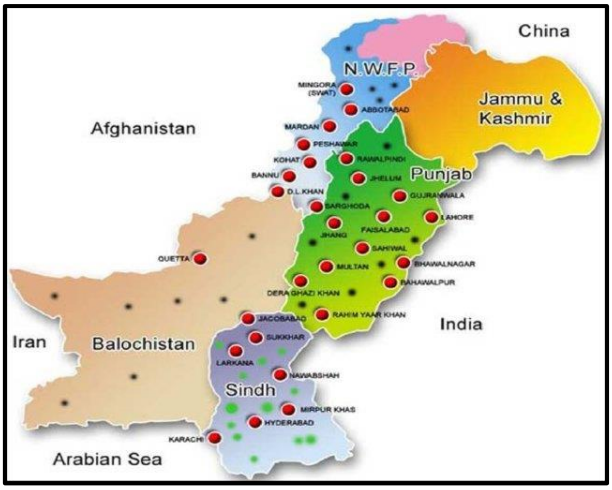


Figure 2: Map of Pakistan

The recent development in the healthcare system of Pakistan is National public health. Moreover, the trends of teaching homeopathy and pharmacy have developed overtime as well. The ministry of health normally looks after the matters of national planning and coordination while dealing with public health [89]. Drug Control Organization is a company of the Ministry of Health. It encouraged the registration and licensing of local pharmaceutical units and importers of medicines and made it possible to participate in various activities around the world. Figure 2 showing the prominent cities of Pakistan.

(B) Structure and Health Services in Pakistan

Tehsil General Hospital (THQ) covers residents at the street level, The health system in any country depends to a large extent on available human resources [90]. Pakistan over the last few decades has observed a downfall as far as the long-term planning is concerned. The ever-increasing population, the drought of resources and economic barriers have put Pakistan in an uncomfortable position during these years. The understanding of health infrastructure is outdated due to which life to death ration is quite high in the country. There is no systematic disease surveillance system, and the ability to use the information to make decisions is limited—the inadequate general capacity to conduct health policy and systems research [91].

In recent years, a few pharmacists have been appointed to most public hospitals. Their role is limited to drug delivery, procurement, and stock control. Community hospitals and pharmacies lack pharmacy services because they are isolated, and pharmacists are not recognised as health care professionals. The lack of well-trained personnel and the lack of communication between the pharmacist and the public is also the main reason for the lack of awareness of the

pharmaceutical industry [92]. Figure 3 showing a brief review of Pakistan's division of health care system.

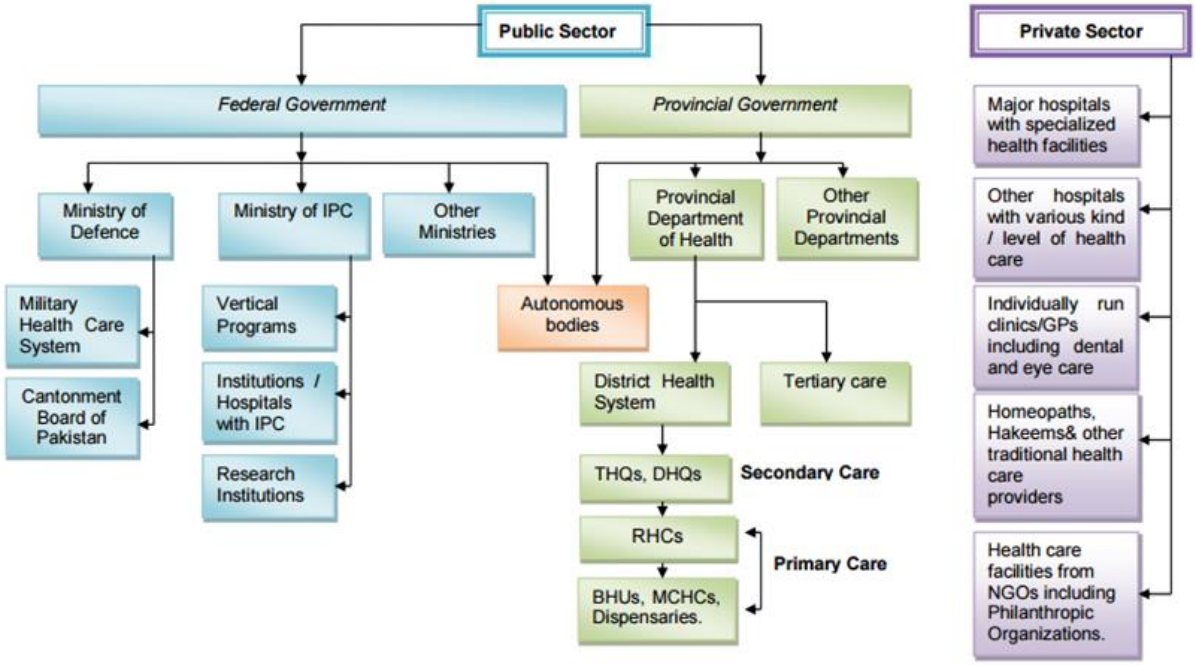


Figure 3: Division of Healthcare System in Pakistan

2.7 Pharmacy Practice in Pakistan

(A) Challenges of Pharmacy Practice in Pakistan

Although the role of pharmacists is recognised in community pharmacies, hospitals, and drug regulatory agencies elsewhere in the world, Pakistan's health care system is not yet aware of this role. There are many reasons for the lack of awareness of pharmacy in Pakistan, such as the lack of public health service pharmacists and community pharmacies, which has led to a lack of interaction between communities and pharmacists. At the time of independence, there was no pharmacy institute in Pakistan which was quite detrimental for the initial few years for Pakistan. The unavailability of skilled professionals and teaching institutes further added to increase situation of healthcare at that time [93]. There were no affiliated colleges where students can study pharmacy and later practice it in their professional lives. To address this issue, it has been suggested that the duration of an existing pharmacy residency program or hospital's professional internship after completing a five-year course be extended from six months to one year and that certain allowances should be mandatory. Pharm-D students in Pakistan are now allowed to participate as pharmacists in hospital's executive operations, this

enables them to get hands on customer experience and initiates their career as clinical pharmacists [94].

Figure 4: Pharmacist dispensing to patients.

(B) Establishment of Pharmacy Profession and Pharmacy Education in Pakistan

As mentioned before Pakistan started of slowly in the field of pharmacy with no affiliate institutes in the country after partition. Later with the development of healthcare system in country, the pharmacy courses were formally inducted in the medical studies. The pharmacy course was initially a three-year undergraduate course, and then expanded to a four-year course from 1978-1979. At the time, the pharmacy approach focused on drug production, which helped provide qualified and skilled human resources to the pharmaceutical industry but did not consider the role of pharmacists in the pharmacy. In 2003, began to introduce Doctor of Pharmacy (Pharm.D) as a five-year professional degree program in Pakistan, focusing mainly on the clinical aspects of pharmacy. Approximately 2,587 pharmacists graduate each year. For the current population, this number is insufficient to provide the best health care [95].

If the statistics are observed now regarding the development of pharmacy sector in Pakistan, it can be noted that the operational pharmacy agencies in Pakistan are 28 in total. Pharmacists are now allowed to work both in the public and the private sector, the total number of registered pharmacists in the country are 8102. A number of regional pharmacy bodies have been established which overlook the pharmacy sector in each area. Globally pharmacists are recognized as clinical pharmacists, Pakistan is yet to realize this and formally document it for

the pharmacists in the country [96]. The pharmacy education is now federally monitored by the Pharmacy Council of Pakistan which manages the controlling and registering the pharmacists in each of the provinces.

(C) Influence of Pharmaceutical Sector in Pakistan's Healthcare System

Human welfare is directly related to health. Beyond the importance of norms focusing on public health, there is also a positive correlation between a country's population health and economic development. An important part of public health is access to quality medicines, which account for a large proportion of health expenditures. In low and middle-income countries, total pharmaceutical expenditure accounts for approximately 30% of the total (public and private) health expenditure [97]. In addition, for low-income households in developing countries, the number of drug expenditure is particularly high compared to the global average of about 50%. Although statistics are not available for Pakistan, they are even higher in India, accounting for 76% of the total health expenditure on medicines purchased by low-income households. Therefore, the pharmaceutical industry is particularly important for developing the public health outcomes of the country. The pharmaceutical industry is also an important contributor to the economy. The global pharmaceutical market was estimated at the US $ 11.05 trillion in 2016 [98]. Although North America and Europe dominate the market in terms of sales, the pharmaceutical industry in many developing countries has achieved double-digit growth in recent years. The total size of the industry in Pakistan is estimated at 3 billion dollars. The Pakistani pharmaceutical industry contributes about 1% of Pakistan's gross domestic product, employing 150,000 people directly and 300,000 people indirectly. Although it represents only 0.3% of the global market, the company that collects global healthcare data, IQVIA, ranks Pakistan as an "emerging market" and expects that Pakistan has enormous growth potential [99].

Despite its size, Pakistan's pharmaceutical industry has never experienced the growth and vitality of a growth-related industry. No backward linkages have been established, of which 95% of raw materials are imported. In addition, Pakistan's pharmaceutical exports are currently about $ 200 million. By comparison, India's total drug exports in 2015 were $ 14 billion, while Jordan's exports were about $ 800 million (although the population is only 9 million). In addition, there are 201 US Food and Drug Administration (USFDA) certified factories in India and 4 factories in Jordan. This enables them to export to the United States, which accounts for 60% of the global market. Pakistan's exports are sluggish, and there are no companies approved

by the US Food and Drug Administration. This is the international gold standard, which indicates that the country has low competitiveness and poor product quality [100].

2.8 Problem Statement

Both pharmacists and doctors believe that the biggest obstacles to cooperative medicine include insufficient compensation, insufficient time, and the need to collaborate with many doctors/pharmacists. Reimbursement and infrastructure models, such as county detachments and electronic health records, may need to be changed to take advantage of collaborative practices between pharmacists and doctors to support optimal patient care. The following study aims to identify potential inter-professional barriers that exist within the health care sectors of Pakistan.

3.0 CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter will discuss the underpinning methodology used to determine the barriers of inter-professional relationships between doctors and pharmacists in Pakistan's healthcare system. This study has been done by using the mixed-method approach. The mixed-method method requires philosophical assumptions along with the quantitative and qualitative paradigms. The specific components of both qualitative and quantitative research have been explained. This chapter also explains the usage of the mixed-method approach for collecting the data. The concept of pragmatism and its role in this study will also be critically evaluated in this chapter. The use of a framework to guide the reader and the rationale for using a mixed-method approach are included in this chapter. Hence, this research's ultimate goal was to determine the barriers of inter-professional among doctors and pharmacists in Pakistan.

3.2 Theoretical Framework

Charles Sanders Peirce introduced pragmatism, and later Mead, Dewey, and James were the philosophers who continuously worked for its development. Pragmatism believes that the validity of truth can only be determined based on the outcomes that are both desirable and observable. This principle is known as a pragmatic rule or pragmatic maxim—the principal talks about the provisional truth rather than the absolute truth. Pragmatic rule or pragmatic maxim is the guiding principle during research. A pragmatic framework can be significant for bridging the gap between classic qualitative study and empirical scientific research. Several philosophers have said that this pragmatic approach is the philosophy of common sense, which feeds on humans' inquisitive nature towards nature [101].

The early pragmatists such as C.S. Peirce did not believe in the traditional methods of acquiring the knowledge. They thought that there could never be an absolute truth in this world. The nature of reality can be singular or multiple realities because the researcher can combine both deductive and inductive thinking to present various reality perspectives [102]. Several philosophers and scientists believe that this theoretical framework is necessary for a strong foundation of research. Different researchers tend to consider different worldviews depending on what suits them best.

The main reason for choosing this framework for this study is to focus more on the research questions, their consequences, and multiple methods for collecting the data so that there is no

stone unturned. To get to a provisional truth (what suits best to the situation), the researcher combined inductive thinking with deductive one. While doing a social inquiry or a study that is based on social relations, several philosophers do not agree on the use of pragmatism as the paradigm.

These philosophers believe that pragmatism will cause damage to the method of scientific research. This was one of the reasons that the initial success of pragmatism was slow, but once the researchers started to know about its benefits and the range of its diversity, they have continuously accepted this view over formalism.

3.3 Epistemology/Ontology

Several underlying beliefs on which a study is based should have significant importance. A world view or a research paradigm is a set of ideas of this world and an individual's position within it. Each paradigm has four main elements:

- Methods: This includes the procedure that is done to gather the data and analyse it.
- Methodology: This includes how a researcher determines what he wants to know about the world [103].
- Epistemology: This includes the relationship between the research and the world.
- Ontology: This includes information about the nature of reality and what is still known about it.

Epistemologically, positivism is objectivism. This means that the key to pragmatism is practicality. Here, the researcher collected the data by focusing on both the objective and subjective methods of collecting data, while positivism is purely objective. The positivism approach collects the data through observation and is objective towards influence works while investigating the data collected.

While taking a pragmatic approach, both unbiased and biased perspectives of the knowledge are taken into consideration. This approach also values the objective as well as a subjective experience. The data collected was mixed, and every kind of question can tell a well-established scientific story. This approach allows the researcher does not to focus on a single aspect of the study design.

Ontology the branch of philosophy which considers the relationships and knowledge about different entities that exist in this world. This branch believes in the knowledge about different entities that exist in this world. It also includes the questions that will tell us about which truth

is accepted at the most provisional level of reality. Ontologically, this approach believes that the truth depends on the situation. It can be singular or multiple.

Philosophers worldwide are slowly starting to accept the approach of pragmatism because of its diversity in gathering the data and analysing it. Some researchers have said that the pragmatic approach is significant because of its mixed methods, while the other ways are narrow and constricting.

3.4 Philosophical Assumptions & Methodology Worldview

The study aims to determine the inter-professional relationships between doctors and pharmacists in Pakistan. The pragmatism method is highly supportive of doing thorough research on the barriers of inter-professional relations among pharmacists and doctors. The mixed-method allows a researcher to focus on all different aspects of a study design and will help the researcher in gaining the data that is more accurate and precise than the data that will be gathered via using a single method.

Any research needs to adopt a specific worldview and philosophical assumptions that can provide a strong foundation for their study. Similarly, the mixed-method approach also requires philosophical beliefs to guide how to design the research and then conduct it [104]. Researchers all over the world mostly undertake four different points of views in which a researcher operates:

- The worldviews that are formed within the scholarly communities may vary from one community to the other.
- The type of mixed-method design that is being used in the study also determines the choice of world view.
- Mixed methods study can only be informed by multiple worldviews rather than a single worldview.
- Only one “best” worldview for the mixed method approach is present.

Several philosophers supported the stance that the choice of worldview depends on the researcher's type of mixed-method design. They further explained that if a researcher focuses only on qualitative research such as interviews and does not go to the second phase, i.e., the quantitative phase, it becomes more or less like a personal perspective than a study [105]. While focusing on the relation between the pharmacists and the doctors in various hospitals across Pakistan, the quantitative survey was done on the basis of the post-positivism perspective.

While doing this phase of the survey, the data were collected by observing and integrating the responses of the participants to the questions of the survey.

The questions of the survey were strictly based on getting the knowledge about the reasons for the barriers among the two professionals and how these relations can be improved. It is one of the reasons that the worldview of pragmatism is growing rapidly, for this view combines the data of the qualitative and the quantitative survey and allows the usage of different methods to interpret the results of the findings.

3.5 Research Questions

Following are the questions that needed to be answered in this research study

- What are the consequences of low expectations of doctors with pharmacists?
- What are the barriers to inter-professional relations among doctors and pharmacists?
- What are the perceptions, expectations, and experiences of pharmacists in their field of work, and how do they think they contribute to the success of Pakistan's health care system?
- How can the relations between the two professionals be taken to bridge the gap among doctors and pharmacists?
- What are doctors' perceptions, expectations, and experiences about the role of pharmacists in the health care system of Pakistan?

3.6 Why Mixed Methods

One of the most significant steps of conducting research is choosing the right methodological method. It has been observed over time that quantitative study is the dominant choice by researchers while dealing with the course that is related to health. These researchers did not focus on the qualitative survey. But over time, it has been found that quantitative surveys alone are not capable of answering all the complicated issues associated with our study topic [106]. Quantitative research with a large sample size can provide strong evidence by its objective approach; however, on its own, it tends to be weak in terms of gaining an understanding of the context behind the comments or observations of people. To get the answers to all the questions in the survey, researchers started to use a mixed-method approach. This led to the increased recognition of mixed methods instead of using a single procedure.

Following is some of the significant roles that a mixed-method approach plays in performing a research design:

- The researcher is not confined to use a single method. He can use different types of forms for collecting data and then analysing them.
- When the data regarding a topic was collected via qualitative methods and quantitative surveys, then the validity of the process increases, proving helpful in further study of the problem.
- A situation cannot be explained by using a single worldview. The mixed-method designs allow a person to support the research with more than a single worldview.
- When research uses both quantitative and qualitative surveys, then the chance of missing any factors decreases.

The questions that might not be answered using only the qualitative method or only the quantitative method can be answered by using the mixed methods.

3.7 The Case of Mixed Methods for Pharmacy Practice Research

The topic of barriers of inter-professional that exist between doctors and pharmacists is not single-faceted. To collect the information regarding the research multi-faceted issue, it was vital to use a mixed-method approach. The mixed-method method works by combining quantitative and qualitative surveys, along with considering the philosophical assumptions [107]. This approach allows a researcher to gather information and apply the data to determine the study's overall strength. One of the other reasons for choosing this method was to ensure that the researcher could not focus on either quantitative or qualitative research. The mixed-method allows pluralism and combines different ways when required.

As discussed earlier, the thesis topic is multi-faceted; it is evident that a mixed-method approach is the best fit. The systemic review showed that the barriers of inter-professional relationships among doctors and pharmacists need both qualitative and quantitative evidence. Sometimes while conducting research, a single type of survey can't answer all of the questions. So, to get more accurate answers, this thesis topic requires a mixed-method approach rather than using an available method. Mixed study methods allow the researchers to use systematic and theory-led approaches for practical and effective interventions in the health field [106]. Also, using different ways to collect the data suits this thesis more than using a single method. For example, if the researcher has conducted a quantitative survey but has not found the result, the mixed-method approach allows the researcher to take other methods to take into consideration rather than sticking to the previous one. Thus, a mixed methodology was adopted to fulfil all the thesis's requirements rather than focusing on one of them and neglecting the

others [108]. To meet the overall aim of the current study, an understanding of both doctors' and pharmacists' expectations and experiences of pharmacists' role in the health care system of Pakistan should be determined. Detailed qualitative research is required to understand doctors' and pharmacists' inter-professional relations within the health care system.

In line with this, thorough qualitative research is also necessary to understand the barriers among professionals, which is not allowing them to work in harmony for the benefit of patient's welfare and the betterment of the overall health care system.

3.8 The Rationale Behind Using Mixed Methods

In this thesis, triangulation was achieved by comparing the results of the qualitative interviews. The interviews of the pharmacists and the doctors revealed several factors that influenced the barrier between them. This step is included in the complementarity purpose [109]. The development includes using the results of one survey to start the next phase of the study and then integrating the surveys' findings. To check the inconsistencies in any factor or step of the survey, the initiation step is involved in detecting the contradictions. If some factor is still unknown or is showing some rejection, different methods are usually applied to expand the inquiry and get all the results needed [110].

Creswell identified the six most commonly used designs for mixed methods research, i.e., three contemporary designs and three sequential ones [104]. All these methods are used depending on the topic of the study. The sequential explanatory system of the mixed method is one of the most popular of the sequential designs and has been described below:

3.9 Sequential Explanatory Mixed Method Design

Several different mixed methods can be used to collect the data. These methods are usually being chosen depending on the objective of the study. For this research, a sequential exploratory design was used. It is essential to gather the background information regarding the course's factors for adopting a sequential explanatory design. These steps are very important to run the surveys smoothly.

Sequential Explanatory Mixed Method Design is usually used when there is strong quantitative evidence was present. Since this research program aims to study the relations between doctors and pharmacists in Pakistan, qualitative methods are also important [111].

The research design had the objective of facilitating the analysis of the quantitative phase results by using qualitative methods to gain a deeper understanding.

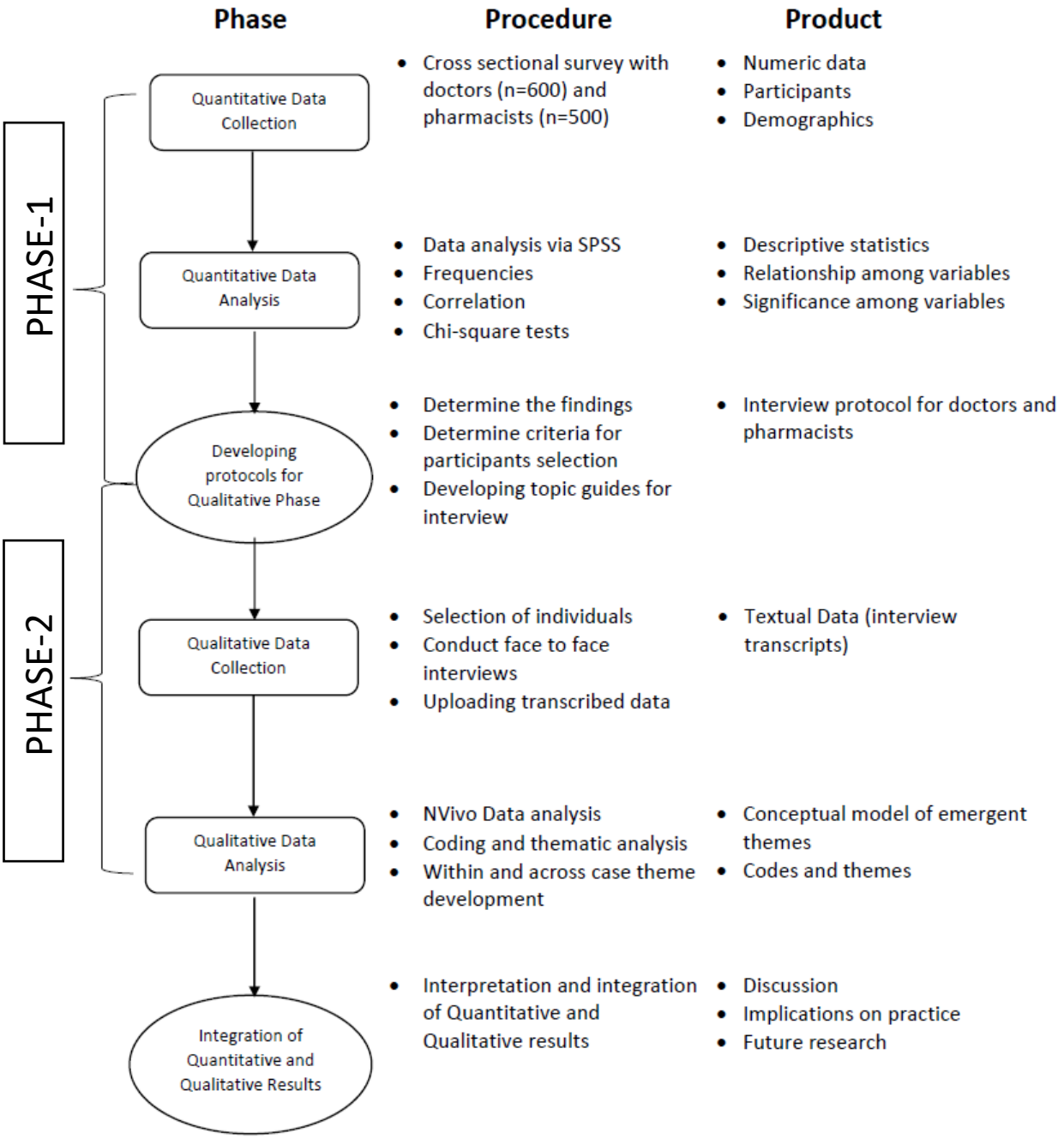


Figure 5: Research Process

In this particular thesis, the focus is given more on quantitative data rather than qualitative one. While determining the importance of mixed-method design, its practicality was also the point of importance. While conducting this research, this design of mixed methods takes a long time to completion. Out of the two variants included in the explanatory sequential design, the most common one is the follow-up explanation variant [112]. This variant is beneficial when a

researcher tries to analyse and find the connection between the quantitative data. On the other hand, if the researcher is trying to focus on the qualitative data, the participants-selection variants are chosen.

3.10 Advantages of Using Sequential Explanatory Design

One of the many advantages of using the explanatory sequential approach is that it allows a single researcher to do all the processes independently. When a single person is doing almost all the work, it is evident that this process takes more time than usual. It is mainly because of the interdependence of the qualitative and quantitative data and the combination of both kinds of research [113]. Following are the situations that should already be taken care of while choosing the explanatory sequential approach as the methodology design:

- The researcher has sufficient time on his/her hand to conduct both quantitative and qualitative surveys.
- The orientation of the research and the researcher is quantitative.
- To collect a single type of data at a time and to analyse it, the researcher has enough sources to do it.
- All the essential variables are taken into consideration, and the researcher knows about them and knows how to use the instruments to measure the construct.
- The questions that are supposed to be answered are based on quantitative data. On the other hand, the same questions cannot be answered using quantitative data, and qualitative surveys are essential for getting the answers.
- The researcher can get back to the participants to conduct the qualitative strand after completing the quantitative stand [114].

With such mixed methods, the researchers usually have full freedom in designing their methodology and theoretical framework. They also decide if they want to focus on qualitative or quantitative research. Taking the criteria in turn for this research, the theoretical perspective adopted by the researcher was a post-positivist framework for the analysis of quantitative data, such as the measurement of the variables in Phase 1, and a constructivist approach for the more in-depth description and analysis facilitated in the qualitative Phase 2. For this study, it was made sure that the data from both the qualitative and quantitative phase was combined to determine which topic needs more attention.

Despite all the advantages and increasing importance of the mixed method designs, some obstruction should be considered to make sure that the study goes on smoothly, the first one

being the time frame. These designs take a lot of time for completion as the second phase of the surveys cannot be done until the first phase is done. Thus, this method might not be applicable for the studies with a low budget and a short period to complete it [115]. Several philosophers believe that the mixed-method approach of study is not universal and can cause difficulties. This is mainly because all the factors that are usually taken into consideration while choosing the mixed-method approach are related to Americans. This limitation shows that the mixed-method approach cannot be used worldwide. But there is no empirical evidence present for this limitation which is why the whole world is using the mixed-method approach for conducting the research. As we have discussed before, the mixed method design has a pluralistic approach; the traditional philosophers have widely criticized it. These views come from those who do not recognize the importance of paradigms in the mixed-method design to those who do not even think that this design is time worthy.

3.11 Initiation of Work

For this research, the priority criteria refer to the greater weight that was given to the collection of quantitative data since the later exploratory Phase 2 was used to help provide an explanation for the results of the initial quantitative Phase 1. Finally, in terms of integration, it became clear that the data would be combined from the two stages, with the researcher using the analysis of Phase 1 set to help in choosing which topics should be explored further and to decide upon who to interview. Also, the findings were, of course, merged as the stage arrived for their interpretation.

3.12 Phase One

(A) Quantitative Procedures

This passage provides a description of the procedures for the quantitative study used within Phase 1 of the research. Quantitative analysis carried out to elaborate the basic information about the relationship among doctors and pharmacists in Pakistan's health system. This part will involve those professionals who are practising in hospitals only in various cities of Pakistan. This part of the study has been completed from Jan 2018 till April 2018. The survey was questionnaire based, and prior approval has been obtained from the hospitals, to perform the data collection. Volunteers/ facilitators aid has also been taken to speed up data collection, and the volunteers are only those who are practising in their own hospitals.

(B) Study Objectives

The primary objective of a quantitative study is to elicit information from respondents about their current level of contacts and the perceived quality of relationships among doctors and pharmacists in hospital. It also involves questions regarding expectations and experiences with doctors. The survey also involves the level of satisfaction of pharmacists about the pharmacy curriculum in Pakistan.

(C) Participants

Given the ethical considerations of the research, the participant profile was limited to those who were at least a medical/ pharmacy graduate and practising in a hospital. Both females and males were included, i.e., those who had worked in hospitals and private and public hospitals. Data collection was conducted using a non-probability convenience sampling technique. Since there is considered to be selection bias and uncertainty with convenience sampling, it is viewed as a weak approach; as such, improvement to the representativeness of the sample was sought through three different measures. Firstly, questionnaires were distributed to participants of various ages and of both genders on different days and at various times of the day. Secondly, it was considered the larger the sample size, the more reliable the findings. Thirdly, an effort was made by the researcher to allow all participants present to complete a questionnaire if they so wished. In that manner, the approaches of the convenience sample could be improved, and it also aided the acquisition of a probability sample that had representative characteristics. The study sample size was estimated using an automated online calculator (RAOSOFT) [161]; three factors are taken into consideration by the calculator, i.e., the population and response distribution (for this study, 50%), the error margin (for this study, 5%), and the confidence interval (for this study, 95%). For this research, however, a total of 1,100 participants were invited to take part randomly (600 participants from doctors and 500 pharmacists). There were two reasons for choosing this number of participants. Firstly, it was recommended to have a larger sample size, especially as a convenience sample approach was being taken. Secondly, as the research project had the aim of providing a national narrative of Pakistan from both doctors and pharmacists, it was considered that a large sample size gave the researcher an improved means of finding sufficient participants for each category. The research purpose and the manner in which the findings would be used was fully explained to every study participant. All those who agreed to be a participant had to provide written consent. Assurance was given that the data would remain confidential.

(1) Doctor's participants

There were five sections within the questionnaire that were used with pharmacist participants—starting from basic demographic information about participants, the interactions of doctors with pharmacists—followed by dichotomous scale questions, expectations with pharmacists, acceptance of pharmacists in the healthcare system, experiences of doctors with pharmacists and the involvement of pharmacists in medicines management.

The researcher had detailed discussions with two of the supervisors (Director of Studies and 2nd supervisor, a Clinical Pharmacist) at the University of Sunderland regarding the interaction of doctors and pharmacists. Discussions also covered the UK situation in detail, and the two countries were compared with account taken of the differences in the societal contexts and their cultural backgrounds. A number of stages for developing and refining the questionnaire were completed. The language of the questionnaire remained English as the basic education of medicine in Pakistan is English. The researcher gained help from peer doctors in Pakistan and used it in a pilot study for doctors. The pilot study of the initial questionnaire for doctors was undertaken by the investigator for four doctors working at two leading hospitals in Karachi. Each of the doctors was selected randomly, with those in attendance asked for their answers to the questions. Prior to commencing the main study, the researcher had discussions about the results of the pilot study with the supervisor, and the necessary amendments were made.

Once the amendments had been completed, the chief investigator travelled to the various cities of Pakistan. The questionnaires were distributed among the participants of this group in the various cities of Pakistan. The details about each city and hospitals involved have been attached here. There were mostly closed-ended questions with few exceptions of open-ended questions in order to facilitate the respondent's freedom of expression. In connection to that, questions relating to demographic details were also part of a survey. There were also questions related to the current level of contacts and perceived quality of relationships among doctors and pharmacists in the hospital. It also involves questions regarding expectations and experiences with doctors. Prior to data collection, approval letters from the hospitals were obtained. The researcher then distributed the questionnaires to the different departments of hospitals. The study was undertaken from January 2018 up to April 2018. There was an expectation that many participants would require a little further explanation to help them complete the questionnaire fully. Once the questionnaires were completed, the researcher collected them from the respective respondents. Out of the total of 550 people approached, 20 people did not participate because of lack of time. Also, 17 participants returned questions that were incomplete, and

which had to be excluded, and 10 of them did not return the questionnaires at all. Hence, a total of 483 questionnaires were completed successfully (87.81%), the results of which were then taken forward for analysis.

Table 1: The response rate for the questionnaire

Distributed questionnaires	Returned	Refused	Uncompleted	Not returned	Response Rate
550	483	20	17	10	87.81%

(2) Pharmacist's Participants

There were five sections within the questionnaire that were used with pharmacist participants. Starting from basic demographic information about participants, the interactions of doctors with pharmacists. Followed by dichotomous scale questions, expectations with pharmacists, acceptance of pharmacists in the healthcare system, experiences of doctors with pharmacists and the involvement of pharmacists in medicines management. Numerous procedures and steps were passed from the initial meeting of the researcher with the academic supervisors through to reaching the final version of the questionnaire; these steps are summarised as follows: -

- An initial questionnaire to be used for the pharmacists was developed with the aid of literature.
- The questionnaire was taken for a pilot study on 10 participants from this group.
- The results of the pilot test were discussed, and appropriate modifications were made to the questionnaire.
- The questionnaire was administered within the various cities of Pakistan.
- The data collected from Pharmacists practising in hospitals only.

Once the amendments had been completed, the chief investigator travelled to the various cities of Pakistan, and a total of 500 questionnaires were distributed among the participants of this group in the various cities of Pakistan. The details about each city and hospitals involved can be found in the annexures section. There were mostly closed-ended questions with few exceptions of open-ended questions in order to facilitate the respondent's freedom of expression; in connection to that, questions relating to demographic details were also part of the survey. There were also questions related to the current level of contacts and perceived quality of relationships among doctors and pharmacists in the hospital. It also involves the question's role of expectations of pharmacists regarding their role in the healthcare system, experiences with doctors. The survey also involves the level of satisfaction of pharmacists

about the pharmacy curriculum in Pakistan and the role of pharmacists in medicines management. Prior to data collection, approval letters from the hospitals were obtained. The researcher then distributed the questionnaires to the Pharmacy department of hospitals. The study was undertaken from January 2018 up to April 2018. There was an expectation that many participants would require a little further explanation to help them complete the questionnaire fully. Once the questionnaires were completed, the researcher collected them from the respective respondents. In the case of volunteers, a complete overview of the study has been explained first, and then the same procedure is carried out by them took place. The volunteers were the part of the same hospitals from where the data has been collected. Out of the total of 500 pharmacists approached, 32 people did not participate because of lack of time. Also, 50 participants returned questions that were incomplete, and which had to be excluded, and 22 of them did not return the questionnaires at all. Hence, a total of 396 questionnaires were completed successfully (79.20%), the results of which were then taken forward for analysis.

Table 2: Questionnaire response rate

Distributed questionnaires	Returned	Refused	Uncompleted	Not returned	Response Rate
500	396	32	50	22	79.20%

(D) Data Collection Methods

Demographic questions about the individual doctors/pharmacist (age group, gender) were also included to build up a profile of respondents and ensure a variety of pharmacists/doctors were represented. The questionnaire was distributed in person at the hospital facilities. Completion took between 20-30 minutes, depending on the respondents' level of contact and size of the area. All respondents were assured of the confidentiality of their responses and made aware that during the data inputting stage, all names and other identifying would be removed, and codes assigned and used for the remainder of the project.

In Phase 1, questionnaires were used to conduct the cross-sectional survey design. Whilst questionnaires are the most common manner in which to collect data within research that is quantitative, and they can also be employed within research that is qualitative questionnaires can be a very effective method for describing populations by, for instance, counting the frequency of a particular event, for assessing the distribution of certain variables, or for

studying associations between variables such as sex, age, education, place of work, experience, state. As an instrument of research, the questionnaire has numerous advantages, with it being fairly easy to organize, and is also economical, both in terms of time and money, when compared with other methods such as interviews; this is the case, particularly when there are large numbers of participants spread over a broad geographical area. Interpersonal factors can have less of an impact when questionnaires are used, and they offer greater anonymity. Using questionnaires, however, can have several disadvantages, such as the possibility that questions may be unclear to certain participants and the response rate may be relatively low. Furthermore, it may be difficult for the direction of variable associations to be established. The researcher chose to hand the questionnaires out himself within the health centres in an attempt to overcome these disadvantages; personally, being there enabled the researcher to introduce the topic of the study and to encourage the participants to give frank responses. The researcher could provide clarification when needed and encourage participants to fully complete the questionnaires whilst they were in the waiting rooms.

(E) Data Analysis of The Questionnaires

As noted above, a cross-sectional survey was conducted with doctors and pharmacists regarding their inter-professional relations in Pakistan. SPSS version 24 was used for the analysis of data that was acquired by the questionnaire.

The measurement variables:

- Information of a demographic nature, such as gender, age, level of education, current job title, state, years of experience and place of work
- Interactions of Doctors with Pharmacists
- Interactions of Pharmacists with Doctors
- Expectations of doctors with the role of pharmacists
- Expectations of pharmacists with their own role in the health care system
- Acceptance of pharmacists in the health care system
- Experiences of doctors with pharmacists
- Experiences of pharmacists with other HCPs
- Perception of pharmacists regarding pharmacy curriculum in Pakistan
- Integration of pharmacists in medicines management

(F) The Rationale behind the Choice of a Survey Questionnaire for This Research

As noted by Creswell [116], the questionnaire is one of the most commonly used primary data collection tools. The survey-based study offered the best choice in terms of economy and time as a large target population sample was required to achieve the objectives of the research. The questionnaires are a prime means of describing a population and studying the relationship between different variables by undertaking the necessary techniques for test analysis. The questionnaires are consistent with the pragmatic paradigm approach adopted for this particular study. [117]

Questionnaire questions can be open-ended or a combination of open and close-ended. Usually, closed questions are employed within research investigations that are quantitative. The researcher offers a participant a fixed number of possible answers to choose from within closed questions. There may be options in a ranking scale, such as questions with Likert-scale, multiple-choice questions, or simple questions requiring a simple yes or no response. [118] Questions that are closed tend to be helpful for gathering simple demographic data and for the categorisation of respondents. Also, it is easier to conduct an analysis on closed questions; their answers are easy to compare and, when compared with questions that are open-ended, less time is required for both the participant and the researcher. When a researcher uses open-ended questions, there are no answers from which the participant can choose; instead, the respondent has to answer in their own words to explain their opinions. This, of course, can be very beneficial since open-ended questions give the participant the opportunity to provide information in greater depth and express their personal feelings and perspectives on a particular topic. Closed questions can lead to artificially suggested answers, whereas open-ended ones give participants the latitude to take a different revealing angle on the question than the pre-conceived view of the researcher. [119]

For Phase 1 of the research, few questions were employed with both open and closed questions for the data collected from the participants (doctors and pharmacists). It was considered a useful way in which to build up baseline information from the sample. Also, given the large sample size of 1,100 participants, the questionnaire survey was considered to be an ideal approach. Furthermore, given the suitability for using a computer analysis program, such as the Statistical Packages for the Social Sciences (SPSS), the type of questionnaire chosen enabled identification of associations and trends between variables, and so the two questionnaires, i.e., one for the doctors and one for the pharmacists, were utilised in this study. Chi-squared

contingency table analysis with their corresponding probability (p) values were performed using SPSS version 24.

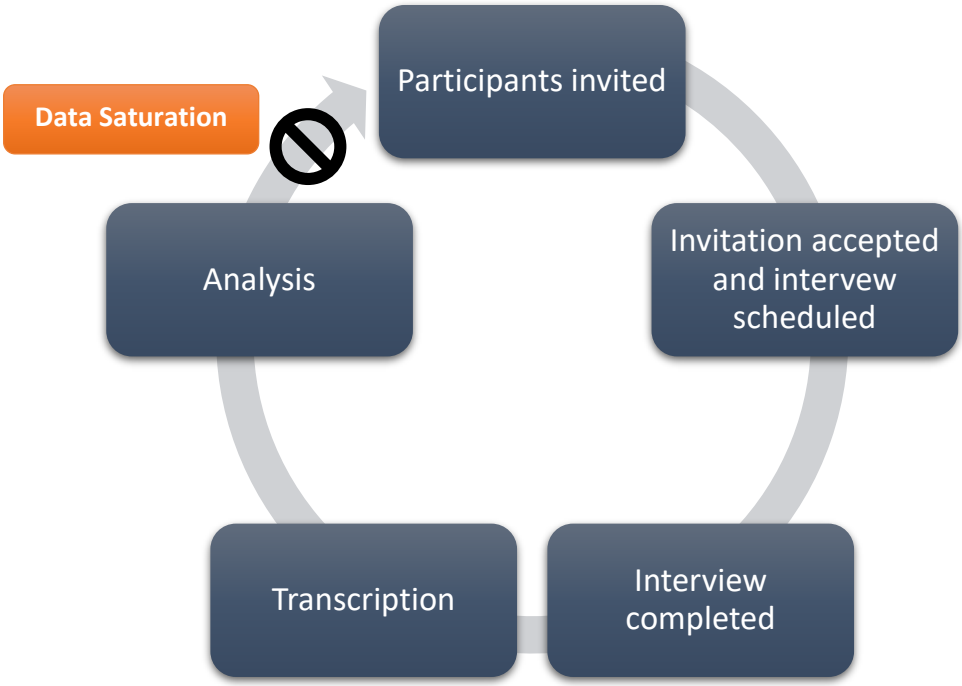


Figure 6: Summary of interview process

3.13Phase 2

(A) Qualitative Procedures

Quantitative research can result in meanings that are closer to the beliefs of the researcher than to those of the respondents. Bryman [120] concurs, proposing that one facet of the distinction between quantitative and qualitative research is that the former is orientated to the specific concerns of the researcher and the latter to the perspectives of the research participants. This particular section has a description of the qualitative research methods that were used for addressing the study objectives of Phase 2 of the research project. Reicher and Taylor [121] note that with qualitative analysis, the researcher needs to be clear and explicit about what they are doing and what they say they are doing actually matches up with what they do. As Creswell and Clark [122] note, qualitative research has the main aim of providing details of the experiences, opinions, or views of participants.

Qualitative research helps a researcher have a deeper appreciation of participant perceptions and how their world is structured within the context of everyday life. The most commonly used method for collecting data within qualitative research is the interview, which has been described as a conversation that is directed more or less towards the researcher's particular needs for data. An interview can be both flexible and practical and is especially appropriate when a researcher has the aim of obtaining detailed information, such as the experiences, feelings, or opinions of people. [123] A researcher can make observations within an interview with regard to changes in the facial expressions or voice or any other indications of participant feelings, and when it comes to undertaking an analysis of the data, such details can be very significant. Interviews may be totally open, semi-structured or highly structured. [124] An open or unstructured interview seeks to gain an understanding in depth of the point of view of an interviewee on a specific topic, whereas a semi-structured interview aims for particular information or knowledge that can be contrasted or compared to other views gathered across studies or within the same study. [125] An interview that is structured is similar to a questionnaire; it is undertaken with the participant face-to-face, with the aim of gathering participant information using a schedule with a particular order. The interview type chosen is dependent upon the research purposes with, for instance, certain studies using unstructured interviews, since there is a need for a deep exploration into how the participants feel or think about a particular research subject in question. [122]

The choice of analysis for this research lies in its flexibility, suitability to a pragmatic framework, ease of use, acceptability, its provision of a detailed description of data sets, its allowance for social as well as psychological interpretation of data and its ability to highlight similarities and differences across data sets. [126]

This study aimed to enhance the understanding of relational networks through additional qualitative work. Interviews were conducted with a purposive sample of 15 respondents from both doctors and pharmacists across various cities of Pakistan. The interviews aimed to explore further details about the inter-professional relations among doctors and pharmacists practising in hospitals across various cities of Pakistan, such as their experiences of interaction, how they felt relationships had been achieved (or not), and the opportunities and constraints they faced. The interview schedule design was constructed by the research questions, literature review and the findings from the quantitative phase of the study. Interviews took place at a suitable place, and audio recordings were taken place and are transcribed verbatim. Interviews last between 40 minutes and an hour. NVivo software was utilized to assist with the coding and organisation of qualitative data.

(B) Qualitative Phase Objectives

- To determine the relations of doctors and pharmacist in various hospitals in Pakistan
- To help in the identification of poor relations among the two professionals
- To help in the identification of the views of doctors and pharmacists about the role of pharmacists in the healthcare system of Pakistan
- To help in identification of the perception of doctors and pharmacists about the integration of pharmacists in medicines management
- To identify the perception of pharmacists regarding pharmacy curriculum in Pakistan

(C) Sampling

Corresponding with an explanatory mixed methods design, doctors and pharmacists for the interview in Stage Two were selected from the respondents to the survey. Although the overarching design for sample selection was purposive, within this framework, a modified random selection procedure was employed to select interviewees. There is no empirical method for calculating the number of participants required for a qualitative study. As such, the decision was made to initially interview 15 participants. The number of participants from each group was decided with the consultation of supervisory team along with the aid of available literature.

An additional five participants from each group will be selected but will be held in reserve and to be interviewed if data saturation will not occur with the first 15 interviews of each group.

(D) The Interview Procedure

The researcher have conducted all the interviews in Pakistan himself, and he made clarifications whilst there and made further in-depth questions, where possible when emergent themes became apparent. As well as the taking of notes, the researcher transcribed all the interviews. When the interviews began, to accord with the ethical approval for the research, as well as to accord with previous research techniques established for interviews, the interview nature will be contextualised, with the research purpose explained to potential interviewees. The participants selected were contacted at first by phone to arrange an appropriate date and time for the semi-structured interview, and this will be later confirmed the day before the scheduled interview. Prior to the commencement of each interview, the researcher was the interviewee an explanation of the research purpose and why they are being interviewed and informed the participants of the purpose for any findings obtained. The participants were then be asked to give their signature to a consent form, and assurance was given that data would remain anonymous and confidential and stored appropriately. The interviews had a duration of between about 40-60 minutes. The interviews were recorded, and an outline was also be handwritten, and a full transcription were performed later. All the interviews were undertaken by the researcher in person within offices or pharmacies.

(E) Developing and Piloting the Interview Topic Guide

Ryan, Coughlan and Cronin [127] suggest that developing the interview topic guide is central to obtaining data that will address the study's purpose and objectives. The topic guide used for interviews in this study was informed by different sources, including the study's research questions literature and the data collected from doctors and pharmacists in Phase One. The questions focused upon the following areas central to the study. The topic guide for the interview can be found in Annex IV.

(F) Ethical approval for both phases

Within academic research, particularly studies involving direct contact with people, it is always important to give full consideration to ethical matters. At the University of Sunderland, it is an essential prerequisite for research studies to receive formal ethical approval, and therefore this

was requested from the University of Sunderland Ethics Committee. The following matters were required to be addressed within the application: -

- Drafting of an information sheet for the participants describing all study aspects.
- Ensuring the participant gives their informed consent through submission of a consent form and ensuring that participants are clearly informed so that they can withdraw from the study whenever they wish without their rights being affected.
- Ensuring any information acquired is retained confidentiality and anonymously, with the Committee needing to be reassured that information will be stored safely.
- Any potential hazards or risks for the researcher and participants need to be identified and described for consideration by the Research Ethics Committee.
- Prior to the participant signing the consent form, they need to be fully informed of the research nature and purpose.

As the study involve doctors and pharmacists practising in hospitals across various cities of Pakistan. Individual ethics approval was also sought from each participating hospital. Once the nature of the study was explained fully to participants, their informed consent was sought, and their involvement only proceeded if that informed consent was obtained. Having established the risks involved in the study, these were shown to the Research Ethics Committee, and it was made clear that should a participant happen to have a poor reaction to their involvement in the study, they are free to withdraw. Any risks involved in the study needed to be completely identified and notified to the Research Ethics Committee of **University of Sunderland**. All the information gathered during the study was stored in electronic form on a computer using a password for protection. Separate approvals were sought from the ethics committee and can be found at Annex VI and VII respectively.

4.0 CHAPTER FOUR: RESULTS

4.1 PHASE ONE: Quantitative Phase

(A) Doctor's perception, expectations, and experiences regarding the role of Pharmacists in hospital settings of Pakistan

(a) Introduction

The profession of pharmacy is often viewed as an allied health profession that is associated with the supply of medicines within a legally regulated environment. This is carried out by either dispensing prescription medicines following receipt of a doctor's prescription or through over the counter (OTC) sales of non-prescription medicines [128]. This conventional view ignores contemporary changes in clinical practice that have occurred in many developed countries and focuses mainly on pharmacy practice associated with a retail pharmacy. It disregards the intricacy of practice in primary, secondary, and tertiary healthcare sectors [129]. Notwithstanding the importance of dispensing medicines in a safe and controlled manner, the modern practice of pharmacy incorporates a wide range of professional patient-oriented activities that aim to improve patient safety and health outcomes that are sometimes not directly linked to dispensing service [130-132].

In many developed countries, pharmacists are either in process or have already been recognised as autonomous clinical practitioners. For instance, pharmacists in the UK have been licensed not only to dispense but also prescribe medicines [133]. During the past 25 years, pharmacists have been encouraged to embrace clinical responsibility and accountability, most notably with the development and application of Hepler & Strand's (1990) description of the 'pharmaceutical care' model [131]. The pharmaceutical care model or service is patient-oriented care provided by the pharmacist with an aim to improve the patients' treatment outcomes [130-132, 134]. Evidence highlights that pharmacists may have a substantial influence on patient's well-being [135]. Despite some level of advancements in the pharmacy profession in few developed countries, there is a continuing resistance to the development of clinical pharmacy practice both in developed and many developing countries [136-138].

A potential barrier to acceptance of pharmacists' role and benefiting from pharmacists could be due to the negative perceptions in doctors' mind [134-141]. However, evidence indicates that a significant number of doctors were welcoming to the notion of an enhanced role envisioned for pharmacists and believed that few pharmacists performed their duties as per

international standards of practice [136, 138]. This belief was mainly due to the limited role of pharmacist, i.e., dispensing and compounding of medications [141-143]. Although there may be a belief in practitioners that pharmacists could perform better in clinical roles, the medical profession essentially works to prevent this in the form of professional protectionism [144].

Pakistan is an economically developing country in the South Asian region. The health expenditure of the country was 2.6% of the total GDP in 2015 [145-147]. This was quite low as the healthcare spending of the UK was 9.9% of its GDP in the same year [148]. The healthcare system of Pakistan is comprised of private and state-funded hospitals [149, 150]. The state-funded health infrastructure is a three-tiered system comprising primary, secondary, and tertiary care facilities. The primary care facilities include basic health units and healthcare centres in rural areas. Secondary care includes ambulatory, acute and in-patient care, while tertiary care includes teaching hospitals at the district level [149, 150]. The total number of various healthcare facilities are 14,282 that includes 1,201 hospitals. However, with an increasing population, inadequate funds and inefficient distribution of healthcare staff, the health needs are not fulfilled by state-funded health structure. Therefore, the private sector contributes to the healthcare services and is utilized by a larger population of the country [147, 149-151]. There is no difference in the practice of pharmacy in private and state-funded hospitals since both are regulated by the same health authority of Pakistan.

The Western model of pharmacy practice in Pakistan's healthcare sector is still developing. The Government of Pakistan formulated the 'Drugs Act 1976', which was similar to the UK Medicines Act 1968, for regulating the pharmacy profession [152]. It stated regulations for the manufacturing of drugs and their use as well as the role of pharmacists [152]. Unlike the Medicines Act 1968, the Drugs Act 1976 was not subjected to constant modifications considering the changes in clinical practice.

Since the last decade, the curriculum of pharmacy education in Pakistan is being subjected to regular changes over time to accommodate the advancements in drugs use and the pharmacy profession. Initially, the practice of pharmacy in Pakistan's healthcare system was focused on drug dispensing and compounding. Hence, a degree in pharmacy was designed as Bachelor of Science in Pharmacy (BSc. Pharmacy) comprised of 3 years of full-time courses with core subjects related to compounding and dispensing of medicine. This was later modified to a bachelor's in pharmacy (B. Pharm), which was a four-year degree and had industrial pharmacy-related courses. In 2008, the course was again modified to Doctor of Pharmacy (Pharm.D),

which was a five-year degree and had clinical and hospital pharmacy-related courses along with the previous ones [153-155]. This was done envisioning the clinical role of pharmacists in the country's healthcare system [155,151]. Currently, as per the regulations of the Pharmacy Council of Pakistan, pharmacists are considered a part of the healthcare team without prescribing authority [31]. However, some misapprehensions and scepticism regarding their clinical role exist among doctors [142, 158-159].

(b) Methodology

(i) Objective

The aim was to evaluate doctor's perceptions, expectations, and experiences regarding the role of Pharmacist in hospital settings of Pakistan.

(ii) Study design, duration, and venues

A cross-sectional survey was carried out from January 2018 to April 2018. The target population for this study was medical doctors. All doctors who graduated with a degree in medicine, with one year of house job experience and were practising in hospitals across Pakistan were included. There are 968 state-funded hospitals across eight administrative units of the country. Since the state-funded healthcare structure is inadequate to fulfil the healthcare needs of the population, most Pakistanis utilize private sector hospitals as well [147]. The study was conducted in 122 tertiary care hospitals in 27 cities of Pakistan that were in 6 administrative units of the country (figure 7).

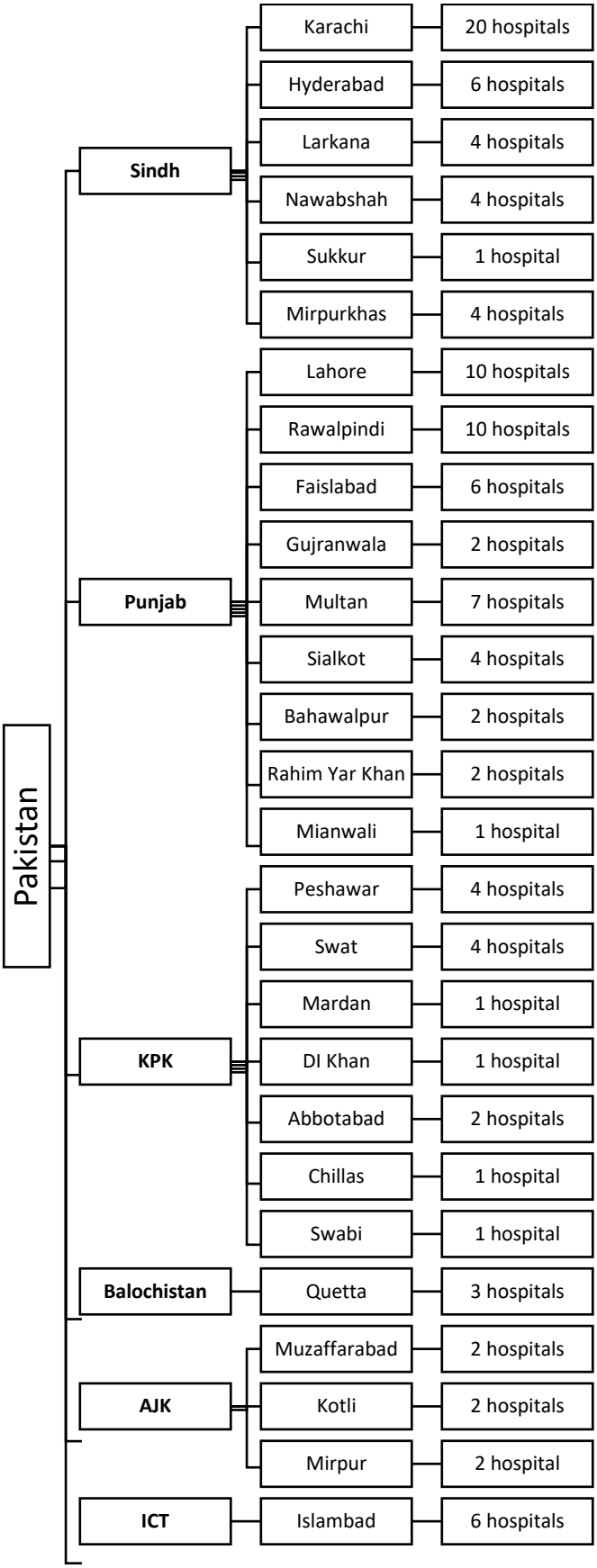


Figure 7: Study Venues

(iii) Target population and eligibility criteria

The target population was doctors working in hospital settings in several cities of Pakistan. The eligibility criteria of doctors were adopted from Naqvi et al., i.e., licensed doctors who were currently working in healthcare settings of Pakistan for at least one year [148]**.** All licensed doctors working in the industry, academia and community clinics were excluded. They were excluded from the study since they were not working in the healthcare settings and may have different perceptions that may not be representative.

(iv) Sampling strategy and sample size calculation

The sample size was estimated using an automated online calculator (RAOSOFT) [160]. The official figures for the number of doctors with a basic degree in medicine are 186,980 [161]. This figure was considered as the total population, keeping an alpha error rate of 0.05 and a confidence level of 95%. The sample size was 540 plus a 2% drop-out rate (n=10). Initially, a list covering all doctors working at studied hospitals was prepared, then the simple randomization technique was used to select doctors. Finally, a total of 550 participants were approached randomly to participate in this study. Before the initiation of the survey, the doctors were given an explanation regarding the research purpose, and their consent to participate in the study was obtained. The questionnaires was in the English language, distributed as hard copy, in a face-to-face manner and, were collected later at a suitable time indicated by respondents. In some cases, the doctors were not keen on participating in the study mainly because of their busy schedule.

(v) Research instrument development and validation

The questionnaire was prepared with help from previous literature by a panel of experts, including two academicians and two clinical pharmacists [133, 151, 152]. There were four sections in the questionnaire that included demographic information about participants, the interactions of doctors with pharmacists, the reasons for their interactions and, the perception of doctors regarding their professional role in Pakistan's healthcare settings. Apart from demographic questions, it included questions related to professional acceptance of pharmacists in the healthcare system, pharmacists' experience of working with doctors and, the involvement of pharmacists in medicines management. The final questionnaire contained a total of 45 items and took about 25 minutes on average to fill in the response. The options for questions except for demographics were dichotomous, i.e., in yes/no format. The questionnaire was in the English language.

The questionnaire was subjected to content validation by a panel of experts that included three academicians, two clinical pharmacists and three pharmacists. Each member of the panel reviewed the questions and indicated them as essential/non-essential. Content validation was conducted using the methodology described by Lawshe and Rungtusanatham [153, 154]. The content validity index was reported at 0.81, which was greater than the cut-off value of 0.75 required for establishing validity [154]. The reliability of the questionnaire was estimated using Cronbach alpha and was reported at 0.889. The intraclass correlation coefficient was 0.889 (95% CI: 0.873 – 0.904).

(vi) Data collection

The questionnaire was delivered as hardcopy by hand and was either completed at the same date or collected at a later date as indicated by the respondent. Prior to handing the questionnaire, the participants were briefed about the study purpose.

(vii) Data analyses

Data were analysed by SPSS 24.0 (SPSS, Chicago, IL, USA) and reported as a percentage (%) and sample count (N). Chi-square ($\chi 2$) was used to analyse independent variables such as level of education; type of hospital; and previous experience, with; dependent variables, such as expectations of pharmacists; acceptance of pharmacists within the healthcare system; experiences of doctors with pharmacists; and involvement of pharmacists in medicines management. Statistical significance was accepted at a p-value less than 0.05.

(viii) Consent and ethics approval

All those who agreed to participate had to provide their consent before data collection. The study was approved by the Research Ethics Committee of the University (Reference Number 00286). In addition, approval letters from the local hospitals were also obtained before data collection.

(c) Results

Of 550 questionnaires received in total, 483 were completed and used in analyses giving a response rate of 87.9%. However, sixty-seven questionnaires were discarded based on failure to comply with the given instructions. Most respondents were male (61.9%, n = 299) doctors. Almost half of the respondents (55.3%) possessed a specialized post- registration medical qualification, whilst almost a third (31.1%) had only a basic medical degree. Some doctors had overseas medical qualifications (13.7%), meaning that most respondents were trained and qualified in Pakistan. Almost equal proportion of doctors worked in state-funded (51.6%) and

private hospitals (48.4%), respectively. As judged by individual job titles, most respondents were classed as Resident Medical Officers (RMO) (56.7%), 17.8% were Medical Officer, Registrar (9.5%), and Assistant Professors were 9.5%. Few were Associate Professors (5.2%) and Professors (1.2%).

Almost half of the respondents (45.3%) had work experience of less than 5 years, whereas 36.6% had experience between 5 and 10 years, reflecting the predominantly junior grades of respondents. Whereas only 18% had work experience of more than 10 years. Areas of practice stated by respondents included internal medicine (27.3%), surgery (26.1%), paediatrics (22.4%) and obstetrics & gynaecology (10.1%). About 14% of doctors were working in departments, namely orthopaedics, ear, nose and throat (ENT) and, emergency (ER). The respondents involved in the study were from all provinces of Pakistan in the following proportions; Sindh (30.4%), Punjab (41.8%), Baluchistan (4.1%), Khyber Pakhtunkhwa (KPK) (13.3%), Islamabad Capital Terri- tory (7.5%), and Azad Jammu & Kashmir (AJK) (2.9%). All the respondents were registered with Pakistan Medical and Dental Council (PM & DC). The majority (83.4%) of participants had national professional memberships, while few doctors had both national and international memberships (16.6%). Table 1 illustrates the details about respondents' demographics and relevant information. Among all respondents, slightly more than a quarter (26.5%) had interactions with pharmacists described as 'weekly', whilst the majority described more than once daily interactions with pharmacists (67.5%). Few (6%) doctors had them as a technician or having the technical role. Regarding the occupation of pharmacy, most respondents considered pharmacists as professional (70.2%), whereas a fifth (21.7%) considered pharmacists as part of a commercial enterprise. A relatively few respondents (8.1%) described pharmacy as both professional and business. Table 3 summarises these views.

The later sections of the survey report the expectations and experience of doctors as well as their acceptance of pharmacists along with p-values of three main variables of the study, i.e., education of doctors, type of hospitals, and work experience of doctors. Tables 4, 5 and 6 indicate doctors' expectations. Furthermore, Tables 7, 8 and 9 provide details about acceptance of pharmacist from a doctor perceptive. Besides, Tables 10, 11 and 12 tabulates the experience of doctors with a pharmacist, while Tables 13, 14 and 15 reports the details pertaining to the perception of doctors regarding the involvement of pharmacists in medicines management.

Table 3: Demographic Information

Characteristics	Respondents (n=483)
Gender	
Male	299 (61.9%)
Female	184 (38.1%)
Professional Education	
Basic Medical Qualification	150 (31.1%)
Specialized Medical Qualification	267 (55.3%)
Overseas Medical Qualification	66 (13.7%)
Place of Work	
State Funded Hospital	249 (51.6%)
Private Hospital	234 (48.4%)
Current Job Title	
Professor	6 (1.2%)
Associate Professor	25 (5.2%)
Assistant Professor	46 (9.5%)
Senior Registrar	46 (9.5%)
Resident Medical Officer	274 (56.7%)
Medical Officer	86 (17.8%)
Years of Experience	
Less than 5 years	219 (45.3%)
5-10 years	177 (36.6%)
More than 10 years	87 (18.0%)
Area of Practice	
Internal Medicine	132 (27.3%)
Surgery	126 (26.1%)
Paediatrics	108 (22.45)
Obstetrics and Gynaecology	51 (10.6%)
Others (Ortho, ENT, ER)	66 (13.7%)
State of Practice	
Sindh	147 (30.4%)
Punjab	202 (41.8%)

Baluchistan	20 (4.1%)
KPK	64 (13.3%)
Capital Territory	36 (7.5%)
AJK	14 (2.9%)
Are you registered with Medical Council?	
Yes	483(100%)
Please state your Professional Membership	
National	403 (83.4%)
International (Both)	80 (16.6%)

Table 4: Frequency and reasons for interactions with Pharmacist

Characteristics	**Respondents (n=483)**
How often do you work directly with Pharmacists?	
Never/ Rarely	29 (6.0%)
Once a week	128 (26.5%)
Once a day	326 (67.5%)
What are the most common reasons for these interactions?	
Drug availability queries	356 (73.7%)
Drug alternative queries	48 (9.9%)
Drug dosage queries	34 (7.0%)
Side effects queries	16 (3.3%)
Drug interaction queries	29 (6.0%)

Table 5: Perception about Pharmacy Profession in Pakistan

Characteristics	**Respondents (n=483)**
Which of the following you think best describes the Pharmacist?	
Clinician	405 (83.9%)
Technician	78 (16.1%)
How would you define Pharmacy as an occupation?	
Professional	339 (70.2%)

Business	105 (21.7%)
Both	39 (8.1%)

Table 6: Expectations of doctors from pharmacists:

	Education	Agree	Disagree	P-Value	Type	Agree	Disagree	P-Value	Experience	Agree	Disagree	P-Value
I expect pharmacists to educate my patients about the safe and appropriate use of their medication	Basic	140	10	0.078	State funded	224	25	0.817	<5 years	194	25	0.387
	Specialized	238	29		Private	209	25		5-10 years	163	14	
	Overseas	55	11		other	0	0		>10 years	76	11	
I expect pharmacists to monitor my patients' response to drug therapy and let me know if a patient encounters any drug-related problem	Basic	104	46	**0.000**	State funded	198	51	**0.000**	<5 years	175	44	**0.000**
	Specialized	253	1.4		Private	225	9		5-10 years	161	16	
	Overseas	66	60		other				>10 years	87	0	
Be mostly involved in the technical component of dispensing (counting tablets and labelling)	Basic	31	119	**0.000**	State funded	53	196	0.072	<5 years	46	173	**0.000**
	Specialized	26	241		Private	35	199		5-10 years	11	166	
	Overseas	31	35		other	0	0		>10 years	31	56	
Provide a "closed shop "service that just receives prescriptions from the clinicians and couriers the medicine to the patient	Basic			0.191	State funded	218	31	0.163	<5 years	203	16	0.103
	Specialized				Private	214	20		5-10 years	153	24	
	Overseas				other	0	0		>10 years	76	11	
	Specialized	242	25		Private	51	183		5-10 years	33	144	
	Overseas	66	0		other	0	0		>10 years	27	60	
Advise on the cost-effectiveness of medicines for disease states	Basic	134	19	**0.000**	State funded	210	39	**0.038**	<5 years	189	30	**0.002**
	Specialized	241	26		Private	212	22		5-10 years	165	12	
	Overseas	47	19		other	0	0		>10 years	68	19	
Formally review patient's medicines and discuss possible alterations to	Basic	101	49	**0.019**	State funded	180	69	**0.005**	<5 years	163	55	**0.003**
	Specialized	186	81		Private	141	93		5-10 years	108	69	
	Overseas	34	32		other	0	0		>10 years	50	37	

medicines therapy with the clinician												
Supervise repeat prescriptions for a patient, according to agreed protocols	Basic	80	70	**0.000**	State funded	92	157	**0.041**	<5 years	79	140	0.358
	Specialized	52	21.5		Private	66	168		5-10 years	53	124	
	Overseas	26	40		other	0	0		>10 years	26	61	
	Specialized	231	36		Private	214	20		5-10 years	152	25	
	Overseas	55	11		other				>10 years	76	11	
Prescribe a medicine for a patient after the clinicians has made the diagnosis, decided on the category of medicine required and given the pharmacist relevant clinical details (partnership prescribing)	Basic	62	88	**0.000**	State funded	57	192	**0.000**	<5 years	51	168	**0.000**
	Specialized	11	256		Private	16	218		5-10 years	22	155	
	Overseas	73	66		other				>10 years	0	87	

Table 7: Doctor's experience of working with pharmacist

	Education	**Agree**	**Disagree**	**P-Value**	**Type**	**Agree**	**Disagree**	**P-Value**	**Experience**	**Agree**	**Disagree**	**P-Value**
Pharmacists routinely counsel my patients regarding the safe and appropriate use of their medications	Basic	134	16	**0.027**	State funded	229	20	0.837	<5 years	179	40	**0.000**
	Specialized	243	24		Private	214	20		5-10 years	177	0	
	Overseas	66	0		other	0	0		>10 years	87	0	
	Overseas	55	11		other	0	0		>10 years	65	22	
In my experience, pharmacists appear willing to take personal responsibility for resolving any drug-related problems they discover	Basic	124	26	**0.000**	State funded	207	42	**0.006**	<5 years	182	37	**0.000**
	Specialized	251	16		Private	214	20		5-10 years	172	5	
	Overseas	46	20		other	0	0		>10 years	67	20	

Pharmacists routinely inform me if they discover clinical problems with my prescriptions	Basic	119	31	**0.000**	State funded	188	61	**0.000**	<5 years	199	20	**0.001**
	Specialized	241	20		Private	234	0		5-10 years	157	20	
	Overseas	55	10		other	0	0		>10 years	66	21	

Table 8: Doctor's acceptance of pharmacists' role

	Education	**Agree**	**Disagree**	**P-Value**	**Type**	**Agree**	**Disagree**	**P-Value**	**Experience**	**Agree**	**Disagree**	**P-Value**
Design and monitor pharmacotherapeutic regimes	Basic	119	31	**0.042**	State funded	187	62	**0.000**	<5 years	188	31	**0.004**
	Specialized	236	31		Private	225	9		5-10 years	146	31	
	Overseas	57	9		other	0	0		>10 years	78	9	
Prevent prescription errors by near-patient pre-screening of prescriptions	Basic	136	24	**0.042**	State funded	238	11	**0.009**	<5 years	205	14	**0.001**
	Specialized	245	22		Private	209	25		5-10 years	166	11	
	Overseas	66	0		other	0	0		>10 years	76	11	
Treat minor illnesses (prescribing for common ailments) independent of other clinicians	Basic	52	98	**0.000**	State funded	44	205	0.659	<5 years	41	178	**0.001**
	Specialized	26	241		Private	45	189		5-10 years	37	140	
	Overseas	11	55		other	0	0		>10 years	11	76	
	Overseas	66	0		other	0	0		>10 years	87	0	
Review and stop unnecessary antimicrobial agents	Basic	38	112	**0.000**	State funded	54	195	0.203	<5 years	42	177	**0.000**
	Specialized	26	241						5-10 years	22	155	
	Overseas	30	36		Private	40	194		>10 years	30	57	
					other	0	0					
	Basic	141	9	**0.006**	State funded	239	10	**0.001**	<5 years	201	18	0.333

Liaise with primary healthcare providers about the care of patients	Specialized	237	30		Private	205	29		5-10 years	166	11	
	Overseas	66	0									
					other	0	0		>10 years	77	10	

Table 9: Doctor's perception regarding pharmacists' involvement in Medicines Management

	Education	**Agree**	**Disagree**	**P-Value**	**Type**	**Agree**	**Disagree**	**P-Value**	**Experience**	**Agree**	**Disagree**	**P-Value**
Do you think pharmacists should increase their involvement in medicines management?	Basic	150	0	**0.001**	State funded	240	9	0.893	<5 years	219	0	**0.000**
	Specialized	249	18		Private	225	9		5-10 years	159	18	
	Overseas	66	0		other	0	0		>10 years	87	0	
Other than to dispense prescriptions, pharmacists are on the periphery of the core health care team	Basic	135	15	**0.000**	State funded	214	35	**0.000**	<5 years	204	15	**0.080**
	Specialized	258	9		Private	234	0		5-10 years	168	9	
	Overseas	55	11		other	0	0		>10 years	76	11	
A pharmacist providing this service would not be calling my judgment into question	Basic	11	139	0.117	State funded	31	218	0.163	<5 years	20	199	0.614
	Specialized	29	238		Private	20	214		5-10 years	20	157	
	Overseas	11	55		other	0	0		>10 years	11	76	
	Specialized	267	0		Private	27	207		5-10 years	177	0	
	Overseas	55	11		other	0	0		>10 years	76	11	
I don't feel comfortable with the autonomy pharmacists have when dealing with patients	Basic	11	139	**0.001**	State funded	238	11	**0.001**	<5 years	11	208	0.054
	Specialized	11	256		Private	234	0		5-10 years	11	166	
	Overseas	11	55		other	0	0		>10 years	11	76	
	Specialized	195	72		Private	11	223		5-10 years	136	41	
	Overseas	46	20		other	0	0		>10 years	67	20	
Pharmacist's knowledge of pharmacology and clinical use of medicines is	Basic	33	117	**0.000**	State funded	164	85	0.086	<5 years	22	197	0.699
	Specialized	11	256		Private	171	63		5-10 years	22	155	

inadequate to intervene on the patient's behalf	Overseas	11	55		other	0	0		>10 years	11	76	
I have sufficient confidence in the clinical knowledge of pharmacists for them to provide this service	Basic	124	26	**0.000**	State funded	212	37	**0.000**	<5 years	193	26	**0.000**
	Specialized	267	0		Private	234	0		5-10 years	177	0	
	Overseas	55	11		other	0	0		>10 years	76	11	
Pharmacists are sufficiently trained to provide this service.	Basic	33	117	0.484	State funded	64	185	**0.000**	<5 years	27	192	**0.004**
	Specialized	47	220		Private	27	207		5-10 years	42	135	
	Overseas	11	55		other	0	0		>10 years	22	65	
	Overseas	66	0		other	0	0		>10 years	87	0	
This service would improve patients' medicine-related health outcomes	Basic	141	9	**0.024**	State funded	227	22	**0.037**	<5 years	184	35	**0.011**
	Specialized	230	37		Private	199	35		5-10 years	166	11	
	Overseas	55	11		other	0	0		>10 years	76	11	

(d) Discussion

Evidence indicates that coordination among healthcare professionals is essential to achieve the optimal patient outcome in any healthcare setting [163, 164]. Studies emphasize that the harmonization of clinical roles among health professionals must always exist [165, 166]. Though doctors considered pharmacists as part of the clinical team, however, our findings indicate that communication between them was not satisfactory.

The findings revealed that demographic factors are a determinant in shaping doctor's perceptions about pharmacists. The level of education, work experience and type of hospital of doctors influenced their expectations, experiences, and overall opinion about the pharmacists. Hence, our results are in line with the findings of Klopotowska and colleagues [148].

Most doctors in our study were male; it was not reflective of the official figures for male and female doctors in Pakistan, which is roughly 50:50. A possible explanation for this occurrence could be the non-practising of female graduates. Most female graduates do not practice medicine after graduation and become housewives. This was highlighted in several news articles, and the phenomenon is termed as 'Doctor Brides' [167-169]. According to the 2016 Asian Development Bank report, the number of Pakistani women pursuing a university degree has increased. However, only a quarter work outside [170]. The report of World Economic Forum 2018 placed Pakistan in the second-to-last place in the list for worst gender equality index [171].

Most respondents had work experience less than 5 years. This occurrence may be due to the frequent migration of experienced doctors from Pakistan to developed countries [172]. Studies conducted in Pakistan highlighted a higher tendency among medical and allied health students to emigrate abroad. Most doctors who gain a certain level of work experience and seniority move to other countries. Those who stay in Pakistan may attain higher administrative positions and are involved in the practice to a lesser extent [173, 174].

In our study, the majority of the participant (67.5%) responded that they interacted with pharmacist daily, and the reason for their interaction was mainly related to drugs availability inquiry (73.7%). This finding highlights that doctors' knowledge and perception of pharmacists' role was limited as they mainly interacted with pharmacists for logistical issues. This limited interaction further highlights the partial recognition of the pharmacist's role in

clinical settings. This finding is also consistent with the work of Khan and colleagues who evaluated the perceptions of doctors about pharmacists in public sector hospitals of Pakistan [143, 165].

Most doctors (89.6%) believed that pharmacists should guide patients about the safe use of medicines ($p>0.05$). The majority (87.6%) of doctors mentioned that they expect pharmacists to monitor patient's response to drug therapy ($p<0.05$). Additionally, most doctors (66.5%) expected pharmacists to review patient's medicines and discuss possible amendments to therapy with patients should there be a need ($p<0.05$). Besides, most doctors (84.9%) disagreed with the notion of pharmacists prescribing medicine for patients ($p<0.05$). The doctors believed that pharmacists could perform several clinical duties such as educating patients, designing therapy regimens, dispensing drugs and monitoring prescriptions for any errors [166]. The doctors were not welcoming to the idea of pharmacists treating minor illnesses during their stay in the hospital. Most participants (81.6%) did not want pharmacists to prescribe independently. The respondents (80.5%) did not believe that pharmacists could review and stop antimicrobial agents if they feel it to be unnecessary. This suggests that doctors were not comfortable with pharmacists intervening in prescriptions.

Previous studies have reported that pharmacists have a substantial impact on patient safety in hospitals [175-177]. Evidence indicates that improved interactions between pharmacists and doctors foster safe and cost-effective therapy. Most doctors (87.2%) agreed that pharmacists were keen to accept the responsibility for resolving drug-related problems ($p<0.05$). Furthermore, the doctors (87.4%) responded positively that in their experience, pharmacists regularly advise them about any clinical problems they encountered in prescriptions ($p<0.05$). One of the core tasks in pharmaceutical care service provided by pharmacists is to look for any drug-related problem and resolve them [178]. Hence, the pharmacist may consider these tasks as their prime obligation.

In our study, most doctors disagreed (84.9%) with the notion of pharmacists prescribing medicine as they feared that confrontation between doctors and pharmacists could occur if pharmacists are involved in prescribing. It is evident from studies that although doctors may agree to the concept of pharmacists as counsellors there is a hesitation among them regarding pharmacists' independent prescribing and decision-making responsibilities [143, 160, 179].

This perception is further strengthened by regulations and legalities as pharmacists in Pakistan are not allowed to act as independent prescribers [180].

The outcomes of the study indicated that doctors considered pharmacists for logistical queries regarding drugs and not for clinical queriers. This suggests poor communication among doctors and pharmacist. The doctors considered them to be drug dispensers. This finding is in line with previous studies [132, 148, 157-162, 181-183]. Moreover, most doctors negatively perceived that pharmacist in Pakistan lacked clinical expertise in recommending prescription drugs and believed that pharmacist could not properly execute the duties related to advance clinical pharmacy practice.

The demographic variables of education level, area of practice and work experience of doctors influenced their perceptions about pharmacists and their roles. As the level of education increases, such as undergoing fellowship training or pursuing a masters, PhD, etc., that is usually done in a developed country. Doctors come across other allied health professionals and learn to work as a team to treat and ensure the achievement of treatment goals for patients. Such education, work experience and place of practice may help in increasing their awareness regarding pharmacists and their roles in clinical settings. This may change their mindset and build a positive perception about pharmacists.

The results of our study, together with previously reported literature, highlight that the attitude of Pakistani doctors and their acceptance of pharmacists' clinical roles have gradually improved over time [143, 160, 184]. However, the acceptance of pharmacists' clinical role was linked to doctor's experience of interaction with pharmacists. The doctors were generally receptive to consultation and counselling services provided by pharmacists but were impervious to their independent decision-making authority.

According to the national legislation, pharmacists are required to perform their traditional roles, i.e., dispensing, drug information, etc., along with clinical roles that further includes medication utilization reviews, counselling, therapeutic drug monitoring, formulation of intravenous preparations, etc. However, the results of the current study reveal the gap between a pharmacist's clinical knowledge and its application. The opportunities available for pharmacists to practise in Pakistan's healthcare system are scant, and therefore pharmacists are not able to fully perform their clinical duties, and hence their potential of the clinical role

remains to be utilized to the full extent. The results highlight that there is a need to create awareness regarding pharmacist's role in clinical settings. Therefore, integration of courses for inter-professional interactions among doctors and pharmacists should be added to the curriculum. This may be beneficial in the long run and may ensure satisfactory patient care [164, 179, 185]. Studies that could compare the benefits of pharmaceutical care with controls to demonstrate its effectiveness are recommended [186].

(e) Strengths and limitations of the study

The study gathered response from a large sample of doctors spread across 26 cities of Pakistan, and a detailed analysis of their response highlights the extent of this problem. Such studies have not been carried out in Pakistan before. These aspects could be considered as strengths of this study. However, the results of this study cannot be generalised as responses from doctors in primary care hospitals as well as non-institutional doctors were not included. The views may differ among doctors based on hospitals and doctors' expectations. Moreover, most doctors in our study had little work experience; the perception of experienced doctor may have been different.

This study did not investigate the perceptions, expectations, and experiences of pharmacists. Further studies that investigate attitudes and experiences of pharmacists would provide a better understanding of the problem from the pharmacist's point of view. The study was survey-based research and involved close-ended questions. Qualitative studies might be able to extract rich data and help explicate expectations as well as experiences of doctors regarding the same.

(f) Conclusion

The study highlights that doctor considered pharmacists as drug information specialists, dispensers, educators, and counsellors; however, their expectation of pharmacists performing the clinical role and being involved in direct patient care was limited. They seemed sceptical of advance clinical pharmacy roles such as intervening in prescriptions and medication therapy, consultations, prescribing, etc. The doctors were not welcoming to the idea of pharmacists working as a member of an allied healthcare team. There is a need to increase doctor's awareness regarding the role pharmacists could play in Pakistan's healthcare system. It is vital to involve pharmacists' clinical rotations with doctors to develop a professional relationship. Moreover, it may be helpful if seminars are conducted on the importance of clinical pharmacy

services in the healthcare system. Such activities would provide an opportunity to recognize the accomplishments and limitations of a pharmacist's clinical role.

(B) Pharmacist Viewpoint Towards Their Professional Role in Healthcare System: A Survey of Hospital Settings of Pakistan

(a) Introduction

The profession of pharmacy has evolved from a product-focused practice to a patient-oriented one [187]. In general, the primary duties of the pharmacist include providing drug information, medicines management, preparation and dispensing of medicines, counselling of patients, and formulating pharmaceutical care plan for patients [188]. The pharmaceutical care plan is an individualized service provided by the pharmacist that aims to improve the quality of a patient's health [189]. Pharmaceutical care involves a collaborative relationship between the pharmacist and the physicians to improve the health status of patients [190]. It was envisioned that in future, pharmacists would be greatly involved in clinical and administrative roles and their traditional roles of pill counting, packaging and dispensing would be performed by technicians and trainees [191]. Literature suggests that pharmaceutical care practice has a substantial positive effect on healthcare and disease management in developed countries [192, 193]. However, the situation is different in developing countries as the application of pharmaceutical care is hindered due to time constraints, lack of standard reimbursement, less access to patients' records, poor communication among healthcare professionals, insufficient number of qualified pharmacists and absence of government and hospital policies [193].

A pre-requisite to establishing efficient pharmaceutical care services would be the greater involvement of hospital pharmacist as a member of allied heath team with more interaction with other healthcare professionals. Effective implementation of this service requires an understanding of a hospital pharmacist's perception towards the concept of pharmaceutical care, their role in direct patient care and, the extent and level of interaction with other healthcare professionals. The traditional role of the pharmacist has always been purchasing and inventory management of medicines along with ensuring their safety and efficacy [194]. However, with the introduction of the 'Pharmaceutical care' concept by Hepler and Strand during the 90s, the traditional role of the pharmacist has transcended from medicine provider to a patient care provider [195]. During the last few decades, pharmacists have practised pharmaceutical care to improve patients' treatment outcomes and maximize the benefits of medication therapy to patients [190, 196].

According to the World Health Organization, pharmacists are deemed to perform advisory roles for allied health team and must have specialized knowledge and skills in their domain of practice [197, 198]. In Pakistan, the health authorities have resolved to introduce pharmaceutical care services within the healthcare system to improve patient's quality of life [199]. However, the concept of pharmaceutical care is relatively new and is not understood well among pharmacists, allied health professionals and the public. In addition, the lack of qualified pharmacists and the unavailability of practice guidelines for pharmacy practice hinder the role of the pharmacist in Pakistan's healthcare system [200]. There is an acute shortage of pharmacists in all healthcare sectors. Moreover, hospital pharmacists are involved to a greater extent in traditional pharmacy services and administrative activities than in clinical pharmacy services. Furthermore, it has been observed that pharmacy graduates in Pakistan preferred to join pharmaceutical marketing and sales jobs. [201-202].

In recent time, useful and modern adaptations has observed in the policy and education of the pharmacy profession [203]. Moreover, the current pharmacy practice model in Pakistan requires modifications concerning collaborative practice supported by evidence and should have confined perspective in its application and conceptualisation [204-205]. As this paradigm is novel in Pakistan, it requires more planning for future perspectives suitable to the country's policies. At the same time, it is imperative to find out what pharmacists perceive about pharmaceutical care service and their supposed engagement with the other medical staff to understand the determinants that hinder their clinical role in the Pakistani healthcare system.

The health authorities of Pakistan should implement pharmaceutical care practices in the health system of the country to improve the safe use of medicines and improve patients' quality of life [206]. The present study was conducted to evaluate the acceptability of pharmacists as patient care provider, their relation and interaction with the doctors and, their perception about performing medicines management services. Thus, the study evaluated pharmacists' viewpoint regarding their professional role in the healthcare system of Pakistan.

(b) Methodology

(i) Objective

The primary objective of this study was to document the attitude of pharmacists towards their role in Pakistan's healthcare system, their experience with doctors and perceptions towards involvement in medicines management.

(ii) Study design, duration, and venues

This study was a cross-sectional survey that was conducted for a period of four months from January 2018 up to April 2018. Pakistan is a South Asian country and hosts a population of over 220 million. The healthcare system of Pakistan consists of state-funded and private sector healthcare facilities [207]. There are 968 state-funded hospitals across 8 administrative units of the country. Since the state-funded healthcare structure is inadequate to fulfil the healthcare needs of the population, most of Pakistanis utilize private sector hospitals as well [208]. The study was conducted in 122 tertiary care hospitals in 27 cities of Pakistan that were in 6 administrative units of the country (figure 8).

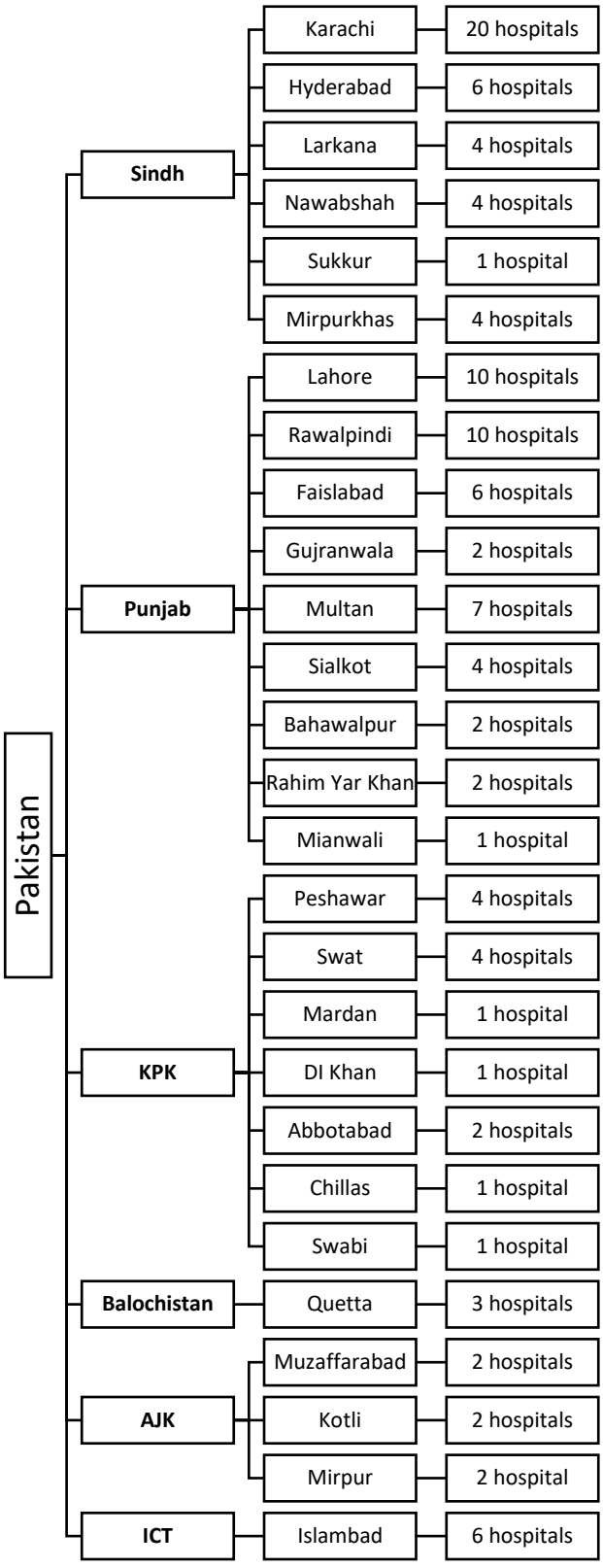


Figure 8: Study Venues for Pharmacists

(iii) Target population and eligibility criteria

The target population was pharmacists working in hospital settings in several cities of Pakistan. The eligibility criteria of pharmacists were adopted from Naqvi et al., i.e., licensed pharmacists who were currently working in healthcare settings of Pakistan for at least one year [209]**.** All licensed pharmacists working in the pharmaceutical industry, academia and community pharmacies were excluded. They were excluded from the study since they were not working in the healthcare settings and may have different perceptions that may not be representative.

(iv) Sampling strategy and sample size calculation

Data collection was conducted using the convenience sampling technique due to the unavailability of a database that could highlight the exact number of pharmacists practising in various hospitals across Pakistan. The study sample size was estimated using an online sample size calculator (RAOSOFT) [210]. As per the country's pharmaceutical data obtained from WHO 2010 report, there were roughly 10,000 licensed pharmacists working in all settings of Pakistan [211]. This figure was considered as the target population. A 5% margin of error and 95% confidence level was set. The required sample size was 500. A 2% drop-out rate (N = 10) was added to yield the final number of 490 pharmacists.

(v) Research instrument development and validation

The questionnaire was prepared with help from previous literature by a panel of experts, including two academicians and two clinical pharmacists [194, 212, 213]. There were four sections in the questionnaire that included demographic information about participants, the interactions of pharmacists with doctors, the reasons for their interactions and, the perception of pharmacists regarding their professional role in Pakistan's healthcare settings. Apart from demographic questions, it included questions related to professional acceptance of pharmacists in the healthcare system, pharmacists' experience of working with doctors and, the involvement of pharmacists in medicines management. The final questionnaire contained a total of 45 items and took about 25 minutes on average to fill in the response. The options for questions except for demographics were dichotomous, i.e., in yes/no format. The questionnaire was formulated in the English language.

The questionnaire was subjected to content validation by a panel of experts that included three academicians, two clinical pharmacists and three pharmacists. Each member of the panel reviewed the questions and indicated them as essential/non-essential. Content validation was

conducted using the methodology described by Lawshe and Rungtusanatham [214, 215]. The content validity index was reported at 0.81, which was greater than the cut-off value of 0.75 required for establishing validity [215]. The reliability of the questionnaire was estimated using Cronbach alpha and was reported at 0.889. The intraclass correlation coefficient was 0.889 (95% CI: 0.873 – 0.904).

(vi) Data collection

The questionnaire was delivered as hardcopy by hand and was either completed at the same date or collected at a later date as indicated by the respondent. Prior to handing the questionnaire, the participants were briefed about the study purpose.

(vii) Data analysis

The data were analysed using statistical software (SPSS, Chicago, IL, USA, version 24.0). The results were reported as sample count (N) and frequency (%). Cross tabulation and chi-square (χ^2) test were applied to assess the association between the independent variables (education, type of hospital and experience of pharmacists) and dependent variables (attitude, experiences of pharmacists with doctors and the involvement of pharmacists in medicines management in the hospitals). The cut-off for statistical significance was a p-value of 0.05 or less.

(viii) Consent and ethics approval

All those who agreed to participate had to provide their consent before data collection. The study was approved by the Research Ethics Committee of the University (Reference Number 00286). In addition, approval letters from the local hospitals were also obtained before data collection.

(c) Results

Of the total 500 pharmacists approached, 396 questionnaires were completed giving a response rate of 79.2%, the results of which were then taken forward for analysis. Most respondents were male (64.1%) and had Pharm.D (Doctor of Pharmacy) degree (74.5%). Almost equal proportions of the respondents worked in state-funded (50.3%) and private hospitals (49.7%), respectively. As per the job titles of respondents, most respondents were working in the capacity of pharmacist (91.7%). Among all respondents, almost 60% had experience from 5-10 years. The majority (66.9%) were associated with inpatient pharmacy. Almost all (99.2%)

respondents were registered with Pakistan Pharmacy Council. The demographic information data are tabulated in table 10.

Table 10: Demographic Information

Characteristics	N=396 (%)
Gender	
Male	254 (64.1%)
Female	142 (35.9%)
Professional Education	
Bachelor of Pharmacy/ Master of Pharmacy	87 (22%)
Doctor of Pharmacy (Pharm.D)	295 (74.5%)
Overseas Qualification	14 (3.5%)
Place of Work	
State Funded Hospital	199 (50.3%)
Private Hospital	197 (49.7%)
Current Job Title	
Pharmacist	363 (91.7%)
Senior Pharmacist	26 (6.6%)
Chief Pharmacist	7 (1.8%)
Years of Experience	
Less than 5 years	68 (17.2%)
5-10 years	236 (59.6%)
More than 10 years	92 (23.2%)
Area of Practice	
Inpatient	265 (66.9%)
Outpatient	105 (26.5%)
Oncology pharmacy	26 (6.6%)
State of Practice	
Sindh	143 (36.1%)
Punjab	175 (44.2%)
Baluchistan	9 (2.3%)

KPK	44 (11.1%)
Capital Territory	17 (4.3%)
AJK	8 (2.0%)
Are you registered with Pharmacy Council?	
Yes	393 (99.2%)
No	3 (0.8%)
KPK = Khyber Pakhtunkhwa, AJK = Azad Jammu and Kashmir	

Upon eliciting the opinion of pharmacists as to how they describe the pharmacy job, most of them (N = 362, 91.4%) mentioned that pharmacy duties are mostly clinical. However, a small number of pharmacists (N = 34, 8.6%) mentioned the duties as technical. In response to the question of how they would describe pharmacy as an occupation, most pharmacists (N = 351, 88.6%) mentioned it as a professional occupation, while some pharmacists (N = 20, 5.1%) believed it to be a business profession. A similar number of pharmacists (N = 25, 6.3%) mentioned pharmacy job as both professional and business occupation.

Most participants (N = 365, 92.2%) reported that they interacted with doctors daily, while some pharmacists (N = 18, 4.5%) reported that their interactions with doctors were on a weekly basis. Few pharmacists (N = 13, 3.3%) reported that they rarely interacted with doctors during their duty time. In response to the question regarding the most common reasons for these interactions, most pharmacists (N = 287, 72.5%) mentioned drug availability queries while some (N = 39, 9.8%) mentioned queries regarding drug alternatives. A small number of pharmacists (N = 29, 7.3%) mentioned queries related to drug interactions, while a similar number of participants (N = 25, 6.3%) highlighted queries regarding dosage. Few pharmacists (N = 16, 4%) mentioned queries related to adverse drug reactions as one of the most common reasons for interactions. The data regarding pharmacists' attitude towards their role in the healthcare system and their experience with doctors are tabulated in the following tables. In addition, data related to the perception of pharmacists about their involvement in medicines management are tabulated in table 4. All items were cross-tabulated with three independent variables, namely the level of education of doctors, the nature of hospitals, and the work experience of the pharmacist.

Table 11: Perception regarding the professional role of pharmacists

	Education	Agree	Disagree	P-Value	Type	Agree	Disagree	P-Value	Experience	Agree	Disagree	P-Value
To be available for clinician consultation during ward rounds	B/M Pharm	71 (17.9%)	16 (4.0%)	**0.031**	State funded	169 (42.7%)	30 (7.6%)	**0.031**	<5 years	65 (16.4%)	3 (0.8%)	**0.009**
	Pharm.D	268 (67.1%)	27 (6.8%)		Private	181 (45.7%)	16 (4%)		5-10 years	211 (53.3%)	25 (6.3%)	
	Overseas	11 (2.8%)	3 (0.8%)		other	0	0		>10 years	74 (18.7%)	18 (4.5%)	
To communicate or liaise with other healthcare professionals delivering patient care to facilitate positive health outcomes	B/M Pharm	78 (19.7%)	9 (2.3%)	**0.005**	State funded	193 (48.7%)	6 (1.5%)	**0.000**	<5 years	67 (16.9%)	1 (0.3%)	**0.031**
	Pharm.D	269 (67.9%)	26 (6.6%)		Private	163 (41.2%)	34 (8.6%)		5-10 years	209 (52.8%)	27 (6.8%)	
	Overseas	9 (2.3%)	5 (1.3%)		other	0	0		>10 years	80 (20.2%)	12 (3.0%)	
To dispense and accuracy check the supply of medicines to patient (counting pills, labeling, and accuracy checking)	B/M Pharm	67 (16.9%)	20 (5.1%)	**0.036**	State funded	161 (40.7%)	38 (9.6%)	**0.018**	<5 years	63 (15.9%)	5 (1.3%)	**0.021**
	Pharm.D	259 (65.4%)	36 (9.1%)		Private	176 (44.4%)	21 (5.3%)		5-10 years	203 (51.3%)	33 (8.3%)	
	Overseas	11 (2.8%)	3 (0.8%)		other	0	0		>10 years	71 (17.9%)	21 (5.3%)	
To provide a "closed shop" service: receiving prescriptions from a practitioner and couriers the dispensed medicine to a patient only	B/M Pharm	11 (2.8%)	76 (19.2%)	**0.001**	State funded	54 (13.6%)	145 (36.6%)	**0.000**	<5 years	16 (4.0%)	52 (13.1%)	0.623
	Pharm.D	59 (14.9%)	236 (59.6%)		Private	24 (6.1%)	173 (43.7%)		5-10 years	46 (11.6%)	190 (48.0%)	
	Overseas	8 (2.0%)	6 (1.5%)		other	0	0		>10 years	16 (4.0%)	76 (19.2%)	

To check that prescriptions do not have drug-drug interactions	B/M Pharm	55 (13.9%)	32 (8.1%)	**0.017**	State funded	156 (39.4%)	43 (10.9%)	0.093	<5 years	61 (15.4%)	7 (1.8%)	**0.004**
	Pharm.D	231 (58.3%)	64 (16.2%)		Private	140 (35.4%)	57 (14.4%)		5-10 years	173 (43.7%)	63 (15.9%)	
	Overseas	10 (2.5%)	4 (1.0%)		other	0	0		>10 years	62 (15.7%)	30 (7.6%)	
To formally review a patient's therapy and to make necessary changes to help promote positive health outcomes	B/M Pharm	71 (17.9%)	16 (4.0%)	**0.031**	State funded	169 (42.7%)	30 (7.6%)	**0.031**	<5 years	65 (16.4%)	3 (0.8%)	**0.009**
	Pharm.D	268 (67.7%)	27 (6.8%)		Private	181 (45.7%)	16 (4.0%)		5-10 years	211 (53.3%)	25 (6.3%)	
	Overseas	11 (2.8%)	3 (0.8%)		other	0	0		>10 years	74 (18.7%)	18 (4.5%)	
To prescribe therapy for a patient following a clinician's diagnosis (partnership or supplementary prescribing)	B/M Pharm	79 (19.9%)	8 (2.0%)	**0.001**	State funded	187 (47.2%)	12 (3.0%)	0.816	<5 years	66 (16.7%)	2 (0.5%0	**0.032**
	Pharm.D	282 (71.2)	13 (3.3%)		Private	184 (46.5%)	13 (3.3%)		5-10 years	224 (56.6%)	12 (3.0%)	
	Overseas	10 (2/5%)	4 (1.0%)		other	0	0		>10 years	81 (20.5%)	11 (2.8%)	
To prescribe therapy for a patient independent of clinician's diagnosis following an initial patient assessment (independent prescribing)	B/M Pharm	55 (13.9%)	32 (8.1%)	**0.017**	State funded	156 (39.4%)	43 (10.9%)	0.093	<5 years	61 (15.4%)	7 (1.8%)	**0.004**
	Pharm.D	231 (58.7%)	64 (16.2%)		Private	140 (35.4%)	57 (14.4%)		5-10 years	173 (43.7%)	63 (15.9%)	
	Overseas	10 (2.5%)	4 (1.0%)		other	0	0		>10 years	62 (15.7%)	30 (7.6%)	

Table 12: Experience of pharmacists with doctors

	Education	Agree	Disagree	P-Value	Type	Agree	Disagree	P-Value	Experience	Agree	Disagree	P-Value
Pharmacists routinely counsel patients regarding the safe and appropriate use of medicines	B/M Pharm	72 (18.2%)	15 (3.8%)	**0.002**	State funded	181 (45.7%)	18 (4.5%)	0.606	<5 years	64 (16.2%)	4 (1.0%)	**0.007**
	Pharm.D	277 (69.9%)	18 (4.5%)		Private	182 (46%)	15 (3.8%)		5-10 years	222 (56.1%)	14 (3.5%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	77 (19.4%)	15 (3.8%)	
Pharmacists are willing to take personal responsibility for resolving any medicines-related problems they discover	B/M Pharm	73 (18.4%)	14 (3.5%)	**0.000**	State funded	180 (45.5%)	19 (4.8%)	**0.008**	<5 years	67 (16.9%)	1 (0.3%)	**0.001**
	Pharm.D	284 (71.7%)	11 (2.8%)		Private	191 (48.2%)	6 (1.5%)		5-10 years	225 (56.8%)	11 (2.8%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	79 (19.9%	13 (3.3%)	
Pharmacists are focused on ensuring the safety of patients with respect to the therapeutic use of medicines	B/M Pharm	70 (17.7%)	17 (4.3%)	**0.014**	State funded	184 (46.5%)	15 (3.8%)	**0.023**	<5 years	66 (16.7%)	2 (0.5%)	**0.008**
	Pharm.D	270 (68.2%)	25 (6.3%)		Private	168 (42.4%)	29 (7.3%)		5-10 years	211 (53.3%)	25 (6.3%)	
	Overseas	12 (3.0%)	2 (0.5%)		other	0	0		>10 years	75 (18.9%)	17 (4.3%)	
Pharmacists respect the autonomy of patients and act to promote the concept of concordance	B/M Pharm	73 (18.4%)	14 (3.5%)	**0.000**	State funded	181 (45.7%)	18 (4.5%)	**0.025**	<5 years	66 (16.7%)	2 (0.5%)	**0.002**
	Pharm.D	284 (71.7%)	11 (2.8%)		Private	190 (48%)	7 (1.8%)		5-10 years	226 (57.1%)	10 (2.5%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	79 (19.9%)	13 (3.3%)	

Table 13: Pharmacy curriculum in Pakistan

	Education	Agree	Disagree	P-Value	Type	Agree	Disagree	P-Value	Experience	Agree	Disagree	P-Value
The curriculum adequately addresses all clinical aspects of Pharmacy practice	B/M Pharm	71 (17.9%)	16 (4.0%)	**0.000**	State funded	174 (43.9%)	25 (6.3%)	**0.204**	<5 years	65 (16.4%)	3 (0.8%)	**0.000**
	Pharm.D	274 (69.2%)	21 (5.3%)		Private	180 (45.5%)	17 (4.3%)		5-10 years	218 (55.1%)	18 (4.5%)	
	Overseas	9 (2.3%)	5 (1.3%)		other				>10 years	71 (17.9%)	21 (5.3%)	
Generally, I am satisfied with the Pharmacy undergraduate curriculum	B/M Pharm	56 (14.1%)	31 (7.8%)	**0.000**	State funded	158 (39.9%)	41 (10.4%)	**0.001**	<5 years	64 (16.2%)	4 (1.0%)	**0.000**
	Pharm.D	275 (69.4%)	20 (5.1%)		Private	179 (45.2%)	18 (4.5%)		5-10 years	214 (54.0%)	22 (5.6%)	
	Overseas	6 (1.5%)	8 (2.0%)		other	0	0		>10 years	59 (14.9%)	33 (8.3%)	
The balance of theoretical and practical aspects of the curriculum is correct	B/M Pharm	71 (17.9%)	16 (4.0%)	**0.000**	State funded	171 (43.2%)	28 (7.1%)	0.385	<5 years	61 (15.4%)	7 (1.8%)	**0.003**
	Pharm.D	268 (67.7%)	27 (6.8%)		Private	175 (44.2%)	22 (5.6%)		5-10 years	214 (54.0%)	22 (5.6%)	
	Overseas	7 (1.8%)	7 (1.8%)		other	0	0		>10 years	71 (17.9%)	21 (5.3%)	

for contemporary practice												
The introduction of a 5-year Pharm-D program in Pakistan's pharmacy schools will develop better practitioners	B/M Pharm	55 (13.9%)	32 (8.1%)	**0.017**	State funded	156 (39.4%)	43 (10.9%)	0.093	<5 years	61 (15.4%)	7 (1.8%)	**0.04**
	Pharm.D	231 (58.7%)	64 (16.2%)		Private	140 (35.4%)	57 (14.4%)		5-10 years	173 (43.7%)	63 (15.9%)	
	Overseas	10 (2.5%)	4 (1.0%)		other	0	0		>10 years	62 (15.7%)	30 (7.6%)	

Table 14: Involvement of pharmacists in Medicines Management

	Education	**Agree**	**Disagree**	**P-Value**	**Type**	**Agree**	**Disagree**	**P-Value**	**Experience**	**Agree**	**Disagree**	**P-Value**
Pharmacists should increase their involvement in medicines management	B/M Pharm	45 (11.4%)	42 (10.6%)	**0.000**	State funded	135 (34.1%)	64 (16.2%)	**0.028**	<5 years	54 (13.6%)	14 (3.5%)	**0.000**
	Pharm.D	229 (57.8%)	66 (16.7%)		Private	153 (38.6%)	44 (11.1%)		5-10 years	182 (46.0%)	54 (13.6%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	52 (13.1%)	40 (10.1%)	

Current state or private funding does not support collaborative work between pharmacists and clinicians in medicines management	B/M Pharm	75 (18.9%)	12 (3.0%)	**0.004**	State funded	181 (45.7%)	18 (4.5%)	**0.025**	<5 years	60 (15.2%)	8 (2.0%)	**0.004**
	Pharm.D	282 (71.2%)	13 (3.3%)		Private	190 (48%)	7 (1.8%)		5-10 years	229 (57.8%)	7 (1.8%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	82 (20.7%)	10 (2.5%)	
Medicines management challenges the clinician's authority	B/M Pharm	60 (15.2%)	27 (6.8%)	0.051	State funded	152 (38.4%)	47 (11.9%)	0.189	<5 years	46 (11.6%)	22 (5.6%)	0.478
	Pharm.D	217 (54.8%)	78 (19.7%)		Private	139 (35.1%)	58 (14.6%)		5-10 years	177 (44.7%)	59 (14.9%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	68 (17.2%)	24 (6.1%)	
I feel inadequately trained to deal with clinicians on clinical medicine-related issues on behalf of patients	B/M Pharm	87 (22%)	0 (0%)	**0.000**	State funded	193 (48.7%)	6 (1.5%)	**0.000**	<5 years	59 (14.9%)	9 (2.3%)	0.055
	Pharm.D	245 (61.9%)	50 (12.6%)		Private	153 (38.6%)	44 (11.1%)		5-10 years	200 (50.5%)	36 (9.1%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	87 (22.0%)	5 (1.3%)	
Patients will get conflicting information regarding medicines use if pharmacists develop their medicines management services	B/M Pharm	39 (9.8%)	48 (12.1%)	**0.000**	State funded	77 (19.4%)	122 (30.8%)	0.585	<5 years	19 (4.8%)	49 (12.4%)	**0.009**
	Pharm.D	95 (24%)	200 (50.5%)		Private	71 (17.9%)	126 (31.8%)		5-10 years	83 (21.0%)	153 (38.6%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	46 (11.6%)	46 (11.6%)	
Enhanced clinical input will further	B/M Pharm	51 (12.9%)	36 (9.1%)	**0.000**	State funded	162 (40.9%)	37 (9.3%)	**0.001**	<5 years	66 (16.7%)	2 (0.5%)	**0.000**

develop my current relationship with clinicians	Pharm.D	280 (70.7%)	15 (3.8%)		Private	183 (46.2%)	14 (3.5%)		5-10 years	219 (55.3%)	17 (4.3%)	
	Overseas	14 (3.5%)	0 (0%)		other	0	0		>10 years	60 (15.2%)	32 (8.1%)	

(d) Discussion

Pharmaceutical care is an integral part of pharmacy practice in any healthcare setting, and its application varies from one country to another depending upon health regulations. Pharmaceutical care services are advanced in developed countries and involve pharmacists in more clinical and patient-oriented roles. However, the involvement of pharmacists in pharmaceutical care service and the extent of service coverage is limited in developing countries such as Pakistan as there are low number pharmacists employed in hospitals. Their duties, at most times, are confined to drug dispensing, procurement, and inventory management services, i.e., they mostly perform traditional pharmacy services [213, 216]. It has been mentioned earlier that greater involvement of pharmacist in direct patient care and extensive interaction of pharmacists with allied health members would set the platform for improved pharmaceutical care services, thereby benefiting the patients. This could only be achieved when pharmacists are involved in traditional duties to a lesser extent. The traditional duties could be performed by pharmacy technicians [195].

Most pharmacists mentioned that their role was clinical oriented and interacted with doctors on a daily basis. This highlights that Pakistani pharmacists understand the concept of pharmaceutical care, consider themselves as member of the allied health team and regard their duty as clinical or patient-oriented one. Most pharmacists agreed on their role and duties in the primary health practice that indicates that they were aware of their role as a healthcare professional and considered participation in drug prescribing and therapeutic procedures as a must. This concept of enhancing pharmacists' capabilities and allowing them to contribute to the primary health care system is being promoted, especially in developing countries [217, 218]. This was also in line with the role envisioned by the WHO for pharmacists, i.e., to serve in an advisory capacity for other healthcare professionals in ensuring safe and appropriate use of medicines [198, 199].

The data pertaining to the experience of pharmacists with the doctors highlighted that pharmacists were willing to contact the doctors to discuss patients' condition and medication therapy. However, the general perception of doctors is negative. Evidence indicates that doctors perceive that pharmacists are incapable of providing direct healthcare service to the patient. This negative perception is prevalent among doctors despite considering pharmacists as knowledgeable and experts in counselling patients about drug dosage and its safe use [212].

Besides, most patients in Pakistan are unaware that they can consult pharmacists if they experience any drug-related problem during therapy [213]. Due to this negative perception among doctors and public incognizance, the pharmacists have limited opportunities to assume the role of direct patient care provider and main resort to practising managerial and administrative tasks in public and private healthcare sectors.

It was observed that the perception of pharmacists about their role in medicine management was quite positive. The pharmacists believed that they were capable of providing this service; however, the number of pharmacists who had such expertise and training was low. This occurrence is logical given the previous pharmacy curriculum that was focused on educating and training pharmacy graduates in drug manufacturing and dispensing. Thus, pharmacy graduates were mostly inclined towards pharmaceutical manufacturing and medicines dispensing. In India, a neighboring country, the situation was similar to Pakistan's pharmacy education scenario as Indian pharmacy graduates and practicing pharmacists, despite being in a large number, was educated in preparing and dispensing medicine only [219].

Pakistan's pharmacy curriculum was revised in 2008; the four-year degree of Bachelor of Pharmacy (B.Pharm) was upgraded to a full-time five year Doctor of Pharmacy (Pharm.D) degree program. It was upgraded to strengthen pharmacy graduates' clinical knowledge and practice [220, 222]. Studies mentioned that, on average, 2587 pharmacy students graduate from Pakistan's pharmacy schools every year. However, this number is not sufficient to meet the demands of the pharmacy profession in the country's healthcare system [223]. According to available evidence, currently, 8102 – 10000 pharmacists are working in Pakistan, of which 55% are involved in the production of pharmaceuticals, and only 15% are engaged in community pharmacy [201, 223]. Moreover, in addition to inadequate and untrained resource, doctors were reluctant to engage the pharmacists in medicine prescribing and related tasks [224].

There is a need of understanding the role of pharmacists in the Pakistani healthcare system and focus on their training and utilization in the health sector. The issue of under-recognized role could be addressed by attaching pharmacy schools with hospitals similar to medical schools so that pharmacy students may be able to practice their clinical knowledge in patient care and improve clinical skills [223]. Moreover, Pharm.D graduates must be given extensive duties in

the clinical pharmacy services so that they can progress and effectively play their role as healthcare professionals [225].

Apart from traditional pharmacy roles, pharmacists must assume the clinical role that contemporary healthcare service demands. Khan and colleagues highlighted that most doctors in Pakistan do not consider pharmacist as integral member of allied healthcare team [229]. There is a need to increase their awareness regarding the role pharmacists could play in Pakistan's healthcare system. Evidence highlights that pharmacist's inclusion in disease management as a member of allied health team have improved patients' treatment outcomes [227]. Randomized controlled trials involving pharmacist – driven pharmaceutical care model in Pakistani patients with chronic illnesses such as diabetes, hypertension, rheumatoid arthritis, etc., have shown significant improvements in treatment outcomes [228-230]. This evidence base would improve pharmacists' standing in healthcare.

Secondly, pharmacists would have to increase patient awareness about their role. They would have to perform their role as disease educator and counsellor. The patients would not be able to understand the impact a pharmacist could make in the healthcare system unless the pharmacists take the initiative. Patient education and counselling may not be clinically effective if the pharmacists do not have pharmaceutical care skills [209]. Therefore, it is essential to teach these skills to pharmacy students in Pharm.D curriculum and provide them with opportunities to practice them during summer attachments or experiential training [222, 232]. This would be helpful as the pharmacy students would assume the role of pharmacists in future. There is a need to add the provision of a counselling room in regulations for healthcare settings as this would provide an opportunity for dissemination of information regarding disease and therapy. Moreover, such a provision would enhance patient satisfaction and improve the recognition of pharmacists as patient care provider [209, 233].

(e) Limitations of the study

The results of this study may be interpreted with caution as a pharmacist from primary care hospitals and community pharmacies were not included. Therefore, the findings of this study reflect the opinion of pharmacists from clinical healthcare settings only. The views may differ among pharmacist based on the workplace. The study was survey-based research and involved closed questions. Qualitative studies could investigate extensively and may provide an in-depth

explanation of expectations as well as experiences of pharmacists within the healthcare system of Pakistan.

(f) Conclusion

Pharmacists in Pakistan are willing to perform their duties and provide direct patient care using their clinical knowledge and expertise, pharmaceutical care skills and, experience in medicines management. However, they seemed sceptical of advanced clinical pharmacy roles such as intervening in prescriptions and medication therapy, consultations, prescribing, etc. It is essential to integrate pharmacists' clinical rotations with doctors to inculcate a professional relationship. Moreover, it would be helpful if training and seminars are conducted on the importance of clinical pharmacy services in Pakistan's healthcare system. Such activities would provide an opportunity to recognize the accomplishments as well as limitations of pharmacists' clinical role. Further studies are recommended to explore the concerns of pharmacists regarding these services so that they can be adequately addressed.

4.2 PHASE Two: Qualitative Phase

(A) Doctors' view about the role of Pharmacists in hospital settings of Pakistan.

(a) Introduction

Internationally, there is an increasing inclination for improving collaborative practices between doctors and pharmacists who are engaged in patient management with the objective of enhancing therapeutic results [234]. A joint statement by the International Pharmaceutical Federation in 1998 Congress reiterated the extent of dependency between the roles of the physicians and pharmacists in achieving optimal therapeutic results [235]. To achieve better therapeutic outcomes, it also stated that professionals need to recognize and appreciate each other's professional expertise, communicate efficiently and be reliable [236]. Furthermore, given the number of therapeutic issues and the prospect of more effectual use of resources within the healthcare system, it is vital that doctors and pharmacists collaborate to syndicate their skills in order to address and prevent medication related complications, enhance the therapeutic outcome and encourage careful use of resources [237]. However, the conflict between doctors and pharmacists over professionalism greatly undermines the benefits of professional collaboration. Numerous factors have been highlighted which might have hindered relationship within the healthcare system. [238] This includes the disparity in position, reputation and power rendered to different members of the healthcare team. Furthermore, an absence of interaction and misunderstanding of responsibilities by doctors and other members of the primary healthcare team have been stated to weaken the ability of the primary healthcare team. Cooperation between doctors and pharmacists could enhance patients health results. The incorporation of pharmacists in direct patient care has been fruitful and resulted in improved medicine management in Australia and Europe [239]. With increased collaborative practices between doctors and pharmacist, drug therapy can be increased through the implications of solutions to identified medication therapy complications. [236]

There are some studies conducted in developed countries, explored the attitudes of doctors toward inter-professional collaboration with pharmacists, but none have thus far been done in Pakistan, which highlighted the barriers of professional relations between doctors and pharmacists.

(b) Aim

The aim of this study was to highlight the opinion of doctors regarding the role of pharmacists in hospitals within the healthcare system of Pakistan.

(c) Methodology

(i) Interviews Development

As explained in the methodology chapter, face to face semi-structured interviews was utilized for this part of the study. The interview guide was postulated after analysing the results of the quantitative phase and previous literature and can be found in the annex IV.

(ii) Study participants

Participants were recruited using purposive methods until saturation of themes was achieved. The participants were from five cities of Pakistan. Karachi, Hyderabad, Islamabad, Lahore, and Peshawar, from Nov 2019 until Jan 2020. The participants included in this part of study belongs to all major cities of Pakistan. Few major cities were left behind because of Law-and-Order situation in those areas and as per university guidelines, any areas which has law and order problem should not be included in the research. Arrangements for the time and place of interviews were made during the initial contacts. Written consent was obtained from the participants prior to the interview.

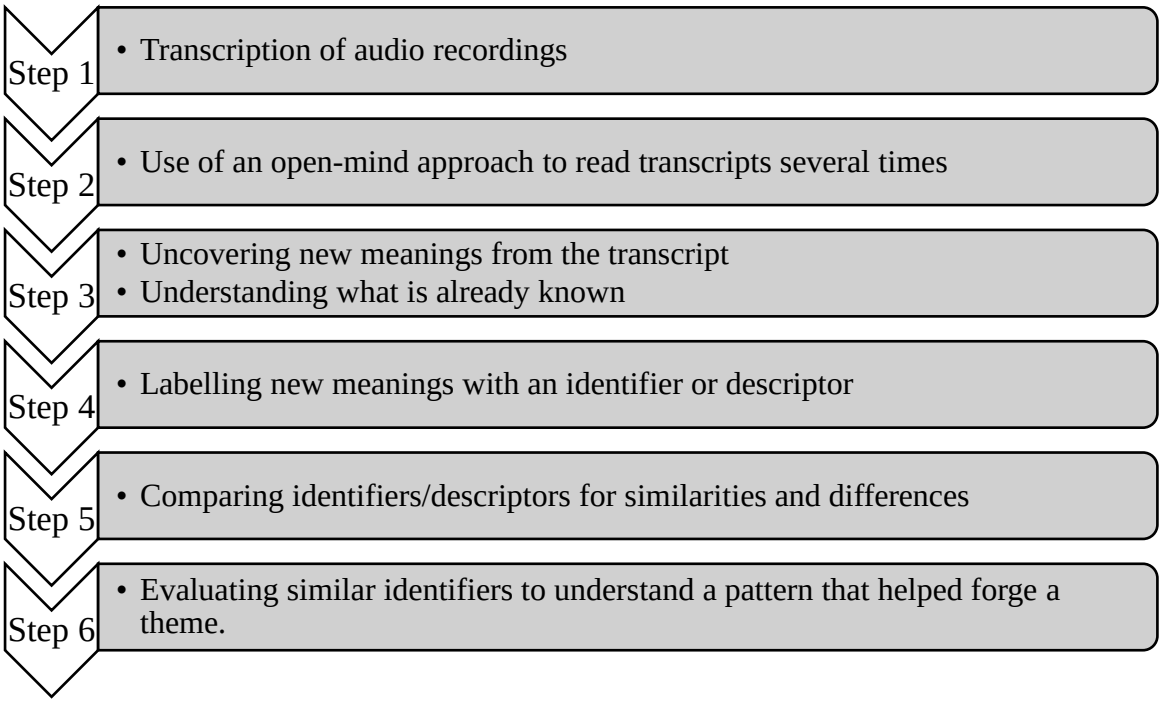
(iii) Data analysis

The interviews focused on doctors' opinion on the role of pharmacists within the healthcare system of Pakistan. Probing questions were used where necessary. Each interview had lasted approximately forty to sixty minutes. All the interviews were conducted in English, audio taped and transcribed. The data were analysed using the thematic analytic approach.

The aim of conducting thematic analysis was to develop an understanding of meaning from the experiences shared by the participants related to the research objective of this study. The transcripts were coded, and inductive thematic analysis was employed by using NVivo. The whole process of thematic analysis was adopted from the work of Sundler and colleagues [240].

The steps involved in the thematic analysis were as follows: i) Audio recordings were carefully listened and transcribed verbatim, ii) the transcripts were read more than once with an open-mind approach to become familiar with the data, iii) the transcripts were read with an aim to uncover new insights and meanings, iv) the novel meanings were identified and labelled with

an identifiers or descriptors that were usually brief with 1 – 3 words in length, v) this process was carried out for a whole transcript, vi) subsequently, all identifiers/descriptors that emerged in a transcript were compared with regards to their similarities and differences vii) similar identifiers were studied together to describe a pattern of meaningful events that subsequently lead to the emergence of a theme. Saturation of data was reached after 12 interviews, with no new themes emerging in the last two interviews. The process used in the study is presented as following:



(d) Results:

(i) Characteristics of participants

Demographic characteristics of respondents are shown following:

Table 15: Doctor's demographic data

Descriptions	**N**
Age range	
Under 30	3
Over 30	9
Gender	

Male	7
Female	5
Place of Work	
Government Hospital	4
Private Hospital	8
Experience	
Less than 10 years	5
More than 10 years	7

The thematic content analysis yielded the following themes and subthemes.

(ii) Theme 1: Interprofessional Interaction

During the interview with doctors, the initial questions were related to the communication of doctors with pharmacists.

Communication

- In our daily routine, we are quite busy in dealing with patients specially in our ward. I often contacted the ward pharmacist regarding the dose of certain drugs as we must adjust the dose most of the time for young patients. (D2)
- I would like to see pharmacists in all wards of the hospital. Specially in paediatrics and intensive care. We have to make prompt decisions and we simply can't wait for a day or so for pharmacist's consultation. (D1)
- We do not have much time always to consult the hospital pharmacists, we must make quick decisions. Yes, if I have plenty time, I will surely consult the pharmacists (D5)

Behaviour of Doctors:

- I am accountable for my patients, they are not. Pharmacists run business and they are responsible for it. I am responsible for my patients. (D6)
- Why would I rely on pharmacist's knowledge on disease and drugs, their job is to dispense medicines which I prescribe. They may be good at pharmacology but that is it. There are very limited number of pharmacists who have good knowledge of drugs and diseases and its management. My hospital pharmacist run their business here. (D12)

Efficiency of Collaboration:

- The relations with pharmacists should always be positive. There is no doubt in it. I know many doctors who did not like a pharmacist guiding them about medicines. However, I feel that the pharmacists can guide us but not direct us. I am responsible for all the outcomes of therapy not them (D5)
- I have work with pharmacists many times in my practise and they are sound professionals. Yes, I am professional. How can a doctor perform everything on his own? We have specialist doctors who perform surgeries, qualified doctors who manages the complex disease so how can we be best at choosing medicines for patients? There are numerous options available of a drug for a single ailment and who is a better person to guide me about them then a pharmacist? (D8)

(iii) Theme 2: Professional role of Pharmacists

Attitude of Professionals

- I am happy to see a pharmacist during my morning ward rounds. Our pharmacists help us in medicines management. I do not have any apprehension for pharmacist. They are important and they will remain a part of my team (D9)
- Pharmacists are perceived as businessperson and it is not false. They run a business in hospital, and they are responsible for it. But there are other responsibilities too. The pharmacists are important to medical team, and they give us clarity over drugs problems. They should have more exposure clinically then just selling and dispensing drugs. (D11)
- The pharmacist need time to build their trust with doctors and it takes a lot of time. Pharmacists gave good advice on drugs alternative but I feel they can do more than that. I would like to see pharmacists in wards with me so that I can get prompt information. (D2)
- In my practise, I have not had much interaction with pharmacists. I have seen them in hospital behind their pharmacy counters, but I do not want a pharmacist to accompany me during my rounds as this would confuse patients and they would get confusing statements from all. Doing that would allow other technicians and health workers to demand more from the system. (D6)

- Pharmacists have good knowledge of drugs, like doses and different brands but I met pharma representatives on daily basis, and they would guide me the same as my floor pharmacists. (D8)

Pharmacists as healthcare professional

- Pharmacists are professionals who are responsible for drug delivery and guide us about any issues they found in prescriptions. Counselling patients is also their duty. I respect their profession and why should it not be? (D1)
- In our country the doctors are considered as the supreme authority, and they seem unhappy when pharmacists interfere with them because they do not like anyone confronting them. Personally, I feel that this attitude is wrong, and the pharmacists should be acknowledged as they are as important in hospital as doctors or nurses are. (D7)
- Pharmacists are always accurate about drugs doses and alternates. They provide you up to date information on drugs which we lack sometimes. We doctors tend to follow or practise then evidence, but it is handy many times. (D4)
- I hate it when my pharmacists call me and confronting me about my prescriptions. I am aware what I am writing but you can't challenge my authority as I will be responsible for my acts not the pharmacists. (D8)

Responsibilities of Pharmacist

- To me the pharmacists in our hospital are responsible for everything related to drugs. They guide us about the dose, frequency and sometimes interactions but we don't get much time to interact with them. I think they are the better source of knowledge for drugs, and it is easier for them to consult the patients on medicines then us. (D3)
- I like the way pharmacists approach medicines and prescription. They got excited if they find any errors or mistakes in prescription and sometimes it helps us a lot. It's a relief that we have someone in our hospital who will cross check my prescriptions because if the patient go out in market, there aren't many trained and qualified pharmacists and they will not even bother to check mistakes in prescription. (D11)

- We doctors are humans and we do made mistakes in our practice. Our stakes are quite high, and a patient's life rely on our decisions. Having a reliable pharmacist in the hospital will surely help us to improve ourselves. (D4)

Extended Services

- I am not fully aware of any extended or extra services that pharmacists can provide. Other than the fact that they can counsel patients regarding their prescriptions. In addition to that I am not aware of anything else. (D5)
- I have witnessed pharmacist prescribing medicines for certain limited conditions in England and by extended services, if you meant this in Pakistan, it will be a disaster. The pharmacist can help us in diabetes management but other than that they have a lot on their table, and they should stick with it (D3)

(iv) Theme 3: Interaction with Pharmacists

Perception of pharmacists' role:

- Pharmacists are great source of drug knowledge. Whenever I contact my hospital pharmacy for any discussion on medicines, there answers are always prompt and correct, they provide the up-to-date information which sometimes I am not aware off. (D7)
- Pharmacists have significant role in the healthcare system. They do face problems in the government hospital but as I have mentioned earlier that I have worked in a private hospital. I have seen pharmacists performing more duties there then here. In this hospital, we barely have interaction with the pharmacists and mostly we contact them for the availability of drugs or the doses (D1)
- We have very low interactions with pharmacists, and I would be happy to have these interactions on regular basis. My perception for these relations is in between satisfaction and dissatisfaction. The pharmacy staff never let me down or showed negative attitude they are always supportive. As I have limited interaction with them, I would say that for now it's good but it can get better. (D8)
- In my hospital, the pharmacist mostly indicated my errors and never rectify them. They should be competent enough to guide me about my mistakes. To be honest, I am not fascinated with my pharmacists. (D4)

Barriers to Collaboration

- As per my experience, the main issue is absence of specialized pharmacist in hospitals as we have speciality and subspeciality for doctors. All pharmacists are not expected to manage all patients. There should be a demarcation as who is responsible for patient's counselling and who will accompany us in the wards. (D2)
- Well, my hospital does not have any rules or scheduled meetings to interact with our fellow professionals. I interact mostly with my nursing staff as they are always around to support us. But pharmacists they are based somewhere else, and I will appreciate if I have a pharmacist on the ward so that I can get support from them ASAP. (D10)

(v) Theme 4: Outcome of Interaction

Impact on patients

- It is important for patients that they get professionals opinion on their prescriptions. Sometimes patient thinks that doctor has prescribed them wrong medicines and if a pharmacist gives them confidence it will surely help both me and pharmacists. (D9)
- I remember recalling that I have once prescribed a medicine which was not suitable for children under 5 years, I got call from pharmacy department and they mentioned that this drug is not suitable for patients under 5. (D3)
- Sometimes, pharmacists contact me about some interactions in my prescriptions. We doctors prescribe as per the guidance of our seniors and sometimes just on the basis of our practice and sometimes we made mistakes in it and then we got call from our pharmacy department to revise my prescriptions. As I am associated with peads department, the stakes are at risks so I keep the record of pharmacist's intervention so that I will not make the mistakes again. (D9)

(vi) Theme 5: Pharmacists' Knowledge

Improvement

- Patients sometimes get conflicting information. In my previous hospital, the pharmacy department do not consult with us and sometimes they confuse the patients. I would like pharmacist to consult us before giving any conflicting information to the patients. At the end of the day the pharmacist does wants to help or support the patients

- Most of the young pharmacists are very enthusiastic and they surely have fresh knowledge of drugs and diseases, but they lack practical knowledge and there they got troubles. I think the pharmacists should have proper training before coming to a busy hospital. (D10)
- For sure, the improvement is necessary in all aspects of life so why not for pharmacists? They lack the confidence in consulting us about certain issues, how can I rely on a person who is not even sure of it and searching it on google for confirmation. I can google it myself so why would I need a pharmacist? (D8)

Recommendations

- The academic level of doctors and pharmacists are very different. Pharmacy curriculum mainly focuses on the pharmacology. Their course lacks the clinical knowledge of disease and patients. Increased collaboration with fellow pharmacists will surely benefit the patents.
- Pharmacist knowledge is good but that's not just it there are many other aspects too which needs to be considered, the pharmacists should have a proper training with senior pharmacists as we do have 1 year house job residency. (D2)
- I guess the pharmacy curriculum is new, but it lacks a lot of clinical aspects. If a pharmacist must practise in hospital, they should be sound clinically not just theoretically. (D7)

(e) Discussion

As analysed in the research by Atif et al. [241], despite the ongoing efforts of the government in the pharmacy settings in Pakistan, a significant impediment for pharmacists is still linked with challenges of lack of recognition for being competent enough to work in both community and hospital settings [242]. The significant barriers to inter-professional relations include lack of collaboration with the other professionals in healthcare, lack of academic capability in terms of implementing patient-oriented clinical services, and lack of awareness among the public of Pakistan regarding the role of pharmacists [242-244]. Similarly, the current research identified that the relations between doctors and pharmacists are critical in Pakistan as doctors do not believe that pharmacists are capable enough to guide doctors about what drug they should prescribe to the patient. However, some participants also stated that collaboration with

pharmacists assists them in prescribing an alternative medicine to the patient when the drugs prescribed previously are not available in the market. This knowledge can only be gained from pharmacists. Thus, they can help with the number of doses, assessing medications, and drug handling. Figure 9 is being constructed with the help of NVIVO. This word cloud explained the most common terms used during the interview with the participants.

Figure 9: Word Cloud

On the other hand, Azhar, Hassali, and Ibrahim [243] and Atif et al. [241] elucidated that a major barrier to inter-professional relations of doctors and pharmacists includes negative feedback from doctors as they do not accept pharmacists' roles being efficient enough in saving patient's lives in comparison with the doctor [242-244]. For instance, few interviewees in this research responded that pharmacists are only capable of dealing with drug handling and do not have practical knowledge about patients compared to doctors. Therefore, when pharmacists accompany doctors on patient visits, they do not feel comfortable with their statements on the health-related aspects, which the doctors know better. This attitude of pharmacists is recognised as another major barrier to inter-professional relations with doctors.

In a similar context, Azhar, Hassali, and Ibrahim [243] and Abdel-Latif [242] highlighted that, in Pakistan, the role of pharmacists is not as significant as in other parts of the world, and the reasons pertinent to it include lack of interaction of pharmacists with other health professionals in hospital settings [241, 244]. It is assumed that lack of standard practice guidelines and shortage of qualified pharmacists in Pakistan are the primary reasons due to which doctors do not consider that pharmacists should interfere in their jobs by involving in any certain decision

regarding the prescription of medicines. The current study, by analysing doctors' views via interviews, also highlighted that it is very unlikely for doctors when pharmacists confront them about their prescriptions and challenge their authority. In a similar context, the research by Khan et al. (2020) presented the association between doctors and pharmacists and the barriers affecting their professional relationship. After conducting surveys from doctors regarding the role of pharmacists, the study revealed that their role in Pakistan's healthcare system is considered minimal [245]. The doctors do not want to interact with pharmacists more often as they consider them as drug information specialists who should have no concern with direct patient care and involvement in pharmacotherapy for patients.

(f) Conclusion

It is noteworthy that for better achievement of optimal therapeutic results, there is a need to appreciate and recognize all the healthcare professionals considering the prospect of more efficient use of resources. The current research has been conducted to identify the different barriers associated with the relations of doctors and pharmacists in Pakistan. For this purpose, results were analysed by carrying out interviews from doctors regarding their relations with pharmacists and the different challenges they face while working with them. The findings revealed that the opinions of doctors on the role of pharmacists slightly differ in some contexts. For instance, some believe that working with pharmacists, doctors can perform better in terms of taking advice regarding medicines.

On the contrary, the majority consider that the involvement of pharmacists should be minimal when doctors are on daily visits with their patients. Therefore, the major barriers to the inter-professional relations between doctors and pharmacists are identified as lack of collaboration among healthcare professionals, lack of academic capability of pharmacists, and lack of awareness. It has been reviewed that in order to address the clinical needs of patients, doctors and pharmacists must collaborate to address the crucial challenges and assure patient-centred care.

(B) Pharmacist's perception, regarding their role of Pharmacists in hospital settings of Pakistan

(a) Introduction

The present age of globalization, particularly in pharmacy which has witnessed advancements in the healthcare environment. In the past, the pharmacist was solely responsible for the manufacture and delivery of drugs [246]. Today the position of the pharmacist has evolved towards clinical orientation. The profession is still experiencing continuous transition. Pharmacists also have an additional part to play in therapeutic care with modifications in care needs [247].

Pharmacy is a healthcare career that connects healthcare to fundamental sciences; it guarantees the safe and efficient use of medicines. The professional responsibilities and roles of

pharmacists have traditionally grown from an emphasis on therapeutic agents to comprehensive drug treatment programmes [248]. Higher demand for health outcomes with a complex variety of chronic drugs and low compliance to prescription medicines has motivated pharmacists to embrace a patient cantered approach. Pharmacies and clinical, educational programmes worldwide have advocated pharmaceutical care over the last few decades as a theory and vision ideal in the healthcare sector. Particularly to ensure that a patient has a beneficial effect with medicines [249].

Pharmaceutical care is a fundamental component of clinical practice in any health care system. But it could differ substantially from one country to another. It has been observed that pharmaceutical care services are advanced in developed countries [250]. Moreover, the participation of pharmacists in pharmaceutical care is vital in developing countries as the number of pharmacists working in hospitals is reduced, and their job is usually confined to drug supply, purchasing, and stock management [251]. Comparable circumstances are noticed in Pakistan. In the importance of creating effective and efficient pharmaceutical care services, the involvement of the hospital pharmacists in the medical management of a patient is essential. Apparent policies should explain the responsibility of pharmacists and indicate significant contributions concerning other healthcare professionals within their institute. Profound insight into the hospital pharmacists' perception regarding their duties, obligations, and collaborating experiences with fellow doctors is vital to highlight their perception and determine the reasons for low expectations towards their role in the healthcare system [250,251].

(b) Aim

The aim of this study was to investigate the perception of pharmacists towards their professional role in the health care system of Pakistan.

(c) Methodology

(i) Interviews Development

As explained in the methodology chapter, face to face semi-structured interviews were utilized for this part of the study. The interview guide was postulated after analysing the results of the quantitative phase and previous literature.

(ii) Study participants

Participants were recruited using purposive methods until saturation of themes was achieved. The participants were from five cities of Pakistan. Karachi, Hyderabad, Islamabad, Lahore, and Peshawar, from Nov 2019 until Jan 2020. Arrangements for the time and place of interviews were made during the initial contacts. Written consent was obtained from the participants prior to the interview.

(iii) Data Analysis

The interviews mainly focused on pharmacists' perception of their professional role within the health system of Pakistan. Each interview lasted approximately forty to sixty minutes. All the interviews were conducted in English, audio taped and transcribed verbatim. The data were analysed using the inductive thematic analytic approach. Audio recordings were carefully listened to and transcribed verbatim. The transcripts were coded, and a thematic analysis was employed by using NVivo. Saturation of data was reached after ten interviews, with no new themes emerging in the last two interviews. The process of thematic analysis is described earlier chapter.

(d) Results

(i) Characteristics of participants

Among the respondents, six were male and four female pharmacists aged between 25 and 50 years who were interviewed.

Table 16: Pharmacists' demographic data

Descriptions	**N**
Age range	
Under 30	3
30-40	7
Gender	
Male	6
Female	4

Practice Setting	
Government Hospitals	5
Private Hospitals	5
Experience	
Less than 05 years	4
More than 05 years	6

The thematic content analysis yielded the following themes:

(ii) Theme 1: Interprofessional Communication

Behaviour:

- Although some doctors can be rather arrogant, most of the doctors that we deal with in our own hospital are very happy to have call them. (P2)
- The problems include that some doctors are arrogant and not acknowledging the pharmacist's role when they need help from pharmacists and not thinking of them making decisions regarding patients, not accepting their suggestions regarding adverse drug reactions, and changing drugs or timings. (P1)
- Sometimes we trust a doctor, but they make mistakes, sometimes they learn from it, and sometimes they do not. Those who are arrogant afterward are not trustworthy at all. (P5)
- Arrogance after realizing your mistake spoils the trust. It would be best if you recognize your errors. What you do affects human life. (P9)

(iii) Theme 2: Professional role of pharmacists

Attitude of professionals

- Pharmacists' community is vast and strong in Pakistan, but the working relationship of pharmacists and doctors are not observed in Pakistan. The doctors dominate the medical field, and they always disregard the fellow pharmacist. Health authorities should bring initiatives in health sector of Pakistan to address these issues. (P1)
- The pharmacy sector will certainly perform better in an encouraging atmosphere. Additionally, the coordination of doctors and pharmacist can be increased if the communication gap between them can be reduce. (P7)

- The definitive objective for an enhanced interaction between doctor and pharmacist is the care of patients. Both are professionals and has got distinct set of abilities with them. (P2)
- The conflict among doctors and pharmacists must be stopped. There weak relations are hindering the purpose of therapeutic demands. Care of patients is the prime target of both professionals. (P8)
- The doctor has built-in respect and trust from patients, plus they are present 24/7 for patients, whereas pharmacists in Pakistan are restricted to pharmacies, and the most contact they have with a patient is during rounds. Thus, the doctors have all the info at their hand and the authority to order any treatment without consulting the pharmacist. (P5)

Pharmacist as health care professional

- Pharmacist has to prove them skilled enough to deal the clinical aspects of patients. With improved skills, the pharmacists will be involved in patient care. In our hospital, there is acute shortage of pharmacist and even with current number of pharmacists, we are occupied with essential demands of the pharmacy (P1)
- When pharmacists can consult with doctors every step of the way, the doctors will acknowledge their contributions, and they will allow their input more and more. (P3)
- Positive affections are that we are trained in opioids, physiology, and pathology as doctors to discuss the situations on their level. Still, negative affection is that in Pakistan, pharmacy has a considerable way to go for obtaining this status in society and hospital, so it is frustrating right now, to be honest. (P7)

Responsibilities of Pharmacist

- The role of pharmacist in hospital is very minimal. The main problem is that the number of pharmacists is insufficient in the hospital. If the number is increased, then we can monitor patients and do clinical interventions." (P4)
- In our country the condition is reversed one. We are just serving the clerical jobs. We are not involved in clinical work. For clinical pharmacy, training is necessary. This lack of clinical pharmacy practice is the negligence of the top management and the chief

pharmacist. The number of pharmacists should be increased; for that purpose, some rules and regulations should be made." (P5)

- Traditionally the pharmacists were expected to fill out prescriptions for inpatients, prepare IV dilutions/chemo, etc. and provide essential medicine for patients. Also, to do a round of the hospital to monitor treatment plans. But now pharmacist is reclaiming their duties by being more vigilant during prescription filling and inform first-hand the consultant about any ADR, making sure the IV dilutions are prepared according to protocol and the patient's labs (creatinine and bacterial cultures). (P9)
- Some pharmacists are very well accepted, some not so much, but a few pharmacists have made their status high in doctors' eyes, so their recommendations are taken seriously. (P2)
- Trust is an essential factor. Anything we do will affect the other's result, so we must understand each other's sides. What we do involves a life, so we must prove our worth to have that power. (P10)

(iv) Theme 3: Interaction with Doctors

Perception of pharmacist role

- The main rationale for minimal acceptability of pharmacists is the employment opportunities for pharmacists. We are not paid according to our qualification. (P6)
- Ward rounds might increase the workload on pharmacists, but it can be tackled by having a rotatory team that only does rounds. Some doctors act unfriendly against pharmacists too. (P9)
- The role of pharmacists is evolving, and it requires certain skills and training. Unfortunately, the training of pharmacists is not exemplary, and it should be improved to tackle all types of situations (P3)
- Some doctors do cause hindrance and act arrogantly and refused to call the pharmacy, reject our calls, or acknowledge our suggestions. As the doctor has the final authority, we cannot ask anyone to override their decision. (P4)

Impact on Patients

- During patient counselling, I recommended the patient ask the doctor not to prescribe her Nikelie, as it is banned due to side effects in most developed countries. The doctor agrees to it and changes it to some other drug relevant to the patients' medical condition.
- Once a doctor prescribed Azomax (azithromycin) 250 mg (4 capsules) daily. Upon receiving a prescription, I guided the patient to switch to 500 mg capsule as it will be easier for her to intake. The patient refused my recommendation and mentioned that doctor had advised her to follow his protocol as the doctor has guided his patients to reject any changes done by the pharmacist. (P4)
- During rounds, I have noticed that the recent labs of a patient show low blood sugar, which meant his IV dilutions should be given in dextrose. But the nursing staff forgot to inform the pharmacy entirely. If I had not remembered this from my round, the patient's blood sugar would continue to fall. (P2)

(v) Theme 4: Policy and procedures

Hospital and government policy

- Patient clinical care revolves around the pharmacist; there are financial aspects along with some other, so, the pharmacist is involved in all policies. Our hospital policies are made by a Commission. If polices do not comply with our professional dealings, we send them back to and then they act accordingly." (P6)
- In our hospital we are involved in making hospital polices. All policies which are made are properly implemented in the hospital like no antibiotic is dispensed without prescription and sensitivity testing." (P8)
- The board of hospital should put in a requirement to have a/two clinical pharmacist with every attending the course plan should be made with their consultancy. Giving respect to every profession is the key to better care for patients. (P8)
- The pharmacists have limited access to patient files as they are bounded in pharmacy. They must be vigilant and consistent for doctors to reply to queries which can be frustrating. The growing knowledge and efficiency of the pharmacist have led the patients and the consultants to take pharmacists seriously. (P4)

(vi) Theme 5: Knowledge of pharmacist

Recommendations to improve.

- I am not happy with pharmacy course. The current course only covers the conventional role of pharmacists and has failed to involve practical and clinical aspects of therapeutic management. (P6)
- The pharmacists should involve themselves is continuous medical education. I have seen many doctors attending CMEs on regular basis. It is utmost important for pharmacists to improve and enhance their professional skills. (P5).

Pharmacy curriculum

- There should be compulsory internships of one year after 3rd and 4th professional year so that graduates can choose the best field for them. There is very little clinical knowledge in the curriculum which is completely bookish and nothing practical. (P2)
- We are lacking in the practical knowledge. Only 10-20% of clinical knowledge is involved which is not enough for making an efficient hospital pharmacist in future. There is a need to revise the curriculum; clinical aspect should be added. (P6)
- In my opinion, the curriculum is made to make a pharmacist "jack of all trades" which is quite confusing as hospital pharmacy is not a real paying profession in Pakistan, we have read almost all subjects as a pharmacist, but we are not acknowledged to be one, we study management. Still, we are not acknowledged to be managers, we study pharmacology, and yet we must be proven worthy of every single recommendation. So, I believe the govt should make sure the clash is solved and make a line between pharmacists and doctors' authority. A pharmacist should be taught to be a pharmacist only via subjects that help them tackle only their specialty and not aspects of the matter regarding diagnosing, anatomy, etc. It is a doctor's territory. We all should be respectful of each other's authority and not try to ridicule anyone. (P2)

(e) Discussion

As mentioned in the initial section that this study sought to explore the perception of pharmacists on their professional role in the overall healthcare system of Pakistan. In relevance to the aforementioned intent, five prominent themes emerged from the results of the thematic analysis that were (1) interprofessional communication, (2) professional role of pharmacists, (3) interaction with doctors, (4) policy and procedures, and (5) knowledge of pharmacists. The first theme (interprofessional communication) evaluated the behavioural aspect of the sample population. The second theme (professional role of pharmacists) revealed their attitude, their role as a healthcare professional and the responsibilities of a pharmacist. The third theme (interaction with doctors) provided the perception on the pharmacist's role, extended services and outcome of the interaction, which included consequences of interactions, impact on patients, and outcome of the interaction. The fourth theme (policy and procedures) explained the hospital and government policy, and lastly, the fifth theme (knowledge of pharmacists) presented considerable results on few aspects such as recommendations to improve and pharmacy curriculum. Figure 10 is being constructed with the help of NVIVO. This word cloud explained the most common terms used during the interview with the participants.

Figure 10: Word Cloud

To evaluate the results, the findings of the first theme indicated that interprofessional communication highly determines the role of the pharmacist in particular healthcare institution of Pakistan. To elaborate, it was revealed that arrogant behaviour negatively affected the

professional role of the pharmacist in healthcare, as patients perceived arrogant clinicians as untrustworthy [252-259]. In comparison, the results also identified that lack of knowledge related to their professional role affected the pharmacist's role in healthcare. In addition, the findings highlighted that inappropriate behaviour of pharmacist contributed to affecting the interpersonal communication between them and doctors. In contrast, it was also revealed that doctors have inappropriate behaviour when they prescribe certain medications to the patients, which according to the pharmacist, can have negative health-related outcomes. When these issues are discussed amongst themselves, their interprofessional relationship gets affected [257].

In comparison, the results from the second theme described the professional role of pharmacists. The findings identified that poor working relationship between doctors and pharmacist affected the professional role of the pharmacist in healthcare [259]. Furthermore, the negative attitude of doctors, such as neglecting the presence of a pharmacist, contributed to affecting the greater role of Pakistani pharmacists in healthcare. However, the results also evaluated that a reduced communication gap would solve the issue between the doctor and pharmacist, as it would allow the pharmacists to play an active role in improving healthcare by collaborating with the doctors. In contrast, the results also indicated that poor competence level among the pharmacist restricts them in playing a vital role in healthcare [252, 253] To evaluate, the results suggested that if pharmacists demonstrate that they are as qualified as other health care professionals are, they will be officially accredited by their hospital, and will be able to get an opportunity to work alongside the doctors in the treatment of patients, which would eventually enhance their professional role in the healthcare.

In relevance to the third theme that analysed the interaction between doctors and pharmacist, it was uncovered that the introduction of pharmacy programmes could be supported by proper instruction and various courses [256]. Pharmacists should be mindful of their positions in the healthcare system at all levels, as it would allow them to establish a better connection with the doctors. However, another result specified that arrogant behaviour and critical decision-making authority among the doctors contributed to reducing the role of the pharmacist in healthcare [253]. Moreover, the findings reflected that extended service must be given to the patients so that access to healthcare becomes affordable for them. From the response of multiple participants, it was identified that both doctors and pharmacist perceive their relationship with

one another as diplomatic, which refrains them from establishing proper interaction that could improve their professional role by enhancing the health-related outcome for the patients.

The fourth theme was centred towards policy and procedures in healthcare institution that has an effect on the professional role of pharmacists. From the analysed results, it was disclosed that hospital policies must be aligned with the patient's clinical care, as it ensures positive health-related outcome [255]. However, in Pakistan, the government intervention is low in individual hospital policies, which results in positive as well as negative healthcare implications for the patients, depending on the kind of resources utilised and services offered to the patients [253]. In the results, it was also unveiled that the board of regulatory body must take action by building a policy for hiring various pharmacist for 24 hours in the hospital to promote the involvement of pharmacists with patients. The finding simply evaluated that strong policy and procedures must be built in every private and public hospital for improved healthcare of the patient.

The last theme was based on the knowledge of pharmacists related to their professional role. It was revealed from the results that sufficient training and development are not offered to pharmacists, as they lack sufficient knowledge on healthcare. This has been one of the major reasons that reduced the professional role of pharmacists in healthcare [258]. It is the pharmacist's responsibility to develop their practice and technical abilities. This would be advantageous if they are competent in their technical abilities. Pharmacists should devote their expertise to hospitals and pharmacies in order to increase their professional role in the hospital settings of Pakistan [257]. Many pharmacists shared their opinion that their professional role is limited to the administration of hospital resources and usual clinician practices like providing the prescribed medicines to the patients, which affects their morale and motivation level to continue their services in the hospital. Other than that, the study highlighted that a separate pharmacy curriculum must be established and made compulsory for pharmacists to improve their professional role in various hospital settings of Pakistan.

(f) Conclusion

This research was focused on analysing the professional role of the pharmacist in the hospital setting of Pakistan. The results reflected that the professional role of the pharmacist had been highly reduced due to increased intervention of doctors in being the key player in the treatment

of patients, with the lower intervention of government in individual hospital policies pertaining to patientcare and pharmacist's involvement. The findings highlighted that minimum training is given to the pharmacists relevant to patient care, which eventually results in pharmacists having low knowledge and competence for performing any professional role in hospital settings of Pakistan. The study concludes that extensive training and professional opportunities must be given to the pharmacist so that they can have a better role in patient's care and the overall healthcare sector.

5.0 CHAPTER 5: DISCUSSION AND INTEGRATION OF BOTH PHASES

5.1 Introduction

The findings from both phases of this study are discussed here in this chapter. The discussion consists of two parts. The first part discusses the findings from the quantitative phase. Most importantly, the perception of doctors and pharmacists would be discussed considering the results obtained from the quantitative survey. The study has highlighted the impact of doctors' and pharmacists' perceptions of the professional roles of pharmacists on preferred relationships, which is evaluated as the prospects of an improved relationship between doctors and pharmacists in Pakistan's healthcare system. The barriers to the proposed relationship between doctors and pharmacists are the key findings of this study. For the qualitative data, responses to the face-to-face, semi-structured interviews would be discussed, the barriers to the relationship between doctors and pharmacists, and the ways of improving a professional relationship.

5.2 Findings from Quantitative Data

The responses to the survey questionnaire utilized in this study are discussed under the following sections: Interaction of doctors and pharmacists regarding the professional role of pharmacist and barriers to interprofessional relationships.

(A) Interaction of Doctors and pharmacists

At first, the results obtained from this study highlighted that doctors and pharmacists are interacting at minimal levels, which implies that any communications between the two professionals only occurred minimally. Most of the communications that happen are of generic nature, such as dispensing prescriptions, highlighting adverse drug interactions, and catering to drug information questions, all of which are typical and conventional roles of pharmacists.

It can be assumed that the infrequent interactions between them are because neither of the two professionals is ready to invest extra efforts to develop an inter-professional relationship, probably due to the unresolved dispute that has always occurred between them. The doctors feel that they are at the top of the hierarchy of the medical profession, and as such, they do not need to interact with the pharmacists. This reason was indicated as one of the barriers to the inter-professional relationship between doctors and pharmacists.

It is observed that the doctors are comfortable with fellow pharmacists for carrying out their conventional duties, which focuses mostly on the dispensing of drugs rather than clinical and patient-oriented roles. The reason for this thinking is that pharmacists are intruding on the professional limits of doctors. The doctors also believe that the pharmacists require the hospital's authority to perform the advanced and extended tasks as these are challenging roles for a pharmacist [260]. The hospital administration assumed that pharmacists might not be adequately trained to carry out advance and extended services.

The doctors presented great perceptions of the professional roles of pharmacists and are optimistic towards an interprofessional relationship with the pharmacists, but the concerns mentioned remains consistent as to why doctors are not comfortable with improved interprofessional relations. Statistical data indicates that the current alliance between doctors and pharmacists is low [261].

Additionally, there is a requirement to improve doctors' understanding regarding the role of pharmacists [262]. It is important to include pharmacists in clinical rotations with doctors in order to improve professional relationships between the two professionals [263].

(B) Barriers to interprofessional relationship

Doctors suggested that cooperation with the pharmacists will be more effective if it is governed by the hospital administration. The primary reason for low interactions is the additional time and efforts are expected to initiate collaborative relationships with doctors and pharmacist. Another observed barrier is the lack of government policy advocating collaboration with the pharmacists. The shortages of experienced pharmacists are also observed in this study. Some doctors specified that they do not need to collaborate with pharmacists as they simply do not have time for it. However, the consequences of prescription errors are well-acknowledged, and improved interprofessional relationship between doctors and pharmacists could be thought to be able to lower such outcomes. The doctors assumed that the pharmacists would facilitate monetary benefit over professional morals and will give prejudiced information to patients.

5.3 Findings from Qualitative Data

The responses to the interview questions in the study are debated under the two sections: perception of doctors and pharmacists regarding the professional role of pharmacist and barriers of interprofessional relationships.

(A) Perception of doctors and pharmacists

Most of the participants in this study encouraged interprofessional collaboration with the pharmacists. They are stating that they have a decent relationship with pharmacists. The pharmacists describe that they have authority on drugs and can perform clinical duties. The doctors commented that an understanding of the clinical expertise of pharmacists would make cooperation easier, while some recommended that pharmacists should improve their clinical knowledge and should be well trained. Professionalism was an obstacle to doctors approaching pharmacists for cooperation. The shop keeper image of a pharmacist has great concerns and has reduced professional reliability.

The study highlighted the attitudes of doctors towards the acceptance of pharmacists. The doctors responded that they are quite busy with their schedule, and they do not have ample time to coordinate with pharmacists to discuss patients' therapeutic regimens. The positive aspect from this study suggests that doctors are aware of pharmacist presence in the hospital, and some of them are happy to have a ward round with fellow pharmacists.

During the interview with pharmacists, we have observed that pharmacists are optimistic in providing counselling to patients regarding their drug-related queries. Most of the respondents reported that they have the skills to provide clinical advice to the doctors as they think that they have great knowledge of drugs which can be helpful in architecting a patient's care plan.

(B) Barriers to Interprofessional Relationships

Barriers to the interprofessional relationship between doctors and pharmacists were not discussed in depth in the quantitative phase. However, in the qualitative phase, the study can state the possible barriers to the interprofessional relationship of doctors and pharmacists. These barriers were found perception and attitude of doctors towards the role of pharmacists and the opinions of pharmacists towards their professional role in the healthcare system of

Pakistan. The interviews highlighted the shortage of time within the healthcare environment by stating that "we do not have enough time to discuss patient's profile with pharmacists.

In terms of professional practice, some doctors highlighted that they are uncomfortable with pharmacists criticizing their prescriptions without having complete information. The results also revealed that pharmacists are facing barriers in providing clinical and patient-focused pharmaceutical care services in the hospital. One of the critical and key factors for these barriers was the number of pharmacists present in the hospital. Hence, the role of the pharmacist has shifted to management-oriented rather than clinical-oriented. The doctors reported that they considered pharmacists to be an essential source of drug information, but the interaction between doctors and pharmacists is limited in their health setting.

Some participants mentioned that the absence of subspecialized pharmacists is one of the critical barriers in coordinating with the pharmacist. Most of the doctors were concerned for patients as they get conflicting information from pharmacists and doctors, and because of this, the patients are reluctant towards pharmacists and only prefer to visit pharmacies to purchase drugs. The pharmacist should consult doctors before providing any conflicting information to the patients.

The interview with the pharmacist highlighted that the pharmacist's knowledge of drugs and diseases should be improved and that they should have proper training after their studies. Another issue that emerged during this interview is the financial status of the pharmacist. The pharmacists in hospitals of Pakistan are not paid well. It will hinder the fresh graduates from joining hospitals, resulting in a low or minimal number of qualified pharmacists present in hospitals.

Polices from hospitals and the government also favour the barriers of interactions between doctors and pharmacists. Most hospital simply does not allow pharmacists to be a part of consulting team with fellow health care professionals. The government should develop policies and procedures to harmonize doctor's and pharmacists' interprofessional relations as the ultimate beneficiary of these relationships will be patients.

6.0 CHAPTER 6: CONCLUSION

6.1 Summary

This section focuses on the interprofessional relations of pharmacist and doctors in the healthcare system of Pakistan. The primary focus is on exploring the perception of doctors and pharmacists on the type of interaction between them and the challenges associated with these relations. As mentioned earlier that this study employed both qualitative and quantitative method for gathering the opinion of pharmacists and doctors relevant to their professional role in healthcare. This section evaluates the overall results generated from the qualitative and quantitative analysis that was presented earlier.

In this section, two themes are formulated such as (1) perception of doctors and pharmacists regarding pharmacist's professional role; and (2) barriers of interaction between doctors and pharmacists, in which the results of both quantitative and qualitative analysis are evaluated and concluded.

6.2 Perception of Doctors and Pharmacists Regarding Pharmacist's Professional Role

The first theme that emerged from the analysis highlighted the perception of pharmacists and doctors on their professional role. In relevance to the aforementioned theme, it was unveiled that pharmacist perceived a higher and valuable role of doctors in the healthcare system of Pakistan in comparison to their role, as they believed that their primary role is to provide information to the patients related to the prescription of various medications. It was also viewed by the pharmacists that their professional role is restricted to the prescription of medications, as the overall healthcare system consider pharmacists as incapable of performing any major role in healthcare. Furthermore, the pharmacists perceived that their professional role in healthcare had been limited to conventional practice rather than performing a major role in improving health-related outcomes of the patients

Pharmaceutical treatment is an important aspect of pharmacy practice in every healthcare environment, and its implementation varies by country and health legislation. In developing nations, pharmacy treatment systems are more mature, with pharmacists playing more scientific and patient-focused functions. However, since there are fewer pharmacists working in healthcare facilities in developing nations like Pakistan, pharmacists' presence in

pharmaceutical treatment services and the scope of service provision are restricted. For much of their time, their responsibilities are limited to conventional pharmaceutical services such as medication prescribing, distribution, and warehouse management. The increased pharmacist participation is a direct result of the role played by the pharmacists rather than what they are expected to play. This instance demonstrates that currently employed Pakistani pharmacists have a greater knowledge of pharmaceutical treatment and consider themselves as part of the affiliated healthcare community.

Furthermore, they see their job as clinical and patient-centred and acknowledge that their roles and responsibilities in primary care are therapeutic in nature. This shows that they were mindful of their position as a healthcare provider and that they found medicine prescription to be important. Education also plays an important role as candidates with a newly offered local PharmD or an overseas pharmaceutical certificate, as compared to a local BPharm degree, were more accommodating of these duties. This may be due to the integration of therapeutic pharmaceutical courses into the PharmD programme. It was observed that various locally offered courses or programmes related to pharmaceutical education are limited to basic pharmacy knowledge rather than overall healthcare practice. That is why the professional role of pharmacists is restricted to conventional work in multiple hospitals in Pakistan.

It was observed that doctor's role is crucial in healthcare, and they are vested with the decision-making roles in the hospitals of Pakistan. In addition, doctors perceived limited competence and professionalism among the pharmacists in healthcare, that restricted their professional collaboration. The collaboration between doctors and pharmacists was limited. Besides, doctors perceived pharmacists as medication education experts, dispensers, administrators, and counsellors however, they did not expect pharmacists to play a therapeutic role or be interested in active patient treatment.

The doctors seemed critical of advanced medicinal pharmacy positions such as medications interventions, counselling, appointments, and prescription writing. This limited collaboration was evident due to an unwillingness to establish an inter-professional work relationship, most likely due to the unfinished disagreement that has already existed amongst the doctors and pharmacists in healthcare institutions of Pakistan. The doctors believe that they are at the forefront of the medicine practice's structure and hence do not need to consult with pharmacists.

The argument was regarded as one of the critical elements that contributed to restricting their inter-professional relationships.

The doctors seem to be at ease with fellow pharmacists in performing on their traditional professional positions, which focus more on medication administering rather than therapeutic or patient-centred roles. The rationale for this belief is that pharmacists are stepping on doctors' legal boundaries. Moreover, doctors perceived that pharmacist need institutional authority to perform prolonged and specialised tasks, which are difficult for a pharmacist to perform. The hospital management claimed that pharmacists lacked the necessary training to provide advanced and expanded treatment. Doctors have positive views of pharmacists' professional positions and are hopeful about inter-professional relationships with pharmacists, but the reasons why doctors are uncomfortable with increased inter-professional ties remain intact. There is also a need to enhance doctors' awareness of pharmacists' roles. It is essential to have pharmacists in clinical shifts with practitioners in order to strengthen the working relationships between these two healthcare practitioners.

Further, both doctors and pharmacists have positive as well as negative perception of their professional roles. The pharmacists believed that the doctors play a prominent role in limiting pharmacists' capabilities in clinical practice. However, the doctors mentioned that they would appreciate the greater collaboration with the pharmacists, but the pharmacists lack specialised knowledge on complex treatment procedures, restricting their professional role in advanced healthcare practices. The key decision-making authority is handed over to the doctors as they have greater knowledge, experience and professional practice in overall healthcare as opposed to pharmacists, who only perform the professional role of dispensing the medicines and managing the inventory.

6.3 Barriers of Interaction Between Doctors and Pharmacists

The doctors believe that if communication with pharmacists were regulated by the hospital management, it would be more successful. The additional time and commitment taken to build collaborative partnerships with doctors and pharmacists is the main justification for this. Another identified obstruction is the lack of a public strategy encouraging pharmacist collaboration. This research has discovered a lack of qualified pharmacists. Some doctors said that they do not need to work with pharmacists because they are not left with sufficient time.

Hence, the busy schedule of doctors has been one of the critical barriers that restricted sufficient communication between the doctors and pharmacists.

In the context of barriers of communication between the pharmacists and doctors, the results identified that medication mistakes have well-documented implications, and inter-professional relationships between doctors and pharmacists were considered as one of the variables that might be able to mitigate these effects. The doctors believed that pharmacists would put financial gain ahead of medical ethics and provide misleading support to the patients. The majority of the research participants favoured inter-professional cooperation with pharmacists. They claim to have a good working relationship with pharmacists.

The pharmacists claim to have medication jurisdiction and the ability to conduct professional duties. Despite the fact that doctors regarded pharmacists as members of the clinical staff, the findings of this investigation suggested that interaction between them was inadequate. Some doctors suggested that pharmacists could develop their professional skills and be well educated, whilst others suggested that knowing the clinical experience of pharmacists would make collaboration simpler. Professionalism was identified as a barrier for practitioners who wanted to work with pharmacists. The portrayal of a pharmacist as a clinical practitioner has caused a lot of uncertainty and has lowered professional credibility.

On the bright side, the doctors were informed of pharmacists' role in hospitals and some were able to communicate with their peers. A critical barrier identified was drug interaction misconceptions. Pharmacists are educated to recognise medication reactions to assess whether or not they can benefit or harm patients. It is their responsibility to ensure that the doctor is mindful of all encounters and that adverse reactions are properly monitored by blood checks, symptom tracking and treatment, or regimen changes. On many occasions, this misconception affects the relationship between the doctor and pharmacist, which forms a barrier between their interactions. At the same time, extensive expansion on daily tasks of pharmacists gives them little opportunity to have certain communication with the doctors. Pharmacists' everyday activities are becoming more complex, requiring them to be in many locations at the same time. They would delegate an assignment, which means that some can take longer to finish than others. Such a busy schedule leaves them with little time to have any interaction with the doctors.

In the quantitative process, hurdles to the inter-professional relationship between physicians and pharmacists were not addressed in detail. However, during the qualitative process of the research, the analysis had identified multiple obstacles to doctors and pharmacists working together. These obstacles were discovered in doctors' perceptions and attitudes about pharmacists' roles, as well as pharmacists' views about their professional roles in Pakistan's healthcare system. In the interviews, respondents stated that they do not have adequate time to review patient profiles with pharmacists due to a lack of time in the hospitals. Comparatively, in the clinical practice, some doctors expressed their dissatisfaction with pharmacists who criticise their prescriptions without getting all of the necessary details. The findings have shown that pharmacists in hospitals face challenges in delivering clinical and patient-centred pharmacy treatment, which negatively affected their relationship with the doctors. The availability of pharmacists in the hospitals was one of the critical and main factors in these obstacles. As a result, the pharmacist's position has changed from one of clinical care to one of administration.

Issues such as insufficient time, heavy workload, reduced knowledge among the pharmacists were a few of the critical barriers that encouraged the doctors to have minimum interaction with the pharmacists. However, from the viewpoints of pharmacists, it was revealed that lack of inter-professional skills among the pharmacist, job role limited to clinical practice, and inadequate knowledge on advance procedures of healthcare created hurdles for pharmacist to establish fruitful communication with the doctors.

6.4 Implications for Practice

The results of this analysis would be primarily helpful for multiple doctors and pharmacists working in various hospital settings in Pakistan. The study identified the communication barriers between the doctors and pharmacists that affected their professional role in the healthcare sector. Lack of inter-professional skills among the pharmacists created a barrier for them to establish a positive link with the doctors. The study also highlighted various approaches such as training and development programmes that can be arranged by authorities to enhance the knowledge and skills of pharmacists in the healthcare system. In terms of doctors, the study implied that they must provide enough support to the pharmacists by suggesting an improved

professional role of pharmacists in healthcare as they are vested with considerable decision-making authority in hospital, which could be helpful in improving the professional role of pharmacists in better healthcare. On the other hand, the study indicated that pharmacists must take a stand for themselves rather than accepting the system that restricted their professional role to clinical practice, as it would allow them and other pharmacists in getting a better professional role in overall medical activities performed at the hospital.

6.5 Recommendations for Future Research

The current study is based on the identification of barriers of the relationship between doctors and pharmacists of the professional roles of pharmacists. Therefore, this study has a major focus on the relationship of doctors and pharmacists do not have any focus on the patients and pharmacist's relationship, which is also important when it comes to the role of pharmacists. Therefore, in future, this study could be undertaken in consideration of the identification of the relationship between pharmacists and patients under the limitations of the professional role of pharmacists. On the other side, the current study is limited only to the tertiary hospital settings of the healthcare system of Pakistan. Hence, the results of this study cannot be generalised to all doctors and pharmacist of Pakistan, as the responses from doctors and pharmacists in primary care hospitals as well as non-institutional doctors were not included.

Following recommendations are obtained from the overview of the whole study:

- The doctor's community should understand the role of pharmacists and give confidence to pharmacists as the aim of both professionals is the better care of patients.
- The regulatory authorities of pharmacists should interact with medical associations to mutually arrange continuous medical education programs and social events in order to develop harmony among the two professionals.
- The hospitals should appoint qualified pharmacists in all critical wards so that the doctors can have immediate support in the wards.
- Pharmacy regulatory authority should direct regular and continuous training for pharmacists for renewing their licenses.
- The current pharmacy curriculum should incorporate interprofessional education and the clinical aspects of therapeutics.

- The introduction of social pharmacy in the curriculum would be fruitful to manage the current crisis faced by pharmacists in the healthcare sector.

6.6 Concluding Remarks

Based on the entire research about the viewpoints of pharmacists towards their professional role in the system of healthcare in Pakistan there is great role of pharmacists in numerous possibilities Where one of the most prominent element is that pharmacists in Pakistan are willing to execute their work, perform their duties and offer direct care to patient employing their clinical expertise and related information. Moreover, it has also been found that the pharmaceutical care experience and skills for management of medicine are crucial when it comes to identifying the impact of doctors and pharmacists and perceptions of the professional roles of pharmacists of preferred associations. Through the research, it was also witnessed that the updated curriculum enhanced their clinical information and updated knowledge related to the policies of health regulation that offered more prospects to the pharmacist to cooperate with doctors throughout the care of patients. Nonetheless, they appeared sceptical performing a progressive clinical pharmacy role for instance as superseding in prescriptions and therapy of medication, prescribing and consultations. This cynicism was majorly due to the prevalence of negative insight about the pharmacist's competencies among most doctors. Further, it is important to implement clinical rotations of pharmacists with doctors to indoctrinate that particular professional relationship. Also, it would be supportive if seminars and training are undertaken on the significance of services related to a clinical pharmacy in the healthcare system of Pakistan. Because certain activities would offer the prospects to familiarise themselves with success and also recognise the boundaries of the clinical role of pharmacists. Thus, it has a crucial role and involvement of pharmacists while creating better relationships in order to serve the patients and other clinical measures effectively.

The research shows that the pharmacist considered as a major sources of drug information by the doctors along with the counsellors, educators and various dispensers. On the other side, the expectations of doctors regarding the pharmacists are change because their clinical role is being directly related to the treatment of patients that is entirely related to the prescription of effective medicines. It has been noted that there is a great role of increased awareness of doctors for the medicines required to patients produced based on the research and recommendation of patients.

. The doctors were not welcoming to the idea of pharmacists working as a member of the allied healthcare team. There is a need to increase doctors' awareness regarding the role, pharmacists could play in Pakistan's healthcare system. It is vital to involve pharmacists in clinical rotations with doctors to develop a professional relationship. Moreover, it may be helpful if seminars are conducted on the importance of clinical pharmacy services in the healthcare system. Such activities would provide an opportunity to recognize the accomplishments and limitations of a pharmacist's clinical role.

From the quantitative findings, it has been highlighted that the doctors reflected pharmacists as specialists like knowing the drugs, counsellors and educators, dispensers. Nonetheless, their expectations of pharmacists executing a clinical role and being intricate in the direct care of the patient was scarce and limited from both doctor's and patient's end. They appeared dubious of advanced clinical measures and roles for instance as superseding in the medication therapy, consultation, and prescriptions and other prescribed measures. On the other side, the doctors were not convivial to the notion of pharmacists proceeding as a participant of the allied healthcare group. Hence, there is a need to enhance the awareness of doctors concerning the pharmacist's role that could be performed better in the healthcare system of Pakistan. That is one of the basic reasons it is dynamic to involve pharmacists in different clinical rotations with doctors to create professional associations. Further, it might be supportive if seminars and other related programs are conducted on the significance and applications of clinical pharmacy services in the system of health care. Because certain activities would offer a prospect to distinguish the limitations and fulfilment of the clinical role of pharmacists. Moreover, the rationale related to the need for this strong relationship between the pharmacist and doctor is that the doctor suggests the prescription medicines to the clinicians in order to get timely delivery and availability of the medicines for the patients.

7.0 CHAPTER 7:

REFERENCES

1. Urick BY, Meggs EV. Towards a greater professional standing: evolution of pharmacy practice and education, 1920–2020. Pharmacy. 2019 Sep;7(3):98.
2. Farris KB, Kassam R, Cox CE, Cave A. Pharmaceutical care research and education project: patient outcomes. Journal of the American Pharmaceutical Association (1996). 2001 May 1;41(3):411-20.
3. Isenor JE, Edwards NT, Alia TA, Slayter KL, MacDougall DM, McNeil SA, Bowles SK. Impact of pharmacists as immunizers on vaccination rates: a systematic review and meta-analysis. Vaccine. 2016 Nov 11;34(47):5708-23.
4. Zaidi S, Bigdeli M, Aleem N, Rashidian A. Access to essential medicines in Pakistan: policy and health systems research concerns. PloS one. 2013 May 22;8(5): e63515.
5. Bhagavathula AS, Sarkar BR, Patel I. Clinical pharmacy practice in developing countries: focus on India and Pakistan. Arch Pharma Pract. 2014 Apr 1;5(2):91-4.
6. Wilson AJ, Palmer L, Levett-Jones T, Gilligan C, Outram S. Interprofessional collaborative practice for medication safety: Nursing, pharmacy, and medical graduates' experiences and perspectives. Journal of interprofessional care. 2016 Sep 2;30(5):649-54.
7. Bergman AA, Jaynes HA, Gonzalvo JD, Hudmon KS, Frankel RM, Kobylinski AL, Zillich AJ. Pharmaceutical role expansion and developments in pharmacist-physician communication. Health communication. 2016 Feb 1;31(2):161-70.
8. Kelly DV, Bishop L, Young S, Hawboldt J, Phillips L, Keough TM. Pharmacist and physician views on collaborative practice: Findings from the community

pharmaceutical care project. Canadian Pharmacists Journal/Revue des Pharmaciens du Canada. 2013 Jul;146(4):218-26.

9. Abdel-Latif MM. Hospital doctors' views of, collaborations with and expectations of clinical pharmacists. European Journal of Hospital Pharmacy. 2017 Nov 1;24(6):343-8.

10. Lang N. Professional liability, patient safety, and first do no harm. The American Journal of Surgery. 2001;182(6):537-541.

11. Suwanrath-Kengpol C. Effect of a clinical practice guideline on physician compliance. International Journal for Quality in Health Care. 2004;16(4):327-332.

12. Dollaghan C. Evidence-Based Practice: Myths and Realities. The ASHA Leader. 2004;9(7):4-12.

13. WHO rankings of world's healthcare systems challenged. PharmacoEconomics & Outcomes News. 2001;316(1):2-2.

14. The 2008 Hokkaido-Toyako G8 Summit: neither summit nor plummet | The Asia-Pacific Journal: Japan Focus [Internet]. Apjjf.org. 2020. Available from: https://apjjf.org/-Hugo-Dobson/2970/article.html

15. GAVI. Alleviating System Wide Barriers to Immunization: Issues and Conclusions from the Second GAVI Consultation with Country Representatives and Global Partners. Oslo: GAVI. 2004

16. Ooms G, Van Damme W, Baker B, Zeitz P, Schrecker T. The 'diagonal' approach to Global Fund financing: a cure for the broader malaise of health systems? Globalization and Health. 2008;4(1):6.

17. Naimoli J. Global health partnerships in practice: taking stock of the GAVI Alliance's new investment in health systems strengthening. The International Journal of Health Planning and Management. 2009;24(1):3-25.

18. WHO. Everybody's Business: Strengthening Health Systems to Improve Health Outcomes. WHO's Framework for Action. Geneva: World Health Organization. 2007.

19. WHO. Maximizing Positive Synergies between Health Sytems and Global Health Initiatives. Geneva: World Health Organization. 2008a.

20. Christine Borger et al., "Health Spending Projections through 2015: Changes on the Horizon," Health Affairs 25, no. 2 (2006): w61–w73, http:// content.healthaffairs.org/cgi/content/abstract/ hlthaff.25.w61.

21. WHO | World Health Organization Assesses the World's Health Systems [Internet]. Who.int. 2020 [cited 25 March 2020]. Available from: https://www.who.int/whr/2000/media_centre/press_release/en/

22. Hafner T, Shiffman J. The emergence of global attention to health systems strengthening. Health Policy and Planning. 2012;28(1):41-50.

23. Uwe Reinhardt of Princeton University, for example, estimates that nearly half of the difference in spending between the United States and other industrial nations is due to America's higher GDP. Uwe Reinhardt, Peter Hussey, and Gerard Anderson, "U.S. Health Care Spending in an International Context," Health Affairs 23, no. 3 (2004): 11–12.

24. Fleming D, McDonald W. Professionalism Charter Provides Guidance to Health Care Organizations in These Troubled Times. Annals of Internal Medicine. 2017;166(9):665.

25. Taylor D. Quality and professionalism in health care: a review of current initiatives in the NHS. BMJ. 1996;312(7031):626-629.K

26. Blenkinsopp A, Bradley C. Over the Counter Drugs: Patients, society, and the increase in self medication. BMJ. 1996;312(7031):629-632.

27. Medical Professionalism in the New Millennium A Physician Charter. European Journal of Internal Medicine. 2002;13(3):215-219.

28. Egener B, McDonald W, Rosof B, Gullen D. Perspective. Academic Medicine. 2012;87(5):668-674.

29. Boslaugh S. Health care systems around the world.

30. Anderson R, McDaniel R. Managing Health Care Organizations: Where Professionalism Meets Complexity Science. Health Care Management Review. 2000;25(1):83-92.

31. Cruess S, Johnston S, Cruess R. Professionalism for medicine: opportunities and obligations. Medical Journal of Australia. 2002;177(4):208-211.

32. Cornett B. A principal calling: Professionalism and health care services. Journal of Communication Disorders. 2006;39(4):301-309.

33. Kamhi A. Problem Solving in Child Language Disorders. Language, Speech, and Hearing Services in Schools. 1984;15(4):226-234.

34. Anderson S. Expert committees, welfare and education: the transformation of the hospital pharmacist in Great Britain 1920 to 1995. Revista Estudos do Século XX. 2012;(12):289-309.

35. McSpadden C. Consultant Pharmacists and the Survey Process. The Consultant Pharmacist. 2006;21(7):556-560.

36. Brodie D. Pharmacy's societal purpose. American Journal of Health-System Pharmacy. 1981;38(12):1893-1896.

37. CVS strategy sees shift to long-term care. The Pharmaceutical Journal. 2013;.

38. Hoffman S, Rosenfield D, Gilbert J, Oandasan I. Student leadership in interprofessional education: benefits, challenges and implications for educators, researchers and policymakers. Medical Education. 2008;42(7):654-661.

39. McAlearney A, Hefner J, Robbins J, Garman A. Toward a high-performance management system in health care, part 4. Health Care Management Review. 2016;41(3):233-243.

40. Mitchell R, Parker V, Giles M. When do interprofessional teams succeed? Investigating the moderating roles of team and professional identity in interprofessional effectiveness. Human Relations. 2011;64(10):1321-1343.

41. Stevens M, Rees T, Coffee P, Steffens NK, Haslam SA, Polman R. A Social Identity Approach to Understanding and Promoting Physical Activity. Sports Med. 2017;47(10):1911-1918..

42. McComb S, Hebdon M. Enhancing Patient Outcomes in Healthcare Systems Through Multidisciplinary Teamwork. Clinical Journal of Oncology Nursing. 2013;17(6):669-672.

43. D'amour D, Oandasan I. Interprofessionality as the field of interprofessional practice and interprofessional education: An emerging concept. Journal of Interprofessional Care. 2005;19(sup1):8-20.

44. Mitchell R, Parker V, Giles M. When do interprofessional teams succeed? Investigating the moderating roles of team and professional identity in interprofessional effectiveness. Human Relations. 2011;64(10):1321-1343.

45. van Knippenberg D, De Dreu C, Homan A. Work Group Diversity and Group Performance: An Integrative Model and Research Agenda. Journal of Applied Psychology. 2004;89(6):1008-1022.

46. Shepard D. Managing Medicines: Public Policy and Therapeutic Drugs. International Journal for Quality in Health Care. 1998;10(2):169-169.

47. Barber N, Smith F, Anderson S. Improving quality of health care: the role of pharmacists. Quality and Safety in Health Care. 1994;3(3):153-158.

48. Hepler C, Strand L. Opportunities and responsibilities in pharmaceutical care. American Journal of Health-System Pharmacy. 1990;47(3):533-543.

49. Jevon P. Medicines management. Chichester, West Sussex, U.K.: Wiley-Blackwell; 2010.

50. Waterfield J. Continuing professional development: policy and practice in the National Health Service (NHS). Twenty-First Century Society. 2010;5(1):103-115.

51. Chaar B, Kwong K. Direct-to-consumer advertising: Australian pharmacists' experiences with non-prescription medicines. International Journal of Pharmacy Practice. 2010;18(1):43-50.

52. M L. Clinical Pharmacist Active Role in Registrative Clinical Trials. American Journal of Pharmacology and Pharmacotherapeutics. 2016;03(03).

53. Expanding the clinical role of pharmacists. Clinical Pharmacist. 2015.

54. Travis K. Special Feature: Careers in Pharmacy. Science. 2007.

55. Garretsen H. The role of health centres in the development of urban health systems. Report of a WHO study group on primary health care in urban areas. Health Policy. 1993;25(3):271.

56. Sanborn M. Core Competencies in Hospital Pharmacy Practice: Regulatory Compliance. Hospital Pharmacy. 2006;41(8):792-795.

57. Bayer C, Rockenschaub G. (A287) Who Regional Office for Europe - Health Systems Crisis Preparedness Assessment Tool. Prehospital and Disaster Medicine. 2011;26(S1):s80-s80.

58. Lunde, I. & Dukes, G. (Eds) (1989), The Role and Function of the Community and Hospital Pharmacist in the Health care Systems of Europe, WHO Collaborating Centre for Clinical Pharmacology and Drug Policy Science, The Netherlands: Groningen.

59. Harding G, Taylor K. Responding to change: the case of community pharmacy in Great Britain. Sociology of Health & Illness. 2008;19(5):547-560.

60. Barrenberg E, Knopf H, Garbe E. Over-The-Counter (OTC) Drug Consumption among Adults Living in Germany: Results from the German Health Interview and Examination Survey for Adults 2008–2011 (DEGS1). Pharmacy. 2018;6(2):52.

61. Gertler M, Vinodrai T. Learning from America? Knowledge Flows and Industrial Practices of German Firms in North America. Economic Geography. 2009;81(1):31-52.

62. Duguid M. Evaluating New Medicines for Use in Australian Hospitals: Lessons from North America. Journal of Pharmacy Practice and Research. 2010;40(2):124-129.

63. Ahmed Elnour A. The Future of Pharmacist's Prescribing in Developing Countries. SOJ Pharmacy & Pharmaceutical Sciences. 2014.

64. Goel P, Ross-Degnan D, Berman P, Soumerai S. Retail pharmacies in developing countries: A behavior and intervention framework. Social Science & Medicine. 1996;42(8):1155-1161.

65. Amir M. Clinical pharmacy practice: An activity based definition for pharmacy students of developing countries. Archives of Pharmacy Practice. 2012;3(3):193.

66. Bradley F, Elvey R, Ashcroft D, Hassell K, Kendall J, Sibbald B et al. The challenge of integrating community pharmacists into the primary health care team: A case study of local pharmaceutical services (LPS) pilots and interprofessional collaboration. Journal of Interprofessional Care. 2008;22(4):387-398.

67. Silcock J, Raynor D, Petty D. The organisation and development of primary care pharmacy in the United Kingdom. Health Policy. 2004;67(2):207-214.

68. Dolovich L, Pottie K, Kaczorowski J, Farrell B, Austin Z, Rodriguez C et al. Integrating Family Medicine and Pharmacy to Advance Primary Care Therapeutics. Clinical Pharmacology & Therapeutics. 2008;83(6):913-917.

69. Dobson R, Henry C, Taylor J, Zello G, Lachaine J, Forbes D et al. Interprofessional health care teams: Attitudes and environmental factors associated with participation by community pharmacists. Journal of Interprofessional Care. 2006;20(2):119-132.

70. Hesjedal E, Hetland H, Iversen A. Interprofessional collaboration: self-reported successful collaboration by teachers and social workers in multidisciplinary teams. Child & Family Social Work. 2013;20(4):437-445.

71. Gilbert J. Interprofessional learning and higher education structural barriers. Journal of Interprofessional Care. 2005;19(sup1):87-106.

72. Drinka, T. J. K., & Clark, P. G. Health care teamwork: interdisciplinary practice and teaching. Westport, CT: Auburn House. 2000

73. Cowen M, Halasyamani L, McMurtrie D, Hoffman D, Volley T, Alexander J. Organizational Structure for Addressing the Attributes of the Ideal Healthcare Delivery System. Journal of Healthcare Management. 2008;53(6):407-418.

74. Baldwin D, Daugherty S. Interprofessional conflict and medical errors: Results of a national multi-specialty survey of hospital residents in the US. Journal of Interprofessional Care. 2008;22(6):573-586.

75. Alex S, Kerns J, Adenew A, Arundel C. Clinical pharmacist and physician team collaboration to improve medication safety and cost savings in an inpatient medicine unit: a prospective cohort study. J Pharm Pharmacol. 2014;2:722- 730. doi:10.17265/2328-2150/2014.12.005

76. Snyder M, Zillich A, Primack B, et al. Exploring successful community pharmacist-physician collaborative working relationships using mixed methods. Res Social Adm Pharm. 2010;6: 307-323. doi:10.1016/j.sapharm.2009.11.008.

77. Howard M, Trim K, Woodward C, et al. Collaboration between community pharmacists and family physicians: lessons learned from the seniors medication assessment research trial. J Am Pharm Assoc. 2003;43(5):566-572. doi:10.1331/154434503322452193.

78. Davies C. Getting health professionals to work together. BMJ. 2000;320:1021-1022. doi:10.1136/bmj.320.7241.1021.

79. Keijsers C, Brouwers J, Wildt D, et al. A comparison of medical and pharmacy students' knowledge and skills of pharmacology and pharmacotherapy. Br J Clin Pharmacol. 2014;78(4):781-788. doi:10.1111/bcp.12396.

80. Bridges D, Davidson R, Odegard P, Maki I, Tomkowiak J. Interprofessional collaboration: three best practice models of interprofessional education. Med Educ Online. 2011;16:6035. doi:10.3402/meo.v16i0.6035.

81. Mendoza M, Liedtke M. Google looks within for ways to improve teams. Chicago Tribune. November 23, 2015.

82. Kucukarslan S, Lai S, Dong Y, Al-Bassam N, Kim K. Physician beliefs and attitudes towards collaboration with community pharmacists. Res Social Adm Pharm. 2011;7(3):224-232. doi:10.1016/j.sapharm.2010.07.003

83. Reeves S, Pelone F, Harrison R, Goldman J, Zwarenstein M. Interprofessional collaboration to improve professional practice and healthcare outcomes. Cochrane Database of Systematic Reviews. 2017;.

84. Nakata C, Im S. Spurring Cross-Functional Integration for Higher New Product Performance: A Group Effectiveness Perspective*. Journal of Product Innovation Management. 2010;27(4):554-571.

85. Hughes CM, McCann S. Perceived interprofessional barriers between community pharmacists and general practitioners: a qualitative assessment. Br J Gen Pract 2003; 53: 600-606.

86. Farris KB, Llimos FF, Benrimoj S. Pharmaceutical Care in Community Pharmacies: Practice and Research from Around the World. Ann Pharmacother 2005;39.

87. Azhar S, Hassali MA, Ibrahim MI. Doctors' perception and expectations of the role of the pharmacist in Punjab Pakistan. Trop J Pharm Res 2010; 9(3): 205-212.

88. Matowe L, Abahussain EA, Al-Saffar N, Bihzad SM, Al-Foraih A. Physicians' perception and expectations of pharmacists' professional duties in government hospital in Kuwait. Med Princ Pract 2006; 15(6): 185-189.

89. Pakistan Health Care Policies and Developments - Flags, Maps, Economy, History, Climate, Natural Resources, Current Issues, International Agreements, Population, Social Statistics, Political System [Internet]. Photius.com.. Available from: https://www.photius.com/countries/pakistan/society/pakistan_society_health_care_policies~10390.html

90. Ghaffar A, Kazi BM, Salman M: An Overview of the Health Care System in Pakistan. Journal of Public Health Medicine. 1999, 22: 38-42.

91. Azhar S, Hassali M, Ibrahim M, Ahmad M, Masood I, Shafie A. The role of pharmacists in developing countries: the current scenario in Pakistan. Human Resources for Health. 2009;7(1).

92. Islam A: Health Sector Reform in Pakistan: Why it is needed?. J Pak Med Assoc. 2002, 52: 95-100.

93. Khan AA: Re-defined role of pharmacist in public sector hospitals of Pakistan. 15th International Pharmacy Conference and Exhibition. 2009, Lahore: Pakistan Pharmacists Association

94. Pharmacy Education and Healthcare. [http://www.gcu.edu.pk/Library/NI_Feb07.htm]

95. Report of the Health System Review Mission – Pakistan. [http://gis.emro.who.int/HealthSystemObservatory/PDF]

96. Ahsan N: Pharmacy Education and Pharmacy Council of Pakistan. Pakistan Drug Update. Islamabad. 2005

97. Naseemullah, A. 'Spirits of capitalism: explaining industrial variation in South Asia'. Doctoral Dissertation, University of California, Berkeley. 2010

98. IFPMA (International Federation of Pharmaceutical Manufacturers and Associations) (2017) 'The pharmaceutical industry and global health: facts and figures 2017'. Geneva: IFPMA (https://www.ifpma.org/wp-content/uploads/2017/02/IFPMA-Facts-And-Figures-2017.pdf).

99. Danzon, P.M. and Chao, L.-W. “Does regulation drive out competition in pharmaceutical markets?', Journal of Law and Economics. 2000. 43: 311–57

100. PRIME (Pakistan Research Institute of Market Economy). 'Pakistan' s pharmaceutical industry'. Islamabad: PRIME. 2017. (http://www.ppma.org.pk/wp-content/uploads/2017/09/Final-Report-Pharma-Industry_August-10.pdf).

101. Bacon M. Pragmatism: an introduction. Polity; 2012 May14.

102. Creswell JW. Controversies in mixed methods research. The Sage handbook of qualitative research. 2011 Apr27;4:269-84.

103. Creswell JW, Clark VL. Designing and conducting mixed methods research.Sage publications; 2017 Aug31.

104. Goldkuhl G. Pragmatism vs interpretivism in qualitative information system sresearch. European journal of information systems. 2012 Mar1;21(2):135-46.

105. Zohrabi M. Mixed Method Research: Instruments, Validity, Reliability and Reporting Findings. Theory & practice in language studies. 2013 Feb1;3(2).

106. Morse JM. Mixed method design: Principles and procedures. Routledge; 2016 Jul8.

107. Ivankova NV. A sample mixed methods dissertation proposal. Education. 2002 Dec;48(1):93-135.

108. Ayton AC. *Mixed Methods Inquiry To Explore Nurses' Views and Opinions about Dementia Care Nursing In* (Doctoral dissertation, Trinity College Dublin).

109. Beyene K. *Sharing Prescription Medicines: An Exploration Of Patients' and Health Professionals' Perspectives* (Doctoral dissertation, ResearchSpace@Auckland).

110. Finch CL. *The rebel leader: A sequential explanatory mixed methods analysis of rebel superintendents in suburban public schools* (Doctoral dissertation, Loyola University Chicago).

111. Morgan DL. Pragmatism as a paradigm for social research. Qualitative inquiry.2014 Oct;20(8):1045-53.

112. O'Carroll V. *Practice mentors' attitudes and perspectives of interprofessional working, and interprofessional practice learning for students: a mixed-methodscase study* (Doctoral dissertation, University of St Andrews).

113. Zhang W, Creswell J. The use of “mixing” procedure of mixed methods in health services research. Medical care. 2013 Aug1;51(8):e51-7.
114. Zhang W, Watanabe-Galloway S. Using mixed methods effectively in prevention science: Designs, procedures, and examples. Prevention Science. 2014 Oct 1;15(5):654- 62.
115. Malina MA, Nørreklit HS, Selto FH. Lessons learned: advantages and disadvantages of mixed method research. Qualitative Research in Accounting & Management. 2011 Apr 12;8(1):59-71.
116. Creswell JW. A concise introduction to mixed methods research. SAGE publications; 2014 Mar 31.
117. McLaughlin JE, Bush AA, Zeeman JM. Mixed methods: Expanding research methodologies in pharmacy education. Currents in Pharmacy Teaching and Learning. 2016 Sep 1;8(5):715-21.
118. Zohrabi M. Mixed Method Research: Instruments, Validity, Reliability and Reporting Findings. Theory & practice in language studies. 2013 Feb 1;3(2).
119. Krosnick JA. Questionnaire design. In The Palgrave handbook of survey research 2018 (pp. 439-455). Palgrave Macmillan, Cham.
120. Bryman A. June 1989 and beyond: Julia Brannen’s contribution to mixed methods research. International Journal of Social Research Methodology. 2014 Mar 4;17(2):121-31.
121. Reicher S, Taylor S. Similarities and differences between traditions. Psychologist. 2005 Sep 1;18(9):547-9.
122. Creswell JW, Hanson WE, Clark Plano VL, Morales A. Qualitative research designs: Selection and implementation. The counseling psychologist. 2007 Mar;35(2):236-64.
123. Merriam SB. Introduction to qualitative research. Qualitative research in practice: Examples for discussion and analysis. 2002 May 28;1(1):1-7.
124. Britten N. Qualitative interviews. Qualitative research in health care. 2006 Jan 1;3:12-20.
125. Schmidt C. The analysis of semi-structured interviews. A companion to qualitative research. 2004 Apr 18;253:258.
126. Rathbun BC. Interviewing and qualitative field methods: pragmatism and practicalities. InThe Oxford handbook of political methodology 2008.

127. Ryan F, Coughlan M, Cronin P. Interviewing in qualitative research: The one-to-one interview. International Journal of Therapy and Rehabilitation. 2009 Jun;16(6):309-14.
128. Cipolle RJ, Strand LM, Morley PC. Pharmaceutical Care Practice: The Patient-Centered Approach to Medication Management Services, 3rd ed. 2012; McGraw-Hill Education, LLC. ISBN 978-0-07-175638-9.
129. World Health Organization. (1998). The Role of the pharmacist in self-care and self-medication: report of the 4th WHO Consultative Group on the Role of the Pharmacist, The Hague, The Netherlands, 26-28 August 1998. World Health Organization. https://apps.who.int/iris/handle/10665/65860
130. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. American Journal of Hospital Pharmacy. 1990;47(3):533–543.
131. Hepler CD. Pharmaceutical Care. Pharm World Sci. 1996;18: 233. https://doi.org/10.1007/BF00735965
132. Hepler CD. Clinical Pharmacy, Pharmaceutical Care, and the Quality of Drug Therapy. Pharmacotherapy. 2004;24(11):1491-1498.
133. The Medicines for Human Use (Prescribing) (Miscellaneous) Amendments) Order. 2006. No. 915.
134. Naqvi AA, Hassali MA, Naqvi SBS, Aftab MT. Impact of pharmacist educational intervention on disease knowledge, rehabilitation and medication adherence, treatment-induced direct cost, health-related quality of life and satisfaction in patients with rheumatoid arthritis: study protocol for a randomized controlled trial. Trials. 2019;20: 488. https://doi.org/10.1186/s13063-019-3540-z.
135. Matowe L, Abahussain EA, Al-Saffar N, Bihzad SM, Al-Foraih A, Al-Kandery AA. Doctors' perceptions and expectations of pharmacists' professional duties in government hospitals in Kuwait. Medical Principles and practice. 2006;15(3):185-189.
136. Smith WE, Ray MD, Shannon DM. Doctors' Expectations of Pharmacists. Am J Health Syst Pharm. 2002;59(1).
137. Bradley CP. The future role of pharmacists in primary care. Br J Gen Pract. 2009;59(569):891–892. doi:10.3399/bjgp09X473105.
138. Bhagavathula AS, Sarkar BR, Patel I. Clinical pharmacy practice in developing countries: Focus on India and Pakistan. Arch Pharma Pract. 2014;5:91-4.

139. George PP, Molina JA, Cheah J, Chan SC, Lim BP. The evolving role of the community pharmacist in chronic disease management-a literature review. Ann Acad Med Singapore. 2010;39(11):861-867.
140. Gallagher RM, Gallagher HC. Improving the working relationship between doctors and pharmacists: is inter-professional education the answer? Advances in health sciences education. 2012;17(2):247-257.
141. Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, Kistnasamy B. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. The lancet. 2010;376(9756):1923-1958.
142. Rosenthal MM, Breault RR, Austin Z, Tsuyuki RT. Pharmacists' self-perception of their professional role: insights into community pharmacy culture. Journal of the American Pharmacists Association. 2011;51(3):363-368a.
143. Khan N, Abbas A, McGarry K, Shahid S. Perceptions and experiences of doctors regarding integration of clinical pharmacists in health practices: A survey of hospitals of Karachi. International Journal of Allied Medical Sciences and Clinical Research. 2014;2(3):222-234.
144. Kassam R, Collins JB, Berkowitz J. Comparison of patients' expectations and experiences at traditional pharmacies and pharmacies offering enhanced advanced pharmacy practice experiences. Am J Pharm Educ. 2010;74(5):90.
145. Mann C. Doctors need to give up professional protectionism. BMJ. 2018;361:k1757. doi: 10.1136/bmj.k1757.
146. Atiq MA. Epidemiology Of Non-Communicable Diseases In Pakistan: Are We On The Right Track? The Pakistan Journal of Medicine and Dentistry. 2018;6(4):52-56.
147. Naqvi AA, Naqvi SBS, Zehra F, Verma AK, Usmani S, Badar S, et al. Estimation of the Direct Cost of Poliomyelitis Rehabilitation Treatment to Pakistani Patients: A 53-Year Retrospective Study. Appl Health Econ Health Policy. 2018;16(6):871-888. doi: 10.1007/s40258-018-0422-6.
148. Naqvi AA, Naqvi SBS, Zehra F, Ahmad R, Ahmad N. The cost of poliomyelitis: Lack of cost-of-illness studies on poliomyelitis rehabilitation in Pakistan. Arch Pharma Pract. 2016;7(4):182-4. doi: 10.4103/2045-080X.191988.

149. UK Health Accounts. Office for National Statistics. 2015. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthcaresystem/bulletins/ukhealthaccounts/2015
150. World Health Organization (WHO). Health service delivery Pakistan. 2019. Available from: http://www.emro.who.int/pak/programmes/service-delivery.html
151. Hassan A, Mahmood K, Buksh HA. Healthcare system of Pakistan. IJARP. 2017; 1(4):170-173.
152. Hussain M, Naqvi SBS, Khan MA, Rizvi M, Alam S, Abbas A, et al. Direct cost of treatment of diabetes mellitus type 2 in Pakistan. Int J Pharm Sci. 2014;6:261-4.
153. The Medicines Act 1968. 2019. Available from: https://www.legislation.gov.uk/ukpga/1968/67.
154. Khan MU. (2011) A new paradigm in clinical pharmacy teaching in Pakistan. Am J Pharm Educ. 2011;75(8):166. doi:10.5688/ajpe758166.
155. Abbas A. The Catch-22 of Pharmacy Practice in Pakistan's Pharmacy Education. Pharmacy. 2014;2(3):202-204. https://doi.org/10.3390/pharmacy2030202.
156. Khan TM. Challenges to pharmacy and pharmacy practice in Pakistan. The Australas Med J. 2011;4(4):230–235. doi:10.4066/AMJ.2011.488
157. Naqvi AA. Evolution of clinical pharmacy teaching practices in Pakistan. Arch Pharma Pract 2016;7:26-7.
158. Pharmacy Council of Pakistan. 2019. Available from: http://www.pharmacycouncil.org.pk/.
159. Rosenthal M, Austin Z, Tsuyuki RT. Are pharmacists the ultimate barrier to pharmacy practice change? Canadian Pharmacists Journal/Revue des Pharmaciens du Canada. 2010;143(1):37-42.
160. Adnan S, Tanwir S, Abbas A, Beg AE, Sabah A, Safdar H, et al. Perception of doctors regarding patient counseling by pharmacist: a blend of quantitative and qualitative insight. Int J Pharm Ther. 2014;5:117-21.
161. Calculator, R. (2014). Raosoft. Retrieved December, 2018.
162. Total number of doctors / dental surgeons (G.P's with basic degree only), registered up to 30th June, 2019. Pakistan Medical and Dental Council (PM & DC). 2019. Retrieved July, 2019. http://www.pmdc.org.pk/Statistics/tabid/103/Default.aspx.

163. Waterfield J. Is pharmacy a knowledge-based profession? Am J Pharm Educ. 2010;74(3):50.
164. Farrell B, Pottie K, Woodend K, Yao V, Dolovich L, Kennie N, et al. Shifts in expectations: evaluating doctors' perceptions as pharmacists become integrated into family practice. Journal of interprofessional care. 2010;24(1):80-89.
165. Klopotowska JE, Kuiper R, van Kan HJ, de Pont AC, Dijkgraaf MG, Lie-A-Huen L, et al. (2010). On-ward participation of a hospital pharmacist in a Dutch intensive care unit reduces prescribing errors and related patient harm: an intervention study. Crit Care. 2010;14(5):R174.
166. Azhar S, Hassali M, Ibrahim M. Doctors' perception and expectations of the role of the pharmacist in Punjab, Pakistan. Trop J Pharm Res. 2010;9(3).
167. Shekhani SS, Moazam F. The myth of 'Doctor Brides'. Dawn.com. 2019. Available from: https://www.dawn.com/news/1460104
168. Zakaria R. The doctor brides. Dawn.com. 2013. Available from: https://www.dawn.com/news/1032070
169. Ilyas F. From 'doctor brides' to practicing doctors. The Express Tribune. 2015. Available from: https://tribune.com.pk/story/969805/docthers-from-doctor-brides-to-practicing-doctors/
170. Annual Report 2016. Asian Development Bank. Available from: https://www.adb.org/sites/default/files/institutional-document/414776/adb-annual-report-2016.pdf
171. The Global Gender Gap Report 2018. World Economic Forum (WEF). Available from: http://www3.weforum.org/docs/WEF_GGGR_2018.pdf
172. Afridi FK, Baloch QB, Baloch VQ. Preventing and reversing Pakistan's medical brain drain through diaspora option and diaspora network. J Postgrad Med Inst. 2016; 30(2): 115-8.
173. Sheikh A, Abbas Naqvi SH, Sheikh K, Shiraz Naqvi SH. Physician migration at its roots: a study on the factors contributing towards a career choice abroad among students at a medical school in Pakistan. Globalization and Health. 2012;8:43. https://doi.org/10.1186/1744-8603-8-43
174. Naqvi AA, Zehra F, Naqvi SBS, Ahmad R, Ahmad N, Usmani S, et al. Migration Trends of Pharmacy Students of Pakistan: A Study Investigating the Factors Behind

Brain Drain of Pharmacy Professionals from Pakistan. Indian Journal of Pharmaceutical Education and Research. 2017;51(2):192-206. doi:10.5530/ijper.51.2.25.

175. Mekonnen AB, McLachlan AJ, Joanne EB. Effectiveness of pharmacist-led medication reconciliation programmes on clinical outcomes at hospital transitions: a systematic review and meta-analysis. BMJ open, 2016;6(2).
176. El-Ibiary SY, Yam L, Lee KC. Assessment of burnout and associated risk factors among pharmacy practice faculty in the United States. Am J Pharm Educ. 2017;81(4):75.
177. Naqvi AA, Hassali MA, Shyum Naqvi SBS, Aftab MT, Zehra F, Nadir MN, et al. Assessment of patient satisfaction following pharmacist counselling session by a novel patient satisfaction feedback on counselling questionnaire. JPHSR. 2019;10(2):243-254. https://doi.org/10.1111/jphs.12294
178. Shah A, Naqvi AA, Ahmad R. The need for providing pharmaceutical care in geriatrics: A case study of diagnostic errors leading to medication-related problems in a patient treatment plan. Arch Pharma Pract. 2016;7:87-94. doi: 10.4103/2045-080X.186173:
179. Fathelrahman A, Ibrahim M, Wertheimer A. Pharmacy practice in developing countries: achievements and challenges. 2016. Academic Press.
180. Azhar S, Hassali MA, Ibrahim MI, Ahmad M, Masood I, Shafie AA. The role of pharmacists in developing countries: the current scenario in Pakistan. Hum Resour Health. 2009;7:54. doi:10.1186/1478-4491-7-54.
181. Olsson E, Kälvemark Sporrong S. Pharmacists' experiences and attitudes regarding generic drugs and generic substitution: two sides of the coin. International Journal of Pharm Pract. 2012;20(6):377-383.
182. Norwood CW, Wright ER. Integration of prescription drug monitoring programs (PDMP) in pharmacy practice: Improving clinical decision-making and supporting a pharmacist's professional judgment. Res Soc Admin Pharm. 2016;12(2):257-266.
183. Spinewine A, Fialová D, Byrne S. The role of the pharmacist in optimizing pharmacotherapy in older people. Drugs & aging. 2012;29(6):495-510.
184. Abbas A, Shah A, Khan N, Nasir H, Khan MH. Perceptions of patients' care givers regarding clinical pharmacists and their practice in a developing country. International

Journal of Pharmacy and Pharmaceutical Sciences. 2014;7(2), 168-173. Retrieved from https://innovareacademics.in/journals/index.php/ijpps/article/view/3601.

185. Abbas A. Evidence Based Improvements in Clinical Pharmacy Clerkship Program in Undergraduate Pharmacy Education: The Evidence Based Improvement (EBI) Initiative. Pharmacy. 2014;2(4):270-275. https://doi.org/10.3390/pharmacy2040270
186. Abbas A, Khan N. Clinical trials involving pharmacists in Pakistan's healthcare system: A leap from paper to practice. Pharmacy. 2014;2(3):244-247. https://doi.org/10.3390/pharmacy2030244
187. Rosenthal MM, Breault RR, Austin Z, Tsuyuki RT. Pharmacists' self-perception of their professional role: insights into community pharmacy culture. J Am Pharm Assoc. 2011;51:363-367.
188. McGivney MS, Meyer SM, Duncan–Hewitt W, Hall DL, Goode JVR, Smith RB. Medication therapy management: its relationship to patient counseling, disease management, and pharmaceutical care. J Am Pharm Assoc. 2007;47:620-628.
189. Rossing C, Hansen EH, Traulsen JM, Krass I. Actual and perceived provision of pharmaceutical care in Danish community pharmacies: the pharmacists' opinions. Pharm World Sci. 2005;27:175-81.
190. Martin-Calero MJ, Machuca M, Murillo MD, Cansino J, Gastelurrutia MA, Faus MJ. Structural process and implementation programs of pharmaceutical care in different countries. Curr Pharm Des. 2004;10:3969-85.
191. Tice L. 2002 white paper on pharmacy technicians: needed changes can no longer wait. J Manag Care Pharm. 2003;9:72-83.
192. Strand LM, Cipolle RJ, Morley PC, Frakes MJ. The impact of pharmaceutical care practice on the practitioner and the patient in the ambulatory practice setting: twenty-five years of experience. Curr Pharm Des. 2004;10:3987-4001.
193. Awad A, Al-Ebrahim S, Abahussain E. Pharmaceutical care services in hospitals of Kuwait. J Pharm Pharm Sci. 2006;9:149-57.
194. Worley MM, Schommer JC, Brown LM, Hadsall RS, Ranelli PL, Stratton TP, Uden DL. Pharmacists' and patients' roles in the pharmacist-patient relationship: are pharmacists and patients reading from the same relationship script? Res Social Adm Pharm. 2007;3:47-69.

195. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. Am J Hosp Pharm. 1990;47:533-43.
196. Farris KB, Fernandez-Llimos F, Benrimoj SI. Pharmaceutical care in community pharmacies: practice and research from around the world. Ann Pharmacother. 2005;39:1539-41.
197. van Mil JWF. Pharmaceutical care, the future of pharmacy: theory, research, and practice. Published 2000. https://www.rug.nl/research/portal/files/14524956/thesis.pdf. (2 March 2020, date last accessed).
198. Zammit D. How to make ethical decisions. Pharm. J. 2003;271:16.
199. Nishtar S, Boerma T, Amjad S, Alam AY, Khalid F, ul Haq I, Mirza YA. Pakistan's health system: performance and prospects after the 18th Constitutional Amendment. Lancet. 2013;381:2193-206.
200. Naqvi AA, Zehra F, Naqvi SBS, Ahmad R, Ahmad N, Usmani S, Badar S, Younus I, Khan SJ. Migration trends of pharmacy students of Pakistan: a study investigating the factors behind brain drain of pharmacy professionals from Pakistan. Ind J Pharma Educ Res, 2017;51(2):192-206. doi:10.5530/ijper.51.2.25.
201. Awan MU, Raouf A, Ahmad N, Sparks L. Total quality management in developing countries: A case of pharmaceutical wholesale distribution in Pakistan. International Journal of Pharmaceutical and Healthcare Marketing. 2009;3:363-380.
202. Stewart D, Letendre DE. The Pharmacy Education: A Historical Perspective. In Pharmacy Education in the Twenty First Century and Beyond. Fathelrahman A, Ibrahim MI, Alrasheedy A, Wertheimer A. editors. London: Academic Press. 2018. p. 11-20.
203. Ahmed A, Tanveer M, Siddiqui A, Khan GM. Bridging the Gap for Clinical Pharmacist in Developing Countries like Pakistan. J Coll Physicians Surg Pak. 2018;28:229-232.
204. Naqvi AA, Zehra F, Khan N, Ahmad R, McGarry K. Interactions and conflicts of interests between prescribers and medical sales representatives (MSRs) regarding prescribing and drug promotion practices in Karachi, Pakistan. Pak J Pharm Sci. 2019;32(2):687-695.
205. Aziz MM, Fang Y, Babar ZU, Usman M. Hospital pharmacy services in Pakistan. Eur J Hosp Pharm. 2017;24:253.

206. Khowaja K. Healthcare Systems and Care Delivery in Pakistan. The Journal of Nursing Administration. 2009;39:263-265. doi: 10.1097/NNA.0b013e3181a96473.
207. Naqvi AA, Naqvi SBS, Zehra F, Verma AK, Usmani S, Badar S, Ahmad R, Ahmad N. Estimation of the Direct Cost of Poliomyelitis Rehabilitation Treatment to Pakistani Patients: A 53-Year Retrospective Study. Appl Health Econ Health Policy. 2018;16:871-888. doi: 10.1007/s40258-018-0422-6.
208. Naqvi AA, Hassali MA, Naqvi SBS, Aftab MT, Zehra F, Nadir MN, Jahangir A, Kachela B. Assessment of patient satisfaction following pharmacist counselling session by a novel patient satisfaction feedback on counselling questionnaire. JPHSR. 2019;10:243-254. https://doi.org/10.1111/jphs.12294.
209. Azhar S, Hassali MA, Mohamed Ibrahim MI. Doctors' Perception and Expectations of the Role of the Pharmacist in Punjab, Pakistan. Trop J Pharm Res. 2010;9:205-222.
210. Khan MU, Khan AN, Ahmed FR, Feroz Z, Rizvi SA, Shah S, Hussain R, Adil Z. Patients' opinion of pharmacists and their roles in health care system in Pakistan. J Young Pharm. 2013;5:90-4.
211. Pakistan Pharmaceutical Country Profile. World Health Organization. https://www.who.int/medicines/areas/coordination/pakistan.pdf. Accessed 15 March 2020.
212. Sample size calculator. Raosoft. http://www.raosoft.com/samplesize.html. Accessed 14 March 2020.
213. Lawshe CH. A quantitative approach to content validity. Personal Psychol. 1975;28:563-575.
214. Rungtusanatham M. Let’s, not overlook content validity. Decision Line. 1998;10-13.
215. Cohen JS. Statistical power analysis for the behavioral sciences. 2nd Edn. 1998.
216. De Vellis RF. Scale development: theory and applications. 26th Edn. 1991.
217. Banerjee A, Chitnis UB, Jadhav SL, Bhawalkar JS, Chaudhury S. Hypothesis testing, type I and type II errors. Ind Psychiatry J. 2009;18(2):127-31. doi: 10.4103/0972-6748.62274.
218. Agresti A. Introduction to categorical data analysis. NY: John Wiley and Sons. 1996.
219. Scahill SL, Atif M, Babar ZU. Defining pharmacy and its practice: a conceptual model for an international audience. Integr Pharm Res Pract. 2017;6:121-129.

220. Smith F. Community pharmacy in Ghana: enhancing the contribution to primary health care. Health Policy Plan. 2004;19:234-41.
221. Jesson J, Bissell P. Public health and pharmacy: A critical review. Critical Public Health. 2006;16:159-169.
222. Goel P, Ross-Degnan D, Berman P, Soumerai S. Retail pharmacies in developing countries: a behavior and intervention framework. Soc Sci Med. 1996;42:1155-61.
223. Bhagavathula AS, Sarkar BR, Patel I. Clinical pharmacy practice in developing countries: focus on India and Pakistan. Arch Pharma Pract. 2014;5:91.
224. Abbas A. The Catch-22 of Pharmacy Practice in Pakistan's Pharmacy Education. Pharmacy 2014;2:202-204. doi:10.3390/pharmacy2030202.
225. Abbas A. Evidence Based Improvements in Clinical Pharmacy Clerkship Program in Undergraduate Pharmacy Education: The Evidence Based Improvement (EBI) Initiative. Pharmacy 2014;2:270-275. doi:10.3390/pharmacy2040270.
226. Azhar S, Hassali MA, Ibrahim MI, Ahmad M, Masood I, Shafie AA. The role of pharmacists in developing countries: the current scenario in Pakistan. Hum Resour Health. 2009;7:54.
227. Azhar S, Hassali MA, Ibrahim MI. Perceptions of hospital pharmacist's role in Pakistan's healthcare system: a cross-sectional survey. Trop J Pharm Res. 2011;10:11-7.
228. Khan A. 15th International Pharmacy Conference and Exhibition. Lahore: Pakistan Pharmacists Association, 2009.
229. Khan N, McGarry K, Naqvi AA, Holden K. Doctors' perceptions, expectations and experience regarding the role of pharmacist in hospital settings of Pakistan. Int J Clin Pharm. 2020. doi: 10.1007/s11096-020-00991-9.
230. Khan N, Abbas A. Clinical Trials Involving Pharmacists in Pakistan's Healthcare System: A Leap from Paper to Practice. Pharmacy 2014;2:244-247. doi:10.3390/pharmacy2030244.
231. Naqvi AA, Hassali MA, Naqvi SBS, Aftab MT. Impact of pharmacist educational intervention on disease knowledge, rehabilitation and medication adherence, treatment-induced direct cost, health-related quality of life and satisfaction in patients with rheumatoid arthritis: study protocol for a randomized controlled trial. Trials. 2019;20:488. doi: 10.1186/s13063-019-3540-z.

232. Bukhsh A, Nawaz M, Ahmed HS, Khan TM. A randomized controlled study to evaluate the effect of pharmacist-led educational intervention on glycemic control, self-care activities and disease knowledge among type 2 diabetes patients: A consort compliant study protocol. Medicine (Baltimore). 2018;97:e9847.
233. Saleem F, Hassali MA, Shafie AA, Ul Haq N, Farooqui M, Aljadhay H, Ahmad FU. Pharmacist intervention in improving hypertension-related knowledge, treatment medication adherence and health-related quality of life: a non-clinical randomized controlled trial. Health Expect. 2015;18:1270-81.
234. El-Awaisi A, Joseph S, El Hajj MS, Diack L. A comprehensive systematic review of pharmacy perspectives on interprofessional education and collaborative practice. Research in Social and Administrative Pharmacy. 2018 Oct 1;14(10):863-82.
235. Egieyeh EO. Inter-professional collaboration between general practitioners and community pharmacists: general practitioners' perspectives (Doctoral dissertation, University of Western Cape).
236. Rixon S, Braaf S, Williams A, Liew D, Manias E. Pharmacists' interprofessional communication about medications in specialty hospital settings. Health communication. 2015 Nov 2;30(11):1065-75.
237. Sabry NA, Farid SF. The role of clinical pharmacists as perceived by E gyptian physicians. International Journal of Pharmacy Practice. 2014 Oct;22(5):354-9.
238. Lounsbery JL, Green CG, Bennett MS, Pedersen CA. Evaluation of pharmacists' barriers to the implementation of medication therapy management services. Journal of the American Pharmacists Association. 2009 Jan 1;49(1):51-8.
239. Touchette DR, Doloresco F, Suda KJ, Perez A, Turner S, Jalundhwala Y, Tangonan MC, Hoffman JM. Economic evaluations of clinical pharmacy services: 2006–2010. Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy. 2014 Aug;34(8):771-93.
240. Sundler AJ, Lindberg E, Nilsson C, Palmér L. Qualitative thematic analysis based on descriptive phenomenology. Nurs Open. 2019;6(3):733-739.
241. Atif, M., Razzaq, W., Mushtaq, I., Malik, I., Razzaq, M., Scahill, S. and Babar, Z.U.D., 2020. Pharmacy services beyond the basics: a qualitative study to explore perspectives of pharmacists towards basic and enhanced pharmacy services in Pakistan. International journal of environmental research and public health, 17(7), p.2379.

242. Abdel-Latif, M.M., 2017. Hospital doctors' views of, collaborations with and expectations of clinical pharmacists. European Journal of Hospital Pharmacy, 24(6), pp.343-348.

243. Azhar, S., Hassali, M.A. and Ibrahim, M.M., 2011. Perceptions of hospital pharmacist's role in Pakistan's healthcare system: a cross-sectional survey. Tropical Journal of Pharmaceutical Research, 10(1).

244. Azhar, S., Hassali, M.A., Ibrahim, M.I.M., Ahmad, M., Masood, I. and Shafie, A.A., 2009. The role of pharmacists in developing countries: the current scenario in Pakistan. Human Resources for Health, 7(1), pp.1-6.

245. Khan, N., McGarry, K., Naqvi, A.A. and Holden, K., 2020. Doctors' perceptions, expectations and experience regarding the role of pharmacist in hospital settings of Pakistan. International journal of clinical pharmacy, pp.1-18.

246. Hepler CD. Clinical pharmacy, pharmaceutical care, and the quality of drug therapy. Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy. 2004 Nov;24(11):1491-8.

247. American College of Clinical Pharmacy, Hammond RW, Schwartz AH, Campbell MJ, Remington TL, Chuck S, Blair MM, Vassey AM, Rospond RM, Herner SJ, Webb CE. Collaborative drug therapy management by pharmacists—2003. Pharmacotherapy: The Journal of Human Pharmacology and Drug Therapy. 2003 Sep;23(9):1210-25.

248. Mekonnen AB, Yesuf EA, Odegard PS, Wega SS. Pharmacists' journey to clinical pharmacy practice in Ethiopia: Key informants' perspective. SAGE open medicine. 2013 Sep 3;1:2050312113502959.

249. Zaidan M, Singh R, Wazaify M, Tahaineh L. Physicians' perceptions, expectations, and experience with pharmacists at Hamad Medical Corporation in Qatar. Journal of multidisciplinary healthcare. 2011;4:85.

250. Kjeldsen LJ, Bjerrum L, Dam P, Larsen BO, Rossing C, Søndergaard B, Herborg H. Safe and effective use of medicines for patients with type 2 diabetes–a randomized controlled trial of two interventions delivered by local pharmacies. Research in Social and Administrative Pharmacy. 2015 Jan 1;11(1):47-62.

251. Sakeena MH, Bennett AA, McLachlan AJ. The need to strengthen the role of the pharmacist in Sri Lanka: Perspectives. Pharmacy. 2019 Jun;7(2):54.

252. Azhar, S., Hassali, M. and Ibrahim, M., 2010. Doctors' perception and expectations of the role of the pharmacist in Punjab, Pakistan. Tropical Journal of Pharmaceutical Research, 9(3).

253. Azhar, S., Hassali, M.A. and Ibrahim, M.M., 2011. Perceptions of hospital pharmacist's role in Pakistan's healthcare system: a cross-sectional survey. Tropical Journal of Pharmaceutical Research, 10(1).

254. Azhar, S., Hassali, M.A., Mohamed Ibrahim, M.I., Saleem, F. and Siow Yen, L., 2012. A survey evaluating nurses' perception and expectations towards the role of pharmacist in Pakistan's healthcare system. Journal of advanced nursing, 68(1), pp.199-205.

255. Hashmi, F.K., Hassali, M.A., Khalid, A., Saleem, F., Aljadhey, H. and Bashaar, M., 2017. A qualitative study exploring perceptions and attitudes of community pharmacists about extended pharmacy services in Lahore, Pakistan. BMC health services research, 17(1), pp.1-9.

256. Jin, X., Azhar, S., Murtaza, G., Xue, F., Mumtaz, A., Niu, H., Taha, A. and Zhang, Y., 2014. Quantitative study evaluating perception of general public towards role of pharmacist in health care system of Pakistan. Age (mean±SD, 31.53±10.8), 15(126), pp.42-4.

257. Khan, N., McGarry, K., Naqvi, A.A. and Holden, K., 2020b. Doctors' perceptions, expectations and experience regarding the role of pharmacist in hospital settings of Pakistan. International journal of clinical pharmacy, pp.1-18.

258. Khan, N., McGarry, K., Naqvi, A.A., Iqbal, M.S. and Haider, Z., 2020a. Pharmacists' viewpoint towards their professional role in healthcare system: a survey of hospital settings of Pakistan. BMC health services research, 20(1), pp.1-15.

259. Rahim, N. and Usmani, S., 2012. Physicians' opinion about the role of pharmacist in the health care system of Pakistan. International Journal of Pharmacy Teaching & Practices, 3(2), pp.1-4.

260. DiPiro JT, Fox ER, Kesselheim AS, Chisholm-Burns M, Finch CK, Spivey C, Carmichael JM, Meier J, Woller T, Pinto B, Bates DW. ASHP Foundation pharmacy forecast 2021: strategic planning advice for pharmacy departments in hospitals and health systems. American Journal of Health-System Pharmacy. 2021 Mar 15;78(6):472-97.

261. Albassam A, Alshammari S, Ouda G, Koshy S, Awad A. Knowledge, perceptions and confidence of physicians and pharmacists towards pharmacogenetics practice in Kuwait. PLoS One. 2018 Sep 5;13(9):e0203033.
262. Moreno G, Lonowski S, Fu J, Chon JS, Whitmire N, Vasquez C, Skootsky SA, Bell DS, Maranon R, Mangione CM. Physician experiences with clinical pharmacists in primary care teams. Journal of the American Pharmacists Association. 2017 Nov 1;57(6):686-91.
263. McIntyre C, Natsheh C, Leblanc K, Fernandes O, Mejia AB, Raman-Wilms L, Cameron K. An analysis of Canadian doctor of pharmacy student experiences in non-traditional student-preceptor models. American journal of pharmaceutical education. 2019 Dec 1;83(10).

ANNEX: I

Clinicians' perceptions of the role of Pharmacists in Pakistan's Healthcare System

(A) Personal Information

Age (years)

_____

Gender

Male ☐
Female ☐

Professional Education

Basic Medical Qualification ☐
Specialized Qualification ☐
Overseas Qualification ☐

Place of Work

State Funded Hospital ☐
Private Hospital ☐
Other_____

Current Job Title

_____

Years of Experience

5 yrs. ☐
5-10 yrs. ☐
>10 yrs. ☐

Area of Practice

_____

Are you a registered with PMDC?

Yes ☐
No ☐

State

Sindh ☐
Punjab ☐
Baluchistan ☐
KPK ☐
Capital Territory ☐
AJK ☐
Fata/ Gilgit ☐

Please state your Professional membership
(National and International)

_____

(B) Interactions of Clinicians with Pharmacist

How often do you work directly with Clinicians?

Never/rarely ☐
Once a Week ☐
Once a day ☐

What are the most common reasons for these interactions? (tick multiple)

Drug availability queries ☐
Drug alternative queries ☐
Drug dosage queries ☐
Side effects queries ☐
Drug interaction queries ☐
Other, specify_____

How would you define Pharmacy as an occupation?

Professional ☐
Business ☐
Both ☐

Which of the following do you perceive as describing a pharmacist?

Clinician ☐
Technician ☐

(C) Clinicians expectations of Pharmacist

What are your expectations with the role of Pharmacists in the Healthcare System of Pakistan?

[Indicate with a tick whether or not you agree or disagree with the following statements]

	Expectations	Agree	Disagree
A.	I expect pharmacists to educate my patients about the safe and appropriate use of their medication		
B.	I expect pharmacists to monitor my patients' response to drug therapy and let me know if a patient encounters any drug-related problem		
C.	I expect pharmacists to be available to me for consultation when I see patients (during rounds)		
D.	Communicate with other health care providers to provide patient care		
E.	Collaborate with other health care providers as part of a team		
F.	Provide advice to patients about their medication and/or health conditions		
G.	Be mostly involved in the technical component of dispensing (counting tablets and labelling)		
H.	Provide a "closed shop "service that just receives prescriptions from the clinicians and couriers the medicine to the patient		
I.	Check prescriptions are the correct dose for the patient		
J.	Check prescriptions do not have drug-drug interactions		
K.	Check a prescription is not contraindicated for the patient		
L.	Advise on the cost-effectiveness of medicines for disease states		
M.	Formally review patient's medicines and discuss possible alterations to medicines therapy with the clinician		
N.	Supervise repeat prescriptions for a patient, according to agreed protocols		
O.	Make dose adjustments to a patient's medicine using protocols established with prescribers		
P.	Prescribe a medicine for a patient after the clinicians has made the diagnosis, decided on the category of medicine required and given the pharmacist relevant clinical details (partnership prescribing)		
Q.	Any other comments:		

(D) Clinician acceptance of Pharmacist providing direct care to patients

Do you feel that it is acceptable for pharmacists provide the following services to patients?

[Indicate with a tick about the following statements]

	Services	Yes	No
A.	Patient education		
B.	Supply non-prescription medications independent of other clinicians		
C.	Design and monitor pharmacotherapeutic regimes		
D.	Prevent prescription errors by near-patient prescreening of prescriptions		
E.	Detect and rectify prescription errors		
F.	Review and monitor prescriptions and therapy initiated by other clinicians		
G.	Treat minor illnesses (prescribing for common ailments) independent of other clinicians		
H.	Recommend prescription medicines to clinicians		
I.	Independently treat patients with specific conditions within an outpatient clinic setting		
J.	Monitor patients taking high risk or narrow therapeutic index medicines		
K.	Review and stop unnecessary antimicrobial agents		
L.	Conduct patient medical/drug histories on admission		
M.	Contribute to discharge management of patients at the end of their hospital stay		
N.	Liaise with primary healthcare providers about the care of patients		
O.	Any other comments:		

(E) Clinicians Experience with Pharmacist

In your opinion what are your experiences with the Pharmacists?

[Indicate with a tick whether or not you agree or disagree with the following statements]

	Experience	Agree	Disagree
A.	In my experience, pharmacists are a reliable source of general drug information (ie, specific facts about drugs, which can be found in standard references)		
B.	Pharmacists routinely counsel my patients regarding the safe and appropriate use of their medications		
C.	Pharmacists routinely inform me about more cost-effective alternatives to the drugs I prescribe		
D.	In my experience, pharmacists appear willing to take personal responsibility for resolving any drug-related problems they discover		

E.	Pharmacists routinely inform me if they discover clinical problems with my prescriptions		
F.	Pharmacists frequently ask me to clarify for them the drug-therapy objectives I have in mind for my patients		
G.	Pharmacists frequently let me know that my patients have experienced some problem with their medications		
H.	Any other comments:		

(F) Pharmacist involvement in Medications Management

To what extent you agree or disagree with the following?

[Indicate with a tick whether or not you agree or disagree with the following statements]

	Medicines Management Services	Agree	Disagree
A.	Do you think pharmacists should increase their involvement in medicines management?		
B.	The funding stream currently does not support pharmacists and clinicians collaborating on medication management		
C.	Other than to dispense prescriptions, pharmacists are on the periphery of the core health care team		
D.	A pharmacist providing this service would not be calling my judgment into question		
E.	This service by a pharmacist would be challenging my authority		
F.	This is not duplication of the clinician's work		
G.	I don't feel comfortable with the autonomy pharmacists have when dealing with patients		
H.	I don't have time to discuss patient-related medicine issues with pharmacists		
I.	Pharmacist's knowledge of pharmacology and clinical use of medicines is inadequate to intervene on the patient's behalf		
J.	I have sufficient confidence in the clinical knowledge of pharmacists for them to provide this service		
K.	Pharmacists are sufficiently trained to provide this service		
L.	The patient may get conflicting information regarding medicines use		
M.	This would enhance my current relationship with my pharmacists		
N.	This service would improve patients' medicine-related health outcomes		
O.	Any other comment:		

Pharmacists' perception of their role in Health Care

(A) Personal Information

Age (years)

_____

Gender

Male ☐
Female ☐

Professional Education

B. Pharm/ M. Pharm ☐
Pharm.D ☐
Overseas Qualification ☐

Place of Work

State Funded Hospital ☐
Private Hospital ☐
Other_____

Current Job Title

_____

Area of Practice

_____

Are you a registered with Pharmacy Council?

Yes ☐
No ☐
Any other association_____

Date of registration as a pharmacist

_____

State

Sindh ☐
Punjab ☐
Baluchistan ☐
KPK ☐
Capital Territory ☐
AJK ☐
Fata/ Gilgit ☐

As a Pharmacist, how long you have been seeing Patients?

_____

(B) Interactions with Clinicians

How often do you work directly with Clinicians?

Never/rarely ☐
Once a Week ☐
Once a day ☐

What are the most common reasons for these interactions? (tick multiple)

Drug availability queries ☐
Drug alternative queries ☐
Drug dosage queries ☐
Side effects queries ☐
Drug interaction queries ☐
Other, specify_____

How would you categories pharmacy?

Professional ☐
Business ☐
Both

Which of the following you think best describes the Pharmacist?

Clinician ☐
Technician ☐

C) Role of Pharmacists in Pakistan Healthcare

As a Pharmacist in Pakistan's Healthcare system, what are your expectations of your role/function?
[Indicate with a tick whether or not you agree or disagree with the following statements]

	Expectation	Agree	Disagree
A	To educate patients and careers about the safe and appropriate use of medicines		
B	To monitor and report patients' responses to drug therapy		
C	To be available for clinician consultation during ward rounds		
D	To communicate or liaise with other healthcare professionals delivering patient care to facilitate positive health outcomes		
E	To collaborate with other healthcare professionals as part of a multidisciplinary team		
F	To provide advice to patients about their medication and/or health conditions		
G	To dispense and accuracy check the supply of medicines to patient (counting pills, labeling, and accuracy checking)		
H	To provide a "closed shop" service: receiving prescriptions from a practitioner and couriers the dispensed medicine to a patient only		
I	To check that prescriptions are written for the correct dose for the patient		
J	To check that prescriptions do not have drug-drug interactions		
K	To check that a prescription is not contraindicated for the patient		
L	To advise clinicians and others about the cost-effectiveness of medicines		
M	To formally review a patient's therapy and to make necessary changes to help promote positive health outcomes		
N	To supervise repeat prescriptions for patients according to agreed protocols		
O	To make dose adjustments to a patient's medicine using protocols established with prescribers		
P	To prescribe therapy for a patient following a clinician's diagnosis (partnership or supplementary prescribing)		
Q	To prescribe therapy for a patient independent of clinician's diagnosis following an initial patient assessment (independent prescribing)		
R	Any other comments:		

D) Pharmacist Experience with Healthcare Professionals

What are your views of your peers?

[Indicate with a tick whether or not you agree or disagree with the following statements]

	Experiences	Agree	Disagree
A	Pharmacists are a reliable source of general medicines information (i.e., specific facts about medicines, which can be found in standard references)		
B	Pharmacists routinely counsel patients regarding the safe and appropriate use of medicines		
C	Pharmacists routinely inform clinicians about the cost-effectiveness of therapy and give accurate advice regarding alternatives treatments		
D	Pharmacists are willing to take personal responsibility for resolving any medicines-related problems they discover		
E	Pharmacists routinely inform clinicians if they discover clinical problems with prescriptions		
F	Pharmacists frequently ask to clarify therapeutic objectives clinicians have for patients		
G	Pharmacists frequently let medics know that patients have experienced some problem with their medications		
H	Pharmacists are focused on ensuring the safety of patients with respect to the therapeutic use of medicines		
I	Pharmacists respect the autonomy of patients and act to promote the concept of concordance		
J	Pharmacists are practicing as autonomous clinicians		
K	Any other comments:		

E) Pharmacists' Perception of the Undergraduate Curriculum

Are you satisfied with the current curriculum of Pharmacy Education in Pakistan?

[Indicate with a tick whether or not you agree or disagree with the following statements]

	Perception Regarding Curriculum	Agree	Disagree
A	The curriculum adequately addresses all the aspects of contemporary Pharmacy practice		
B	The curriculum adequately addresses all clinical aspects of Pharmacy practice		
C	Generally, I am satisfied with the Pharmacy undergraduate curriculum		
D	The balance of theoretical and practical aspects of the curriculum is correct for contemporary practice		
E	The introduction of a 5-year Pharm-D program in Pakistan's pharmacy schools will develop better practitioners		
F	Any other comments:		

F) Pharmacist involvement in Medicines Management

What you think of the following?

	Medicines Management Services	Yes	No
A	Pharmacists should increase their involvement in medicines management		
B	Current state or private funding does not support collaborative work between pharmacists and clinicians in medicines management		
C	Other than dispensing prescriptions, pharmacists are on the periphery of the core healthcare team		
D	Clinicians do not want me to provide medicines management services		
E	Patients would not subscribe to enhanced pharmacy practice services		
F	Medicines management by implication calls the clinician's judgment into question		
G	Medicines management challenges the clinician's authority		
H	This enhanced clinical practice de-skills the clinicians/ practitioners		
I	I don't have time to discuss patient-related medicine issues with clinicians		
J	I feel inadequately trained to deal with clinicians on clinical medicine-related issues on behalf of patients		
K	I have sufficient confidence in my clinical knowledge to provide this service		
L	Patients will get conflicting information regarding medicines use if pharmacists develop their medicines management services		
M	Enhanced clinical input will further develop my current relationship with clinicians		
N	Any other comments:		

ANNEX: II

Literature Reviewed For Initial Study

S. No	Reference	Year	Country	Size	Key Findings	Limitations
1.	Saira Azhar et.al	2010	Islamabad Faisalabad Lahore, Pakistan	344	• 68% of the doctors appeared comfortable with pharmacists playing patient-centred roles. • 84.5 % expected pharmacists to take personal responsibility for resolving any drug-related problem • 76 % of them considered pharmacists as knowledgeable drug therapy experts. • Only 50 % of the doctors thought that pharmacists apply their drug knowledge in practice • 11 % indicated that pharmacists routinely counselled their patients	• Conducted only in three cities of Punjab • Only government hospital involved
2.	Saira Azhar et.al	2011	Islamabad Faisalabad Lahore, Pakistan	116	• 42.2 % of the hospital pharmacists were involved in patient education pertaining to drugs, they were willing to take personal responsibility for resolving drug-related problems encountered • 84.5 % of them conveyed that their current role is more focused on pharmacy record keeping • 57.8% of the pharmacist indicated that they were involved in compiling and updating of their hospital's drug formulary	• Conducted only in three cities of Punjab • Very few numbers of respondents
3.	Najia Rahim et. al	2012	Karachi, Pakistan	116	• 86.2% of physicians was in favour of the need of pharmacist to meet present health care demand	• Less number of respondents • Only descriptive analysis conducted

					• 98.28% of physicians thought that only qualified pharmacists should run pharmacies • 93.1 % of physicians was in favour that there is an urgent need of pharmacist in public/private sector hospitals	
4.	Nabeel Khan et.al	2014	Karachi, Pakistan	278	• Limited interactions among doctors and pharmacists and that too for drug availability inquires • 80-90% physicians have high expectations with pharmacists. Indicated that pharmacists should be responsible for medication related query and should have updated knowledge • Higher proportion tends to disagree with pharmacists intervention in patient's drugs	• Nationwide study should be done • More details required
5.	Sadia Shakeel et.al	2015	Karachi, Pakistan	212	• >90% thought that clinical pharmacist should be a source of clinical medicines information • 70.8% of GPs considered it undoubtedly true that involvement of clinical pharmacist in medication management would enhance relationship • 90% of them agreed that the service would improve patients' medicine-related health outcomes. • ambivalent about the government policies and did not believe that the current policies give sufficient recognition to patient care approach • The government should develop strategies to strengthen doctors-pharmacists relation, thereby enhancing the role of pharmacists in primary care.	• Conflicting information regarding p-values

6.	R Adepu et.al	2006	Karnatka, India	115	• The respondents opined that only qualified pharmacists should run the pharmacies • Although the present D. Pharm qualification is sufficient to run the pharmacies • Pharmacists are considered as a part of health care team • pharmacists should check the legality and drug interactions in the prescriptions and provide the drug information • Respondents were against the pharmacist-run diabetic and anticoagulant clinics and against pharmacists prescribing cost-effective suggestions • Many respondents expressed positive opinion about the extended roles of the pharmacists but said the success mainly depends upon the improved knowledge base and effective communication skills	• KRUSKAL WALLIS was used but no significant of the test reported • Rationale of using the above mentioned test
7.	Eman Abu-Gharbieh et. al	2010	UAE	71	• Physicians (92%) expressed the view that the clinical pharmacist is an important integral part of the healthcare team • 90% of physicians believe that clinical pharmacist can acquire training in certain medical areas to perform patient counselling	• Small sample size was used • HCPs random sampling was not done based on categorization of their facilities which may have an impact on the need for clinical pharmacy services.
8.	Osama Mohammed et.al	2014	UAE	285	• Two thirds of the physicians believed that pharmacists could act as a reliable source of general drug information and play an important role in discovering clinical related problems	• The study has relatively small sample size. Second, parallel exploring study about the pharmacist training and competency

					• Physicians who had fewer years in practice (less than 10 years) and recently graduated had more acceptances to the clinical role of the pharmacist and believed that there should be a clinical pharmacy services in their hospitals	was not conducted. It is possible that skills and confidence in pharmacists' competency account for reduced acceptance and expectations of physicians for clinical pharmacy activities.
9.	Manal Zaidan et.al	2011	Qatar	205	• 89% physicians expected the pharmacist to educate patients about safe and appropriate use of drugs • 57% expected the pharmacist to be available for health-care team consultation during bedside rounds	• Private hospitals were not included in the study • Large study is warranted to extrapolate and generalize the results
10.	Kerry Wilbur et.al	2012	Qatar	62	• Physicians were more comfortable with pharmacist activities closely linked to drug products than responsibilities associated with monitoring and optimization of patient outcomes • Medication education (96.6%) and drug knowledge (90%) were practically unanimously recognized as abilities expected of pharmacists • consultative roles, such as assisting in drug regimen design were less acknowledged	• The data is not linked in the file and makes it confusing • Only descriptive analysis done • Less number of participants involved
11.	L. Matowe et.al	2006	Kuwait	120	• 57% of physicians comfortable with pharmacists carrying out patient-directed roles • 79% of them regarding pharmacists as knowledgeable drug therapy experts • 60% considered pharmacists as applying their drug knowledge in practice	• The sampling was from only four government hospitals • No private hospitals were included

					• 29% agreed that pharmacists routinely counselled their patients.	
12.	Linda M. et.al	2009	Jordan	245	• More than half of the physicians were comfortable with pharmacists providing patient education • 48.2% were uncomfortable with pharmacists suggesting the use of prescription medications to patients • 62.5% expect the pharmacist to educate their patients about safe and appropriate use of drugs • 33.9% of them do not expect the pharmacist to be available for consultation during rounds • 28.2% agreed that pharmacists frequently inform them that their patients have experienced some problem with their medications	• No private hospitals were included • The questionnaire did not include a mix of positively and negatively worded questions
13.	Saja Almazrou et.al	2015	Riyadh, Saudi Arabia	135	• Less than 40% indicated that they either never or rarely worked with a clinical pharmacist • 4% worked with clinical pharmacist quite often • Respondents agreed that clinical pharmacists were an integral part of the medical team • Most respondents agreed that the specific responsibilities of a clinical pharmacist were not clearly defined • Physicians seemed to be unaware of the potential benefits of having a clinical pharmacist on their teams, and some physicians had no prior experience working with clinical pharmacists	• The study is limited to one city • Pharmacists opinion was not considered

14.	Nahid Osman Ahmed et.al	2017	Qasim, Saudi Arabia	189	• Physicians perception were found to be high; such as, patients' education and counselling, monitoring of patients' responses to drug therapy including toxicity/side effects and provision of drug information to healthcare professionals • Physicians showed low perception (less than 76%) in the taking of patients' medication history on admission, by clinical pharmacists	• The study was conducted in only three hospitals at one city of Al Qassim region of Saudi Arabia • Only involved doctors in governmental hospitals and not those in private sector
15.	Abdelmoneim Awad et.al	2006	Khartoom, Sudan	200	• 50% of respondents never or rarely had interaction with pharmacists with regard to patient's medication • Respondents were most comfortable with pharmacists detecting and preventing prescription errors (49.2%), monitoring outcomes of regimen (45.9%), designing therapeutic regimens (43.4%) and suggesting use of prescription medicines (40.3%) • Respondents were least comfortable with pharmacists suggesting the use of certain prescription medications to patients	• The response rate was quite low • All respondents were hospital doctors only • Done in one part of the country
16.	Fatemeh Alipour et.al	2018	Tehran, Iran	415	• 67.2% of Physicians agreed that pharmacists were a reliable source of general drug information • 90.6% of Physicians expected pharmacists to advise their patients about the dose and administration of their medications • 51.6% of Physicians agreed that they were usually informed by pharmacists regarding potential problems in their prescriptions.	• A large study is recommended to extrapolate and generalise the results • This study investigated the perceptions, expectations and experiences of

						physicians and not that of pharmacists • Study done only in Tehran Province
17.	Salim A Hamadi et.al	2015	Iraq	194	• 69.4% reported, rarely interacting with pharmacists • 74.9% enquiring about the availability of medications • Physicians reported being comfortable with pharmacists preventing prescription error, treating minor illness, and suggesting prescription medication to physicians of 74, 75 and 67 % respectively • 47 % were comfortable with pharmacists providing patient education.	• Larger study is recommended to generalize the results to whole province • The study only included physicians in government hospitals and excluded those in the private sector
18.	Andreja čufar et. Al	2014	Slovenia	40	• Physician expect clinical pharmacists to analyse and consult patients' pharmacotherapies, detect drug related problems and suggest changes or optimization of the therapy • Physicians' perception of the role of the clinical pharmacist is more traditional and they are not in favour of passing the right to perform independent interventions of pharmacotherapy to clinical pharmacists • Agree that pharmacists should have access to medical records	• Limited number of Physicians involved in the study • Only Medical Directors and heads of hospitals were included in the study
19.	Deborah V. Kelly et. Al	2013	Newfound land, Canada	33	• Both groups (physicians and pharmacists) overwhelmingly agreed that collaborative practice could result in improved patient outcomes	• Out of 462 physicians only 33 participated in the survey

					• Major barriers were lack of time and compensation and the need to deal with multiple pharmacists/physicians • Physicians indicated they would like more collaboration for insurance approvals and patient counselling • Both groups want more collaboration to improve patient adherence	• Only family doctors were contacted for the study • 407 pharmacists were involved in the study and the difference among the two groups is quite staggering
20.	Linda J.M. Bryant, et.al	2009	New Zealand	565	• The results revealed a gap in perceptions regarding the role of the community pharmacist, with general acceptance of the technical roles but less acceptance of clinical roles by general practitioners • Barriers to increased involvement of community pharmacists in clinical services included a perceived lack of mandate, legitimacy, adequacy, and effectiveness by both groups (GPs and Pharmacists) • The study suggested that there are significant barriers to community pharmacists increasing clinical services, both from the community pharmacists themselves and from the general practitioners	• The study is only a preliminary study that attempts to look beyond the environmental and practical barriers to the provision of medicines management • Only community pharmacists were involved in the study
21.	Maher R. Khdoura et.al	2013	West bank, Palestine	157	• The majority (76.4%) of respondents were most comfortable with pharmacists detecting and preventing prescription errors • They were not comfortable with pharmacists suggesting the use of prescription medications to patients (56.7%)	• The results of the study can • not be generalized to all physicians in hospitals • physicians from private sector was not included in the study

					• Most physicians (62.4%) expected the pharmacist to educate their patients about the safe and appropriate use of their medication • Approximately one-third (31.7%) did not expect pharmacists to be available for consultation during rounds • Physicians' experiences with pharmacists were less favourable • 77% of the physicians agreed that pharmacists were always a reliable source of information • 11.5% agreed that pharmacists appeared to be willing to take responsibility for solving any drug-related problems	• most of the respondents were young (less than 35)
22.	Linda J.M. Bryant et, al	2009	New Zealand	1208	• Results revealed a gap in perceptions regarding the role of the community pharmacist, with general acceptance of the technical roles but less acceptance of clinical roles by general practitioners • Barriers to increased involvement of community pharmacists in clinical services included a perceived lack of mandate, legitimacy, adequacy, and effectiveness by both groups. • Study suggests that there are significant barriers to community pharmacists increasing clinical services, both from the community pharmacists themselves and from the general practitioners	• The paper shared the views of community pharmacists only • Postal services was utilized for data collection • Test utilized to achieve the results can be improved
23.	Saira Azhar et, al	2011	Islamabad Faisalabad	116	• 42.2 % of the hospital pharmacists were involved in patient education pertaining to drugs. The respondents were willing to take personal	• Conducted only in three cities of Punjab

			Lahore, Pakistan		responsibility for resolving drug-related problems encountered • 84.5 % of them conveyed that their current role is more focused on pharmacy record keeping. • 57.8% of the pharmacist indicated that they were involved in compiling and updating of their hospital's drug formulary. • Hospital pharmacists in Pakistan have concerns about their present professional roles and face significant barriers with regards to increasing their involvement in clinical services.	• Very few numbers of respondents
24.	Ut Mui Io et, al	2013	Macau	84	• 33.33% of physicians and 77.8% of pharmacists claimed they collaborated with the other professional at least once a week • The main reason for collaboration was prescription order queries • Both professionals indicated that "medication dispensing" and "identification and prevention of prescription errors" were currently the top responsibilities of pharmacists • It was anticipated by the physicians that pharmacists would remain focused on "medication dispensing" but should put in more effort • Pharmacists, on the other hand, would like to develop their role in direct patient care such as "patient counselling".	• The response rate of physicians and pharmacists was relatively low and the number of participants from each profession was different • Translation of the questions might be interpreted differently by participants, which needed further improvement

25.	Ibrahim Khalid Rayes et, al	2015	Dubai UAE,	198	• Findings showed that community pharmacists are more directed toward business than patients • They dispense all categories of medicines over-the-counter without the need of prescriptions • A new trend of pharmacists in Dubai is to provide enhanced pharmacy services such as consultation to patients upon request.	• Study results cannot be generalized to the whole country as it was restricted to the city of Dubai. • Only frequency and percentages among variables discussed no statistical test was utilized

ANNEX: III

University of Sunderland

PARTICIPANT CONSENT FORM

Project Title: Determining the Barriers of Inter-Professional Relationships between Clinicians and Pharmacists in Pakistan: A Mixed Methods Analysis

Chief Investigator: Nabeel Khan

Participant ID:

Please initial box

1. I confirm that I have read and understand the information sheet, (_____) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily ☐
2. I understand I am being asked to take part in the study by being completing a survey ☐
3. I understand the information from the surveys will be entered onto a database on the university computer system, but any data used will be anonymous ☐
4. I understand I am free to withdraw from the study at any time without giving reason ☐
5. I would like to be informed about the study findings. Please contact me when the findings are available ☐
6. I consent to taking part in the above research study ☐

Signed:

_____	_____	_____
Participant	Date	Signature
_____	_____	_____
Researcher	Date	Signature

1 copy to participant, 1 copy to researcher

ANNEX: IV

Interview Guide for Doctors and Pharmacists

For Doctors: List of questions to be asked in the interview

1. How long have you associated with this hospital?
    i. How long have you associated with this profession?
2. What is your basic education as Doctor?
    i. Do you have any other qualification/ certification other than your basic medical education?
3. How long have you been seeing patients as Doctor?
    i. Only worked in hospitals or elsewhere?
4. How frequent (often) is the communication with the pharmacists in your hospital? i.e. how many times have you met with the pharmacists to have extended discussions about patient care? Or any other query
5. What are the common means of communication?
    i. Are there any face to face visits, using the patients as messengers, by phone etc.?
6. Was there a point in your practice time where pharmacist tried to communicate with you regarding an ongoing treatment which you were in-charge of?
    i. How did that communication go?
7. Have you ever come across a situation where pharmacists communication with you resulted in a better patient outcome or has there been a case where the lack of communication with them resulted in a negative patient outcome?
8. Do you think that it would be useful to potentiate the teamwork with the Pharmacists of your hospital? Why?
    i. If yes, have you ever come across such teamwork? What was the result
9. What steps do you think could be taken to improve communication with Pharmacists?
10. Are there any joint care activities that are performed by pharmacist in your hospital?
    i. If so, please specify those activities?
11. Please specify those joint activities that can potentially be performed by the collaboration of pharmacists? E.g. Pharmacists phoning in refill requests, alerting doctors on the possible ADRs, or discussing a drug therapy problem identified during the dispensing process,
12. How do you see the role of Pharmacists in your hospital?

i. How do you perceive if Pharmacists will only be limited to the dispensing of medicines?

13. Do you think Pharmacists can prescribe common illnesses medicines?

i. Do you think you Pharmacist will be taking your place by prescribing?

14. In your experience, do you think Pharmacists took responsibility for managing medicines related problems?

i. Can you give any example?

15. In your opinion who do you think (pharmacist/doctor) makes an effort to establish an inter-professional collaboration?

i. If possible, please give me examples of this efforts?

16. Are there systems (systems placed by the administrative body, formal and informal / regular and irregular) in place that potentiate the inter-professional collaboration between you and pharmacists?

i. How has your collaboration with pharmacists been facilitated or hindered by the hospital's organizational structure?

17. What do you think about the structure of Pharmacy education in Pakistan? Do you think it has to be improved?

18. How important do you feel trust is to relationship development with the pharmacists with whom you work with?

i. Do you trust the pharmacists with whom you work?

Probing questions:

19. Do the pharmacists in the hospital monitor the drug therapies of patients?

20. Do the pharmacists in the hospital make clinical recommendations to you?

i. If so, how well are they accepted by you?

21. Is there anything more you would like to add on what we have talked about so far?

22. Do you have any question that you would like me to answer?

Thank you for your time and cooperation

For Pharmacists: List of questions to be asked in the interview

1. How long have you associated with this hospital?
    i. How long have you associated with this profession?
2. What is your basic education as Pharmacists?
    i. Do you have any other qualification/ certification other than your basic education?
3. How long have you been seeing patients as Pharmacists?
    i. Only worked in hospitals or elsewhere?
4. How frequent (often) is the communication with the doctors in your hospital? i.e. how many times have you met with the doctors to have extended discussions about patient care?
5. What are the common means of communication?
    i. Are there any face to face visits, using the patients as messengers, by phone etc.?
6. Was there a point in your practice time where doctor tried to communicate with you?
7. Have you ever come across a situation where your communication with the doctors resulted in a better patient outcome or has there been a case where the lack of communication with them resulted in a negative patient outcome?
8. What kind of roles do the doctors in the hospital expect you to play?
    i. What is your understanding of doctors perceive you as? Professional or Technician?
9. Are there any joint care activities that are performed by you and doctors in your hospital?
    i. If so, please specify those activities?
10. Please specify those joint activities that can potentially be performed by the collaboration of pharmacists and doctors? alerting prescription on the possible ADRs, discussing a drug therapy problem identified during the dispensing process,
11. How do you expect the role of Pharmacists in your hospital?
    i. How do you perceive if Pharmacists will only be limited to the dispensing of medicines?
    ii. Can you list the priorities of duties of Pharmacists in the hospital?

12. Do you think Pharmacists can prescribe common illnesses medicines?

i. Do you think you will be taking doctors place by prescribing?

13. In your experience, do you think Pharmacists took responsibility for managing medicines related problems?

i. Can you give any example?

14. Do you think patient's safety is one your main responsibility?

i. If yes, then can you explain how you will perform this duty?

15. How has (in a positive or negative way) your professional education affected you in collaborating with doctors?

16. Are you satisfied with the current pharmacy practice education in Pakistan?

i. What major changes in the curriculum you expect from Pharmacy Council?

Probing questions:

17. Do the pharmacists in the hospital monitor the drug therapies of patients in your hospital?

18. Do the pharmacists in the hospital make clinical recommendations to the doctors?

i. If so, how well are they accepted by them?

19. Is there anything more you would like to add on what we have talked about so far?

20. Do you have any question that you would like me to answer?

Thank you for your time and cooperation

ANNEX: V

University of Sunderland

FACULTY OF APPLIED SCIENCES
SCIENCES COMPLEX
CITY CAMPUS
CHESTER ROAD
SUNDERLAND SR1 3SD
UNITED KINGDOM

TEL: 0191 515
FAX: 0191 515
www.sunderland.ac.uk

Dear Sir,

This letter is to introduce Mr Abdul Nabeel Khan, who is a PhD student studying at the University of Sunderland, in the UK. Mr Khan is a registered pharmacist from Pakistan and will be conducting research work to "*determine the barriers of inter-professional relationships between Physicians and Pharmacists in Pakistan*". This will be a mixed methods analysis consisting of questionnaire analysis and qualitative focus groups of Pharmacists and Physicians.

I would be most grateful if your organisation could assist him by providing a named member of your staff to distribute a certain number of the questionnaires to the Pharmacists and Physicians and to collect these back from a designated "drop-off" point after an appropriate period of time. If you can also provide contract details of the named staff person (to satisfy our University Ethics committee) to ensure we are conducting this research at your Hospital in a professional and responsible way.

This research is very important to the healthcare system of Pakistan and will provide useful information regarding inter-professional barriers which may prevent the pharmacists from fulfilling many useful tasks that they are qualified to do.

The data and details will be kept in the strictest confidence. If you have any queries, please contact me using the below email, phone or address.

With our thanks in advance,

Yours sincerely,

KOMcGarry

UNIVERSITY OF SUNDERLAND
FACULTY OF APPLIED SCIENCES

Dr. Ken McGarry
Senior Lecturer in Statistics for Health Sciences
Faculty of Applied Sciences,
Department of Pharmacy, Health and Well-being.
University of Sunderland,
Sunderland, SR1 3SD
Tel: 0191 5153785
Email: ken.mcgarry@sunderland.ac.uk
Web: https://www.sunderland.ac.uk/about/staff/pharmacy-pharmaceutical-cosmetic-sciences/ken_mcgarry

ANNEX: VI

University of Sunderland

Downloaded: 14/02/2018
Approved: 14/02/2018

Nabeel Khan
School of Pharmacy and Pharmaceutical Sciences
Programme: Doctor of Philosophy

Dear Nabeel

PROJECT TITLE: Determining the barriers of inter-professional relationships between medics and pharmacists in Pakistan: a mixed methods analysis
APPLICATION: Reference Number 000657

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 14/02/2018 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 000657 (dated 08/02/2018).
- Participant information sheet 1003297 version 1 (25/01/2018).
- Participant consent form 1003298 version 1 (25/01/2018).

If during the course of the project you need to deviate significantly from the above-approved documentation please email ethics.review@sunderland.ac.uk

For more information please visit: https://www.sunderland.ac.uk/research/governance/researchethics/

Yours sincerely

Veronique Laniel
Ethics Administrator
University of Sunderland

ANNEX: VII

University of Sunderland

Downloaded: 12/12/2018
Approved: 12/12/2018

Nabeel Khan
School of Pharmacy and Pharmaceutical Sciences
Programme: Doctor of Philosophy

Dear Nabeel

PROJECT TITLE: Determining the Barriers of Inter-Professional Relationships between Clinicians and Pharmacists in Pakistan: A Mixed Methods Analysis
APPLICATION: Reference Number 002861

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 12/12/2018 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 002861 (dated 10/12/2018).
- Participant information sheet 1005597 version 2 (07/12/2018).
- Participant consent form 1005596 version 3 (07/12/2018).

The following optional amendments were suggested:

Please reword condition 4 in the Consent Form - it doesn't make sense in its present form

If during the course of the project you need to deviate significantly from the above-approved documentation please email ethics.review@sunderland.ac.uk

For more information please visit: https://www.sunderland.ac.uk/research/governance/researchethics/

Yours sincerely

Callum Williams
Ethics Administrator
University of Sunderland

ANNEX: VIII

University of Sunderland

School of Pharmacy

Department of Health and Wellbeing

Interview Guide on the Barriers of Inter-Professional Relationships between Doctors and Pharmacists in Pakistan: For Pharmacists

Introduction: I want to thank you for taking the time to meet with me today. My name is Nabeel Khan and I am the principal investigator for the study entitled "Inter-Professional Relationships between doctors and pharmacists in Pakistan". And I would like to talk with you about the level of inter-professional collaboration you have with the doctors in your hospital.

Purpose of the Interview: I am interested in knowing the extent of inter-professional collaboration you have with the doctors in your hospital. The interview should take maximum of an hour. Although I will be taking some notes during the session, I can't possibly write fast enough to get it all down. Because I don't want to miss any of your comments, would it be alright if I tape recorded the session?

Yes/No

If your answer is yes, because we're on tape, please be sure to speak up so that we don't miss your comments. All responses will be kept confidential. This means that your interview responses will only be shared with research team and we will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to and you may end the interview at any time.

Are you willing to participate in this interview?

Yes/ No

ANNEX: IX

University of Sunderland

School of Pharmacy

Department of Health and Wellbeing

Interview Guide on the Barriers of Inter-Professional Relationships between Doctors and Pharmacists in Pakistan: For Doctors

Introduction: I want to thank you for taking the time to meet with me today. My name is **Nabeel Khan** and I am the principal investigator for the study entitled "Inter-Professional Relationships between doctors and pharmacists in Pakistan". And I would like to talk with you about the level of inter-professional collaboration you have with the physicians in your hospital.

Purpose of the Interview: I am interested in knowing the extent of inter-professional collaboration you have with the pharmacists in your hospital. The interview should take maximum of an hour. Although I will be taking some notes during the session, I can't possibly write fast enough to get it all down. Because I don't want to miss any of your comments, would it be alright if I tape recorded the session?

Yes/No

If your answer is yes, because we're on tape, please be sure to speak up so that we don't miss your comments. All responses will be kept confidential. This means that your interview responses will only be shared with research team and we will ensure that any information we include in our report does not identify you as the respondent. Remember, you don't have to talk about anything you don't want to and you may end the interview at any time.

Are you willing to participate in this interview?

Yes/ No

ANNEX: X

Participant Information Letter

Determining the barriers of inter-professional relationships between doctors and pharmacists in Pakistan

Chief Investigator: Nabeel Khan

You are being invited to take part in a research study. Before you make a decision whether or not you wish to be involved, it is important for you to understand why the research is being done and what it will involve if you choose to take part. Please take the time to read through this information and to discuss it with others. If you would like any further information, please contact the researcher (contact details are at the end of this sheet). The decision to take part in the research study is up to you, please take your time to decide if you wish to participate or not.

Note: This is the second phase of the study, in first phase the investigator conducted survey across the major hospitals of Pakistan, this part of the study will provide the in-depth insight of the relations of the two professionals.

Why you are being asked to take part in this study?

The research is based upon the inter-professional relationship among doctors and pharmacist practising in hospitals across various cities of Pakistan.

Why is the research study being done?

In Pakistan, the relationship between doctors and pharmacists are not exemplary and that is why the patients are not able to receive the recommended care plan. Previously, there has not been ample research being done on this topic nationwide and this research will surely provide the ground reality of the relationship and how we can improve the overall healthcare system by addressing these issues to the concern authorities

What will I have to do?

You will be asked to take part in an interview. You do not need to give your name or any other information that could identify you. Completing the interview should take you no longer than 50-60 minutes to complete.

What risks are there?

We do not believe that there are any risks to you or to your organization participating in the research. If you think you might feel uncomfortable, or do not want to take part in the study, simply ignore this letter. Unfortunately, we will not be able to withdraw any response once the respondents have completed the interview as the response will be anonymous and we would not be able to identify you.

Will taking part in the study be confidential?

The data from the interview is anonymous, so the organization name or the respondent's identity will not be identified. The real names of the people will not be used. It may be appropriate that certain staff at the University of Sunderland may be given access to the data for monitoring or audit of the research study to ensure compliance with standards and regulations.

The written data will be stored in a locked file at the University of Sunderland and will be destroyed after five years. Every effort will be made to maintain confidentiality and protect the identities of the participants in line with current laws and practice.

The data will or might be used, e.g. published in journals, presented at conferences, shared with health bodies. However, the identity of the respondents will remain confidential at all stages

What if you decide not to take part?

Taking part in the study is voluntary, and you do not have to take part if you do not wish to. Simply ignore this letter. However, if you decided to not continue participating in the study simply leave the consent form, as any incomplete interviews will not be the part of the study

What happens next?

Please take the time to read this information sheet. It is up to you to decide if you would like to participate in the study. Please feel free to contact the Chief Investigator to discuss any queries you or your organization may have. If you do decide to take part, please contact the Chief Investigator if you wish to receive a printed copy

How you can contact if like to have more information about the research?

Once you have had time to read this sheet and if you have decided to have further information, about the research study, please contact the researcher, for any other information, please contact Dr Ken McGarry at ken.mcgarry@sunderland.ac.uk or the Chair of the University Ethics Committee, Dr John Fulton at john.fulton@sunderland.ac.uk

If you agree kindly signed in the consent form acknowledging your consent and permission for me to conduct this study

Thank you for taking the time to read this information sheet.

This study has been approved by the University of Sunderland
Research Ethics Committee

ANNEX: XI

International Journal of Clinical Pharmacy
https://doi.org/10.1007/s11096-020-00991-9

RESEARCH ARTICLE

Doctors' perceptions, expectations and experience regarding the role of pharmacist in hospital settings of Pakistan

Nabeel Khan[1] · Ken McGarry[2] · Atta Abbas Naqvi[3] · Keith Holden[1]

Received: 4 April 2019 / Accepted: 7 February 2020

Abstract

Background The inclusion of pharmacist in health care system is essential to ensure optimal patient care. However, with the passage of time, pharmacist's role has transcended from dispensing, compounding and counting of pills, to more sophisticated clinical duties. *Objective* To evaluate doctors' experience, perceptions and expectations regarding pharmacists' role in Pakistani healthcare settings. *Setting* All tertiary care hospitals across 26 cities of Pakistan. *Method* A cross-sectional study using a self-administered questionnaire was carried out targeting doctors practising in Pakistan. The survey was conducted from January to April 2018. Chi square (χ^2) test was used to analyse responses of doctors regarding pharmacist's role in the healthcare system of Pakistan. The associations were considered significant at p value less than 0.05. The study was approved by concerned ethical committee. *Main outcome measure* Doctors' experience, perceptions and expectations regarding pharmacists' role. *Results* A total of 483 questionnaires were received and analysed (response rate; 87.9%). Most participants (67.5%) reported interaction with pharmacists at least once daily, and that was mostly related to drug availability inquiry (73.7%). 86.7% of doctors expected pharmacists to ensure safe and appropriate use of medicines to patients. 87.6% of doctors expected pharmacists to monitor patient's response to drug therapy ($p < 0.05$) and 66.5% expected pharmacists to review patient's medicines as well as discuss possible amendments to therapy ($p < 0.05$). Besides, most doctors (84.9%) disagreed with the notion of pharmacists prescribing medicine for patients ($p < 0.05$). Most participants (81.6%) did not want pharmacists to prescribe independently. *Conclusion* The study highlights that doctors considered pharmacists as drug information specialists, dispensers, educators and counsellors; however, their expectation of pharmacists performing the clinical role and being involved in direct patient care was limited. They negated the idea of prescription intervention and direct involvement of pharmacists in pharmacotherapy plan for patients. It is imparative to increase doctors' awareness regarding the role pharmacists could play in Pakistan's healthcare system. Currently, the clinical role of pharmacists in Pakistan's healthcare system seems minimal and is seen with scepticism within the community of doctors.

Keywords Doctors · Pakistan · Pharmacist · Pharmacy practice

Impacts on practice

- Doctors' opinion about the role of pharmacists in hospitals will provide understanding and the means to bridge the gap between the two professions that may support an extended role of pharmacists in patients' medicines management.
- Pharmacists working actively with doctors may provide possibilities to improve patient care.
- For patients, good professional relationship between doctors and pharmacists will surely improve pharmaceutical care practice and safety of patients.

✉ Nabeel Khan
nabeel.khan@research.sunderland.ac.uk

[1] School of Pharmacy and Pharmaceutical Sciences, University of Sunderland, Sunderland, UK

[2] School of Computer Science, Faculty of Technology, University of Sunderland, Sunderland, UK

[3] Department of Pharmacy Practice, College of Clinical Pharmacy, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia

Published online: 17 February 2020

Introduction

The profession of pharmacy is often viewed as an allied health profession that is associated with the supply of medicines within a legally regulated environment. This is carried out by either dispensing prescription medicines following receipt of a doctor's prescription or, through over the counter (OTC) sales of non-prescription medicines [1]. This conventional view ignores contemporary changes in clinical practice that have occurred in many developed countries and focuses mainly on pharmacy practice associated with retail pharmacy. It disregards the intricacy of practice in primary, secondary and tertiary healthcare sectors [2]. Notwithstanding the importance of dispensing of medicines in a safe and controlled manner, the modern practice of pharmacy incorporates a wide range of professional patient-oriented activities that aim to improve patient safety and health outcomes that are sometimes, not directly linked to dispensing service [3–5].

In many developed countries, pharmacists are either in process or, have already been recognised as autonomous clinical practitioners. For instance, pharmacists in the UK have been licensed not only to dispense, but also prescribe medicines [6]. During the past 25 years pharmacists have been encouraged to embrace clinical responsibility and accountability, most notably with the development and application of Hepler and Strand's [3] description of 'pharmaceutical care' model. The pharmaceutical care model or service is a patient-oriented care provided by pharmacist with an aim to improve the patients' treatment outcomes [3–5, 7]. Evidence highlight that pharmacists may have a substantial influence on patient's well-being [8]. Despite some level of advancements in pharmacy profession in few developed countries, there is a continuing resistance to the development of clinical pharmacy practice both in developed and many developing countries [9–11].

A potential barrier to acceptance of pharmacists' role and benefiting from pharmacists could be due to the negative perceptions in doctors' mind [12–14]. However, evidence indicates that significant number of doctors were welcoming to the notion of an enhanced role envisioned for pharmacists and believed that few pharmacists performed their duties as per international standards of practice [9, 12]. This belief was mainly due to the limited role of pharmacist i.e., dispensing and compounding of medications [15–17]. Although there may be a belief in practitioners that pharmacists could perform better in clinical roles, the medical profession essentially works to prevent this in a form of professional protectionism [18].

Pakistan is an economically developing country in South Asian region. The health expenditure of the country was 2.6% of the total GDP in 2015 [19–21]. This was quite low as the healthcare spending of UK was 9.9% of its GDP in the same year [22]. The healthcare system of Pakistan is comprised of private and state funded hospitals [23, 24]. The state-funded health infrastructure is a three-tiered system comprising of primary, secondary and tertiary care facilities. The primary care facilities include basic health units and healthcare centres in rural areas. The secondary care include ambulatory, acute and in-patient care while tertiary care includes teaching hospitals at district-level [23, 24]. The total number of healthcare facilities are 14,282 that include 1201 hospitals. However, with an increasing population, inadequate funds and inefficient distribution of healthcare staff, the health needs are not fulfilled by the state-funded health infrastructure. Therefore, private sector contributes to the healthcare services and is utilized by a larger population of the country [21, 23–25]. There is no difference in the practice of pharmacy in private and state funded hospitals since both are regulated by the same health authority of Pakistan.

The Western model of pharmacy practice in Pakistan's healthcare sector is still developing. The Government of Pakistan formulated the 'Drugs Act 1976', that was similar to the UK Medicines Act 1968, for regulating pharmacy profession [26]. It stated regulations for manufacturing of drugs and their use as well as role of pharmacists [26]. Unlike the Medicines Act 1968, the Drugs Act 1976 was not subjected to constant modifications considering the changes in clinical practice.

Since last decade, the curriculum of pharmacy education in Pakistan has been subjected to regular changes over time to accommodate advancements in drugs use and pharmacy profession. Initially, the practice of pharmacy in Pakistan's healthcare system was focused towards drug dispensing and compounding. Hence, a degree in pharmacy was designed as Bachelor of Science in Pharmacy (BSc. Pharmacy) of 3 years duration and had full-time courses with core subjects related to compounding and dispensing of medicines. This was later modified to bachelors in pharmacy (B. Pharm) which was a 4-year degree and had industrial pharmacy-related courses. In 2008, the course was again modified to Doctor of Pharmacy (Pharm.D) which was a 5-year degree and had clinical and hospital pharmacy-related courses along with the previous ones [27–29]. This was done envisioning a clinical role of pharmacists in the country's healthcare system [29, 30]. Currently, as per the regulations of the Pharmacy Council of Pakistan, pharmacists are considered a part of healthcare team without prescribing authority [31]. However, some misapprehensions and scepticism regarding their clinical role exist among doctors [16, 32, 33].

Aim of the study

The aim was to evaluate doctors' perceptions, expectations and experience regarding pharmacists' role in Pakistani healthcare settings.

Methodology

A cross-sectional survey was carried out from January 2018 to April 2018. The target population for this study was medical doctors. All doctors who graduated with a degree in medicine, with 1 year house job experience and, were practicing in hospitals across Pakistan were included. Incomplete questionnaires were excluded from study. The study was conducted in tertiary care hospitals of twenty six cities of Pakistan.

The sample size was estimated using an automated online calculator (RAOSOFT) [34]. The official figures for number of doctors with a basic degree in medicine was 186,980 [35]. This figure was considered as total population, keeping an alpha error rate of 0.05 and confidence level of 95%. The sample size was 540 plus a 2% drop-out rate (n = 10). Initially, a list covering all doctors working at studied hospitals was prepared, then the simple randomization technique was used to select doctors. Finally, a total of 550 participants were approached randomly to participate in this study. Before the initiation of the survey, the doctors were given an explanation regarding research purpose, and their consent to participate in the study was obtained. The questionnaires were in both English and Urdu languages, distributed as hard copy, in a face-to-face manner and, were collected later at a suitable time indicated by respondents. In some cases, the doctors were not keen to participate in the study because of their busy schedule.

A total of 550 questionnaires were received. There were four sections in the questionnaire: demography; doctors' interpersonal professional relationship with pharmacists; reasons for professional interaction; and doctors' perceptions regarding pharmacists. The questionnaire was prepared from those used in previously published studies [8, 9, 16].

Data were analysed by SPSS 24.0 (SPSS, Chicago, IL, USA) and were reported as percentage (%) and sample count (N). Chi square (χ^2) was used to analyse independent variables such as: level of education; type of hospital; and previous experience, with; dependent variables, such as: expectations of pharmacists; acceptance of pharmacists within the healthcare system; experiences of doctors with pharmacists; and, involvement of pharmacists in medicines management. Statistical significance was accepted at p value less than 0.05.

Ethics approval

Ethics approval was obtained from the Research Ethics Committee of the University of Sunderland, United Kingdom. Approval from respective hospitals was received prior to data collection. This ensured that research approval was also obtained locally.

Results

Of 550 questionnaires received in total, 483 were completed and used in analyses giving a response rate of 87.9%. However, sixty-seven questionnaires were discarded based on failure to comply with the given instructions. Most respondents were male (61.9%, n = 299) doctors. Almost half of respondents (55.3%) possessed a specialized post-registration medical qualification whilst almost a third (31.1%) had only a basic medical degree. Some doctors had overseas medical qualifications (13.7%) meaning that most respondents were trained and qualified in Pakistan. Almost equal proportion of doctors worked in state-funded (51.6%) and private hospitals (48.4%) respectively. As judged by individual job titles, most respondents were classed as Resident Medical Officers (RMO) (56.7%), 17.8% were Medical Officer, Registrar (9.5%) and Assistant Professors were 9.5%. Few were Associate Professors (5.2%) and Professors (1.2%).

Almost half of the respondents (45.3%) had work experience of less than 5 years, whereas 36.6% had experience between 5 and 10 years reflecting the predominantly junior grades of respondents. Whereas, only 18% had work experience of more than 10 years. Areas of practice stated by respondents included; internal medicine (27.3%), surgery (26.1%), paediatrics (22.4%) and, obstetrics & gynaecology (10.1%). About 14% of doctors were working in departments namely orthopaedics, ear nose and throat (ENT) and, emergency (ER). The respondents involved in the study were from all provinces of Pakistan in following proportions; Sindh (30.4%), Punjab (41.8%), Baluchistan (4.1%), Khyber Pakhtunkhwa (KPK) (13.3%), Islamabad Capital Territory (7.5%), and Azad Jammu & Kashmir (AJK) (2.9%). All the respondents were registered with Pakistan Medical and Dental Council (PM & DC). The majority (83.4%) of participants had national professional memberships while few doctors had both national and international memberships (16.6%). Table 1 illustrates the details about respondents' demographics and relevant information.

Among all respondents, slightly more than a quarter (26.5%) had interactions with pharmacists described as 'weekly', whilst the majority described more than once daily interactions with pharmacists (67.5%). Few (6%) doctors had

Table 1 Demographic information

Characteristics	Respondents (n = 483)
Gender	
Male	299 (61.9%)
Female	184 (38.1%)
Professional education	
Basic medical qualification	150 (31.1%)
Specialized medical qualification	267 (55.3%)
Overseas medical qualification	66 (13.7%)
Place of work	
State funded hospital	249 (51.6%)
Private hospital	234 (48.4%)
Current job title	
Professor	6 (1.2%)
Associate professor	25 (5.2%)
Assistant professor	46 (9.5%)
Senior registrar	46 (9.5%)
Resident medical officer	274 (56.7%)
Medical officer	86 (17.8%)
Years of experience	
Less than 5 years	219 (45.3%)
5–10 years	177 (36.6%)
More than 10 years	87 (18.0%)
Area of practice	
Internal medicine	132 (27.3%)
Surgery	126 (26.1%)
Paediatrics	108 (22.45)
Obstetrics and gynaecology	51 (10.6%)
Others (Ortho, ENT, ER)	66 (13.7%)
State of practice	
Sindh	147 (30.4%)
Punjab	202 (41.8%)
Baluchistan	20 (4.1%)
KPK	64 (13.3%)
Islamabad Capital Territory	36 (7.5%)
AJK	14 (2.9%)
Are you registered with medical council?	
Yes	483 (100%)
Professional membership	
National	403 (83.4%)
International (Both)	80 (16.6%)

never or rarely interacted with pharmacists. It was evident from results that doctors interacted with pharmacists for queries regarding medicines availability (73.7%) while other were related to alternative-treatments (9.9%), drug dosage (7%), side effects (3.3%), and drug interactions (6.6%). The details regarding interaction of doctors with pharmacists are tabulated in Table 2.

Of the 483 respondents, most (83.9%) perceived pharmacists as clinicians whereas some doctors (16.1%) perceived them as a technician or having technical role. Regarding the occupation of pharmacy, most respondents considered pharmacists as professional (70.2%) whereas a fifth (21.7%) considered pharmacists as part of a commercial enterprise. A relatively few respondents (8.1%) described pharmacy as both professional and business. Table 3 summarises these views.

Table 2 Frequency and reasons for interactions with pharmacist

Characteristics	Respondents (n = 483)
How often do you work directly with pharmacists?	
Never/rarely	29 (6.0%)
Once a week	128 (26.5%)
Once a day	326 (67.5%)
What are the most common reasons for these interactions?	
Drug availability queries	356 (73.7%)
Drug alternative queries	48 (9.9%)
Drug dosage queries	34 (7.0%)
Side effects queries	16 (3.3%)
Drug interaction queries	29 (6.0%)

The later sections of the survey reports the expectations and experience of doctors as well as their acceptance of pharmacists along with *p*-values of three main variables of study, i.e., education of doctors, type of hospitals, and work experience of doctors. Tables 4, 5 and 6 indicates doctors' expectations. Furthermore, Tables 7, 8 and 9 provides details about acceptance of pharmacist from a doctor's perceptive. Besides, Tables 10, 11 and 12 tabulates experience of doctors with pharmacist while Tables 13, 14 and 15 reports the details pertaining to perception of doctors regarding involvement of pharmacists in medicines management.

Discussion

Evidence indicates that coordination among healthcare professionals is essential to achieve optimal patient outcome in any healthcare setting [36, 37]. Studies emphasize that the harmonization of clinical roles among health professionals

Table 3 Perception about pharmacy profession in Pakistan

Characteristics	Respondents (n = 483)
Which of the following you think best describes the pharmacist?	
Clinician	405 (83.9%)
Technician	78 (16.1%)
How would you define pharmacy as an occupation?	
Professional	339 (70.2%)
Business	105 (21.7%)
Both	39 (8.1%)

Table 4 Cross-tabulation of doctors' expectations from pharmacists with their education (N = 483)

Expectations of doctors from pharmacists	Education	Agree	Disagree	*p* value
Educate patients about the safe and appropriate use of medication	Basic	140	10	0.078
	Specialized	238	29	
	Overseas	55	11	
Monitor patients' response to drug therapy and inform if a patient encounters any drug-related problem	Basic	104	46	0.000
	Specialized	253	1.4	
	Overseas	66	60	
Available for consultation when I see patients (during rounds)	Basic	74	76	0.000
	Specialized	54	213	
	Overseas	26	40	
Communicate with other health care providers to provide patient care	Basic	123	27	0.001
	Specialized	241	26	
	Overseas	49	17	
Collaborate with other health care providers as part of a team	Basic	119	31	0.000
	Specialized	151	116	
	Overseas	50	16	
Provide advice to patients about their medication and/or health conditions	Basic	130	20	0.000
	Specialized	256	11	
	Overseas	55	11	
Be mostly involved in the technical component of dispensing (counting tablets and labelling)	Basic	31	119	0.000
	Specialized	26	241	
	Overseas	31	35	
Provide a "closed shop "service that just receives prescriptions from the clinicians and couriers the medicine to the patient	Basic	134	16	0.191
	Specialized	243	24	
	Overseas	55	11	
Check prescriptions are the correct dose for the patient	Basic	150	0	0.000
	Specialized	238	29	
	Overseas	42	24	
Check prescriptions do not have drug–drug interactions	Basic	118	32	0.000
	Specialized	242	25	
	Overseas	66	0	
Check prescription for any contraindications	Basic	42	108	0.000
	Specialized	42	225	
	Overseas	27	39	
Advise on the cost-effectiveness of medicines for disease states	Basic	134	19	0.000
	Specialized	241	26	
	Overseas	47	19	
Formally review patient's medicines and discuss possible alterations to medicines therapy with the clinician	Basic	101	49	0.019
	Specialized	186	81	
	Overseas	34	32	
Supervise repeat prescriptions for a patient, according to agreed protocols	Basic	80	70	0.000
	Specialized	52	21.5	
	Overseas	26	40	
Make dose adjustments to a patient's medicine using protocols established with prescribers	Basic	130	20	0.778
	Specialized	231	36	
	Overseas	55	11	
Prescribe a medicine for a patient after the clinicians has made the diagnosis, decided on the category of medicine required and given the pharmacist relevant clinical details (partnership prescribing)	Basic	62	88	0.000
	Specialized	11	256	
	Overseas	73	66	

Table 5 Cross-tabulation of doctors' expectations from pharmacists with type of hospital (N = 483)

Expectations of doctors from pharmacists	Hospital	Agree	Disagree	*p* value
Educate patients about the safe and appropriate use of medication	State funded	224	25	0.817
	Private	209	25	
	Other	0	0	
Monitor patients' response to drug therapy and inform if a patient encounters any drug-related problem	State funded	198	51	0.000
	Private	225	9	
	Other	0	0	
Available for consultation when I see patients (during rounds)	State funded	100	149	0.000
	Private	54	180	
	Other	0	0	
Communicate with other health care providers to provide patient care	State funded	218	31	0.188
	Private	195	39	
	Other	0	0	
Collaborate with other health care providers as part of a team	State funded	142	107	0.000
	Private	178	56	
	Other	0	0	
Provide advice to patients about their medication and/or health conditions	State funded	216	33	0.000
	Private	225	9	
	Other	0	0	
Be mostly involved in the technical component of dispensing (counting tablets and labelling)	State funded	53	196	0.072
	Private	35	199	
	Other	0	0	
Provide a "closed shop "service that just receives prescriptions from the clinicians and couriers the medicine to the patient	State funded	218	31	0.163
	Private	214	20	
	Other	0	0	
Check prescriptions are the correct dose for the patient	State funded	209	30	0.000
	Private	221	13	
	Other	0	0	
Check prescriptions do not have drug–drug interactions	State funded	217	32	0.461
	Private	209	25	
	Other	0	0	
Check prescription for any contraindications	State funded	60	189	0.548
	Private	51	183	
	Other	0	0	
Advise on the cost-effectiveness of medicines for disease states	State funded	210	39	0.038
	Private	212	22	
	Other	0	0	
Formally review patient's medicines and discuss possible alterations to medicines therapy with the clinician	State funded	180	69	0.005
	Private	141	93	
	Other	0	0	
Supervise repeat prescriptions for a patient, according to agreed protocols	State funded	92	157	0.041
	Private	66	168	
	Other	0	0	
Make dose adjustments to a patient's medicine using protocols established with prescribers	State funded	202	47	0.001
	Private	214	20	
	Other			
Prescribe a medicine for a patient after the clinicians has made the diagnosis, decided on the category of medicine required and given the pharmacist relevant clinical details (partnership prescribing)	State funded	57	192	0.000
	Private	16	218	
	Other	0	0	

Table 6 Cross-tabulation of doctors' expectations from pharmacists with work experience (N = 483)

Expectations of doctors from pharmacists	Experience	Agree	Disagree	*p* value
Educate patients about the safe and appropriate use of medication	< 5 years	194	25	0.387
	5–10 years	163	14	
	> 10 years	76	11	
Monitor patients' response to drug therapy and inform if a patient encounters any drug-related problem	< 5 years	175	44	0.000
	5–10 years	161	16	
	> 10 years	87	0	
Available for consultation when I see patients (during rounds)	< 5 years	70	149	0.995
	5–10 years	56	121	
	> 10 years	28	59	
Communicate with other health care providers to provide patient care	< 5 years	166	53	0.000
	5–10 years	177	0	
	> 10 years	70	17	
Collaborate with other health care providers as part of a team	< 5 years	157	62	0.024
	5–10 years	104	73	
	> 10 years	59	28	
Provide advice to patients about their medication and/or health conditions	< 5 years	199	20	0.209
	5–10 years	166	11	
	> 10 years	76	11	
Be mostly involved in the technical component of dispensing (counting tablets and labelling)	< 5 years	46	173	0.000
	5–10 years	11	166	
	> 10 years	31	56	
Provide a "closed shop "service that just receives prescriptions from the clinicians and couriers the medicine to the patient	< 5 years	203	16	0.103
	5–10 years	153	24	
	> 10 years	76	11	
Check prescriptions are the correct dose for the patient	< 5 years	210	9	0.000
	5–10 years	157	20	
	> 10 years	63	24	
Check prescriptions do not have drug–drug interactions	< 5 years	183	36	0.007
	5–10 years	166	11	
	> 10 years	77	10	
Check prescription for any contraindications	< 5 years	51	168	0.079
	5–10 years	33	144	
	> 10 years	27	60	
Advise on the cost-effectiveness of medicines for disease states	< 5 years	189	30	0.002
	5–10 years	165	12	
	> 10 years	68	19	
Formally review patient's medicines and discuss possible alterations to medicines therapy with the clinician	< 5 years	163	55	0.003
	5–10 years	108	69	
	> 10 years	50	37	
Supervise repeat prescriptions for a patient, according to agreed protocols	< 5 years	79	140	0.358
	5–10 years	53	124	
	> 10 years	26	61	
Make dose adjustments to a patient's medicine using protocols established with prescribers	< 5 years	188	31	0.935
	5–10 years	152	25	
	> 10 years	76	11	
Prescribe a medicine for a patient after the clinicians has made the diagnosis, decided on the category of medicine required and given the pharmacist relevant clinical details (partnership prescribing)	< 5 years	51	168	0.000
	5–10 years	22	155	
	> 10 years	0	87	

Table 7 Cross-tabulation of doctor's acceptance of pharmacists' role with education (N = 483)

Doctors' acceptance of pharmacists' role	Education	Agree	Disagree	*p* value
Patient education	Basic	129	21	0.573
	Specialized	235	32	
	Overseas	55	11	
Supply non-prescription medications independent of other clinicians	Basic	48	102	0.000
	Specialized	22	245	
	Overseas	9	57	
Design and monitor pharmacotherapeutic regimes	Basic	119	31	0.042
	Specialized	236	31	
	Overseas	57	9	
Prevent prescription errors by near-patient pre-screening of prescriptions	Basic	136	24	0.042
	Specialized	245	22	
	Overseas	66	0	
Detect and rectify prescription errors	Basic	150	0	0.000
	Specialized	238	29	
	Overseas	55	11	
Review and monitor prescriptions and therapy initiated by other clinicians	Basic	32	118	0.299
	Specialized	41	226	
	Overseas	11	55	
Treat minor illnesses (prescribing for common ailments) independent of other clinicians	Basic	52	98	0.000
	Specialized	26	241	
	Overseas	11	55	
Recommend prescription medicines to clinicians	Basic	119	31	0.000
	Specialized	251	16	
	Overseas	46	20	
Independently treat patients with specific conditions within an outpatient clinic setting	Basic	33	117	0.000
	Specialized	36	231	
	Overseas	0	66	
Monitor patients taking high risk or narrow therapeutic index medicines	Basic	128	22	0.006
	Specialized	236	31	
	Overseas	66	0	
Review and stop unnecessary antimicrobial agents	Basic	38	112	0.000
	Specialized	26	241	
	Overseas	30	36	
Conduct patient medical/drug histories on admission	Basic	134	16	0.369
	Specialized	227	40	
	Overseas	55	11	
Contribute to discharge management of patients at the end of their hospital stay	Basic	57	93	0.000
	Specialized	16	251	
	Overseas	20	46	
Liaise with primary healthcare providers about the care of patients	Basic	141	9	0.006
	Specialized	237	30	
	Overseas	66	0	

must always exist [38, 39]. Though doctors considered pharmacists as part of clinical team however, our findings indicate that communication between them was not satisfactory.

The findings revealed that demographic factors are a determinant in shaping doctor's perceptions about pharmacists. The level of education, work experience and type of hospital of doctors influenced their expectations, experiences and overall opinion about the pharmacists. Hence, our results are in line with the findings of Klopotowska and colleagues [21].

Most doctors in our study were male; it was not reflective of the official figures for male and female doctors in

Table 8 Cross-tabulation of doctor's acceptance of pharmacists' role with type of hospital (N = 483)

Doctors' acceptance of pharmacists' role	Hospital	Agree	Disagree	*p* value
Patient education	State funded	205	44	0.003
	Private	214	20	
	Other	0	0	
Supply non-prescription medications independent of other clinicians	State funded	48	201	0.073
	Private	31	203	
	Other	0	0	
Design and monitor pharmacotherapeutic regimes	State funded	187	62	0.000
	Private	225	9	
	Other	0	0	
Prevent prescription errors by near-patient pre-screening of prescriptions	State funded	238	11	0.009
	Private	209	25	
	Other	0	0	
Detect and rectify prescription errors	State funded	224	25	0.148
	Private	219	15	
	Other	0	0	
Review and monitor prescriptions and therapy initiated by other clinicians	State funded	52	197	0.037
	Private	32	202	
	Other	0	0	
Treat minor illnesses (prescribing for common ailments) independent of other clinicians	State funded	44	205	0.659
	Private	45	189	
	Other	0	0	
Recommend prescription medicines to clinicians	State funded	213	36	0.701
	Private	203	31	
	Other	0	0	
Independently treat patients with specific conditions within an outpatient clinic setting	State funded	58	191	0.000
	Private	11	223	
	Other	0	0	
Monitor patients taking high risk or narrow therapeutic index medicines	State funded	217	32	0.173
	Private	213	21	
	Other	0	0	
Review and stop unnecessary antimicrobial agents	State funded	54	195	0.203
	Private	40	194	
	Other	0	0	
Conduct patient medical/drug histories on admission	State funded	218	31	0.351
	Private	198	36	
	Other	0	0	
Contribute to discharge management of patients at the end of their hospital stay	State funded	53	196	0.243
	Private	40	194	
	Other	0	0	
Liaise with primary healthcare providers about the care of patients	State funded	239	10	0.001
	Private	205	29	
	Other	0	0	

Pakistan which is roughly 50:50. A possible explanation to this occurrence could be the non-practicing of female graduates. Most female graduates do not practice medicine after graduation and become housewives. This was highlighted in several news articles and the phenomenon is termed as 'Doctor Brides' [40–42]. According to the 2016 Asian Development Bank report, number of Pakistani women pursuing a university degree have increased, however only a quarter work outside [43]. The report of World Economic Forum 2018 placed Pakistan on the second-to-last place in the list for worst gender equality index [44].

Table 9 Cross-tabulation of doctor's acceptance of pharmacists' role with work experience (N = 483)

Doctors' acceptance of pharmacists' role	Experience	Agree	Disagree	*p* value
Patient education	< 5 years	187	32	0.000
	5–10 years	167	10	
	> 10 years	65	22	
Supply non-prescription medications independent of other clinicians	< 5 years	37	182	0.221
	5–10 years	33	144	
	> 10 years	9	78	
Design and monitor pharmacotherapeutic regimes	< 5 years	188	31	0.289
	5–10 years	146	31	
	> 10 years	78	9	
Prevent prescription errors by near-patient pre-screening of prescriptions	< 5 years	205	14	0.126
	5–10 years	166	11	
	> 10 years	76	11	
Detect and rectify prescription errors	< 5 years	210	9	0.009
	5–10 years	157	20	
	> 10 years	76	11	
Review and monitor prescriptions and therapy initiated by other clinicians	< 5 years	32	187	0.140
	5–10 years	31	146	
	> 10 years	21	66	
Treat minor illnesses (prescribing for common ailments) independent of other clinicians	< 5 years	41	178	0.263
	5–10 years	37	140	
	> 10 years	11	76	
Recommend prescription medicines to clinicians	< 5 years	188	31	0.009
	5–10 years	161	16	
	> 10 years	67	20	
Independently treat patients with specific conditions within an outpatient clinic setting	< 5 years	22	197	0.013
	5–10 years	36	141	
	> 10 years	11	76	
Monitor patients taking high risk or narrow therapeutic index medicines	< 5 years	208	11	0.000
	5–10 years	135	42	
	> 10 years	87	0	
Review and stop unnecessary antimicrobial agents	< 5 years	42	177	0.000
	5–10 years	22	155	
	> 10 years	30	57	
Conduct patient medical/drug histories on admission	< 5 years	208	11	0.000
	5–10 years	132	45	
	> 10 years	76	11	
Contribute to discharge management of patients at the end of their hospital stay	< 5 years	57	162	0.000
	5–10 years	16	161	
	> 10 years	20	67	
Liaise with primary healthcare providers about the care of patients	< 5 years	201	18	0.333
	5–10 years	166	11	
	> 10 years	77	10	

Most respondents had a work experience less than 5 years. This occurrence may be due to frequent migration of experienced doctors from Pakistan to developed countries [45]. Studies conducted in Pakistan highlighted a higher tendency among medical and allied health students to emigrate abroad. Most doctors who gain a certain level of work experience and seniority move to other countries. Those who stay in Pakistan may attain higher administrative positions and are involved in practice to a lesser extent [46, 47].

In our study, majority of the participant (67.5%) responded that they interacted with pharmacist daily and the reason for their interaction was mainly related to drugs

Table 10 Cross-tabulation of doctor's experience of working with pharmacists, with education (N = 483)

Doctors' experience of working with pharmacists	Education	Agree	Disagree	*p* value
Pharmacists are a reliable source of general drug information (i.e., specific facts about drugs, which can be found in standard references)	Basic	130	20	0.009
	Specialized	240	27	
	Overseas	66	0	
Pharmacists routinely counsel my patients regarding the safe and appropriate use of their medications	Basic	134	16	0.027
	Specialized	243	24	
	Overseas	66	0	
Pharmacists routinely inform me about more cost-effective alternatives to the drugs I prescribe	Basic	134	16	0.123
	Specialized	245	22	
	Overseas	55	11	
In my experience, pharmacists appear willing to take personal responsibility for resolving any drug-related problems they discover	Basic	124	26	0.000
	Specialized	251	16	
	Overseas	46	20	
Pharmacists routinely inform me if they discover clinical problems with my prescriptions	Basic	119	31	0.000
	Specialized	241	20	
	Overseas	55	10	
Pharmacists frequently ask me to clarify for them the drug-therapy objectives I have in mind for my patients	Basic	141	9	0.173
	Specialized	241	26	
	Overseas	57	9	
Pharmacists frequently let me know that my patients have experienced some problem with their medications	Basic	141	9	0.000
	Specialized	267	0	
	Overseas	44	22	

Table 11 Cross-tabulation of doctor's experience of working with pharmacists, with type of hospital (N = 483)

Doctors' experience of working with pharmacists	Hospital	Agree	Disagree	*p* value
Pharmacists are a reliable source of general drug information (i.e., specific facts about drugs, which can be found in standard references)	State funded	222	27	0.395
	Private	214	20	
	Other	0	0	
Pharmacists routinely counsel my patients regarding the safe and appropriate use of their medications	State funded	229	20	0.837
	Private	214	20	
	Other	0	0	
Pharmacists routinely inform me about more cost-effective alternatives to the drugs I prescribe	State funded	216	33	0.020
	Private	218	16	
	Other	0	0	
In my experience, pharmacists appear willing to take personal responsibility for resolving any drug-related problems they discover	State funded	207	42	0.006
	Private	214	20	
	Other	0	0	
Pharmacists routinely inform me if they discover clinical problems with my prescriptions	State funded	188	61	0.000
	Private	234	0	
	Other	0	0	
Pharmacists frequently ask me to clarify for them the drug-therapy objectives I have in mind for my patients	State funded	238	11	0.000
	Private	201	33	
	Other	0	0	
Pharmacists frequently let me know that my patients have experienced some problem with their medications	State funded	218	31	0.000
	Private	234	0	
	Other	0	0	

Table 12 Cross-tabulation of doctor's experience of working with pharmacists, with type of hospital (N = 483)

Doctors' experience of working with pharmacists	Experience	Agree	Disagree	*p* value
Pharmacists are a reliable source of general drug information (i.e., specific facts about drugs, which can be found in standard references)	< 5 years	199	20	0.000
	5–10 years	150	27	
	> 10 years	87	0	
Pharmacists routinely counsel my patients regarding the safe and appropriate use of their medications	< 5 years	179	40	0.000
	5–10 years	177	0	
	> 10 years	87	0	
Pharmacists routinely inform me about more cost-effective alternatives to the drugs I prescribe	< 5 years	208	11	0.000
	5–10 years	161	16	
	> 10 years	65	22	
In my experience, pharmacists appear willing to take personal responsibility for resolving any drug-related problems they discover	< 5 years	182	37	0.000
	5–10 years	172	5	
	> 10 years	67	20	
Pharmacists routinely inform me if they discover clinical problems with my prescriptions	< 5 years	199	20	0.001
	5–10 years	157	20	
	> 10 years	66	21	
Pharmacists frequently ask me to clarify for them the drug-therapy objectives I have in mind for my patients	< 5 years	184	35	0.000
	5–10 years	177	0	
	> 10 years	78	9	
Pharmacists frequently let me know that my patients have experienced some problem with their medications	< 5 years	210	9	0.000
	5–10 years	177	0	
	> 10 years	65	22	

availability inquiry (73.7%). This finding highlights that doctors' knowledge and perception of pharmacists' role was limited as they mainly interacted with pharmacists for logistical issues. This limited interaction further highlights the partial recognition of pharmacist's role in clinical settings. This finding is also consistent with work of Khan and colleagues who evaluated the perceptions of doctors about pharmacists in public sector hospitals of Pakistan [16, 38].

Most doctors (89.6%) believed that pharmacists should guide patients about safe use of medicines ($p > 0.05$). Majority (87.6%) of doctors mentioned that they expect pharmacists to monitor patient's response to drug therapy ($p < 0.05$). Additionally, most doctors (66.5%) expected pharmacists to review patient's medicines and discuss possible amendments to therapy with patients should there be a need ($p < 0.05$). Besides, most doctors (84.9%) disagreed to the notion of pharmacists prescribing medicine for patients ($p < 0.05$). The doctors believed that pharmacists could perform several clinical duties such as educating patients, designing therapy regimens, dispensing drugs and monitoring prescriptions for any errors [39]. The doctors were not welcoming to the idea of pharmacists treating minor illnesses during their stay in the hospital. Most participants (81.6%) did not want pharmacists to prescribe independently. The respondents (80.5%) did not believe that pharmacists could review and stop antimicrobial agents if they feel it to be unnecessary. This suggest that doctors were not comfortable with pharmacists intervening in prescriptions.

Previous studies have reported that pharmacists have a substantial impact on patient safety in hospitals [48–50]. Evidence indicates that improved interactions between pharmacists and doctors foster safe and cost-effective therapy. Most doctors (87.2%) agreed that pharmacists were keen to accept the responsibility for resolving drug-related problems ($p < 0.05$). Furthermore, the doctors (87.4%) responded positively that in their experience, pharmacists regularly advise them about any clinical problems they encountered in prescriptions ($p < 0.05$). One of the core tasks in pharmaceutical care service provided by pharmacists is to look for any drug-related problem and resolve them [51]. Hence, pharmacist may consider these tasks as one of their prime responsibilities.

In our study, most doctors disagreed (84.9%) to the notion of pharmacists prescribing medicine as they feared that confrontation between doctors and pharmacists could occur if pharmacists are involved in prescribing. It is evident from studies that although doctors may agree to the concept of pharmacists as counsellors but there is a hesitation regarding pharmacists' independent prescribing and decision-making responsibilities [16, 33, 52]. This perception is further strengthened by regulations and legalities as pharmacists in Pakistan are not allowed to act as independent prescribers [53].

Table 13 Cross-tabulation of doctor's perception regarding involvement of pharmacists in medicines management (MM), with education (N = 483)

Doctor's perception regarding pharmacists' involvement in MM	Education	Agree	Disagree	*p* value
Do you think pharmacists should increase their involvement in medicines management?	Basic	150	0	0.001
	Specialized	249	18	
	Overseas	66	0	
The funding stream currently does not support pharmacists and clinicians collaborating on medication management	Basic	139	11	0.000
	Specialized	267	0	
	Overseas	55	11	
Other than to dispense prescriptions, pharmacists are on the periphery of the core health care team	Basic	135	15	0.000
	Specialized	258	9	
	Overseas	55	11	
A pharmacist providing this service would not be calling my judgment into question	Basic	11	139	0.117
	Specialized	29	238	
	Overseas	11	55	
This service by a pharmacist would be challenging my authority	Basic	38	112	0.000
	Specialized	22	245	
	Overseas	22	44	
This is not duplication of the clinician's work	Basic	150	0	0.000
	Specialized	267	0	
	Overseas	55	11	
I don't feel comfortable with the autonomy pharmacists have when dealing with patients	Basic	11	139	0.001
	Specialized	11	256	
	Overseas	11	55	
I don't have time to discuss patient-related medicine issues with pharmacists	Basic	94	56	0.088
	Specialized	195	72	
	Overseas	46	20	
Pharmacist's knowledge of pharmacology and clinical use of medicines is inadequate to intervene on the patient's behalf	Basic	33	117	0.000
	Specialized	11	256	
	Overseas	11	55	
I have sufficient confidence in the clinical knowledge of pharmacists for them to provide this service	Basic	124	26	0.000
	Specialized	267	0	
	Overseas	55	11	
Pharmacists are sufficiently trained to provide this service	Basic	33	117	0.484
	Specialized	47	220	
	Overseas	11	55	
The patient may get conflicting information regarding medicines use	Basic	128	22	0.000
	Specialized	267	0	
	Overseas	66	0	
This would enhance my current relationship with my pharmacists	Basic	150	0	0.000
	Specialized	216	51	
	Overseas	66	0	
This service would improve patients' medicine-related health outcomes	Basic	141	9	0.024
	Specialized	230	37	
	Overseas	55	11	

The outcomes of the study indicated that doctors considered pharmacists for logistical queries regarding drugs and not for clinical queries. This suggests poor communication among doctors and pharmacists. The doctors considered them to be drug dispensers. This finding is in line with previous studies [5, 21, 30–35, 54–56]. Moreover, most doctors negatively perceived that pharmacists in Pakistan lack clinical expertise in recommending prescription drugs and believed that pharmacist cannot properly execute the duties related to advance clinical pharmacy practice.

Table 14 Cross-tabulation of doctor's perception regarding involvement of pharmacists in medicines management (MM), with type of hospital (N = 483)

Doctor's perception regarding pharmacists' involvement in MM	Hospital	Agree	Disagree	*p* value
Do you think pharmacists should increase their involvement in medicines management?	State funded	240	9	0.893
	Private	225	9	
	Other	0	0	
The funding stream currently does not support pharmacists and clinicians collaborating on medication management	State funded	227	22	0.000
	Private	234	0	
	Other	0	0	
Other than to dispense prescriptions, pharmacists are on the periphery of the core health care team	State funded	214	35	0.000
	Private	234	0	
	Other	0	0	
A pharmacist providing this service would not be calling my judgment into question	State funded	31	218	0.163
	Private	20	214	
	Other	0	0	
This service by a pharmacist would be challenging my authority	State funded	55	194	0.002
	Private	27	207	
	Other			
This is not duplication of the clinician's work	State funded	55	194	0.002
	Private	27	207	
	Other	0	0	
I don't feel comfortable with the autonomy pharmacists have when dealing with patients	State funded	238	11	0.001
	Private	234	0	
	Other	0	0	
I don't have time to discuss patient-related medicine issues with pharmacists	State funded	22	227	0.072
	Private	11	223	
	Other	0	0	
Pharmacist's knowledge of pharmacology and clinical use of medicines is inadequate to intervene on the patient's behalf	State funded	164	85	0.086
	Private	171	63	
	Other	0	0	
I have sufficient confidence in the clinical knowledge of pharmacists for them to provide this service	State funded	212	37	0.000
	Private	234	0	
	Other	0	0	
Pharmacists are sufficiently trained to provide this service	State funded	64	185	0.000
	Private	27	207	
	Other	0	0	
The patient may get conflicting information regarding medicines use	State funded	227	22	0.000
	Private	234	0	
	Other	0	0	
This would enhance my current relationship with my pharmacists	State funded	244	5	0.000
	Private	188	46	
	Other	0	0	
This service would improve patients' medicine-related health outcomes	State funded	227	22	0.037
	Private	199	35	
	Other	0	0	

The demographic variables of education level, area of practice and work experience of doctors influenced their perceptions about pharmacists and their roles. As their level of education increases, such as undergoing a fellowship training or pursuing a masters, Ph.D., etc., that is usually done in a developed country. Doctors come across other allied health professionals and learn to work as a team to treat and ensure achievement of treatment goals for patients. Such education, work experience and place of practice may help in increasing their awareness regarding pharmacists and their roles in

Table 15 Cross-tabulation of doctor's perception regarding involvement of pharmacists in medicines management (MM), with work experience (N = 483)

Doctor's perception regarding pharmacists' involvement in MM	Experience	Agree	Disagree	*p* value
Do you think pharmacists should increase their involvement in medicines management?	< 5 years	219	0	0.000
	5–10 years	159	18	
	> 10 years	87	0	
The funding stream currently does not support pharmacists and clinicians collaborating on medication management	< 5 years	208	11	0.000
	5–10 years	177	0	
	> 10 years	76	11	
Other than to dispense prescriptions, pharmacists are on the periphery of the core health care team	< 5 years	204	15	0.080
	5–10 years	168	9	
	> 10 years	76	11	
A pharmacist providing this service would not be calling my judgment into question	< 5 years	20	199	0.614
	5–10 years	20	157	
	> 10 years	11	76	
This service by a pharmacist would be challenging my authority	< 5 years	22	197	0.001
	5–10 years	38	139	
	> 10 years	22	65	
This is not duplication of the clinician's work	< 5 years	219	0	0.000
	5–10 years	177	0	
	> 10 years	76	11	
I don't feel comfortable with the autonomy pharmacists have when dealing with patients	< 5 years	11	208	0.054
	5–10 years	11	166	
	> 10 years	11	76	
I don't have time to discuss patient-related medicine issues with pharmacists	< 5 years	132	87	0.000
	5–10 years	136	41	
	> 10 years	67	20	
Pharmacist's knowledge of pharmacology and clinical use of medicines is inadequate to intervene on the patient's behalf	< 5 years	22	197	0.699
	5–10 years	22	155	
	> 10 years	11	76	
I have sufficient confidence in the clinical knowledge of pharmacists for them to provide this service	< 5 years	193	26	0.000
	5–10 years	177	0	
	> 10 years	76	11	
Pharmacists are sufficiently trained to provide this service	< 5 years	27	192	0.004
	5–10 years	42	135	
	> 10 years	22	65	
The patient may get conflicting information regarding medicines use	< 5 years	208	11	0.068
	5–10 years	166	11	
	> 10 years	87	0	
This would enhance my current relationship with my pharmacists	< 5 years	195	24	0.001
	5–10 years	150	27	
	> 10 years	87	0	
This service would improve patients' medicine-related health outcomes	< 5 years	184	35	0.011
	5–10 years	166	11	
	> 10 years	76	11	

clinical settings. This may change their mindset and build a positive perception about pharmacists.

The results of our study together with previously reported literature highlight that the attitude of Pakistani doctors and their acceptance of pharmacists' clinical roles have gradually improved over time [16, 33, 57]. However, the acceptance of pharmacists' clinical role was linked to doctor's experience of interaction with pharmacists. The doctors were generally receptive to consultation and counselling services provided by pharmacists but

were impervious to their independent decision-making authority.

According to the national legislation, pharmacists are required to perform their traditional roles, i.e., dispensing, drug information, etc., along with clinical roles that further includes, medication utilization reviews, counselling, therapeutic drug monitoring, formulation of intravenous preparations, etc. However, the results of the current study reveal the gap between a pharmacist's clinical knowledge and its application. The opportunities available for pharmacists to practise in Pakistan's healthcare system are scant and therefore pharmacists are not able to perform their clinical duties and hence their potential clinical role remains to be utilized to the full extent.

Recommendations

The results highlight that there is a need to create awareness regarding pharmacist's role in clinical settings. Therefore, integration of courses for inter-professional interactions among doctors and pharmacists should be added in curriculum. This may beneficial in the long run and may ensure satisfactory patient care [37, 52, 58]. Studies that could compare the benefits of pharmaceutical care with controls to demonstrate its effectiveness are recommended [59].

Strengths and limitations of study

The study gathered response from a large sample of doctors across 26 cities of Pakistan and a detailed analysis of their response highlights the extent of this problem. Such studies have not been carried out in Pakistan before. These aspects could be considered as strengths of this study. However, the results of this study cannot be generalised as responses from doctors in primary care hospitals as well as non-institutional doctors were not included. The views may differ among doctors based on hospitals. Moreover, most doctors in our study had little work experience; perception of experienced doctor may have been different.

This study did not investigate the perceptions, expectations and experience of pharmacists. Further studies that investigate attitudes and experiences of pharmacists would provide a better understanding of the problem from pharmacists' point of view. The study was a survey-based research and involved close ended questions. Qualitative studies might be able to extract rich data and help explicate expectations as well as experience of doctors regarding the same.

Conclusion

The study highlights that doctors considered pharmacists as drug information specialists, dispensers, educators and counsellors however, their expectation of pharmacists performing clinical role and being involved in direct patient care was limited. They seemed sceptical of advance clinical pharmacy roles such as intervening in prescriptions and medication therapy, consultations, prescribing, etc. The doctors were not welcoming to the idea of pharmacists working as a member of allied healthcare team. There is a need to increase doctors' awareness regarding the role pharmacists could play in Pakistan's healthcare system. It is vital to involve pharmacists in clinical rotations with doctors to develop a professional relationship. Moreover, it may be helpful if seminars are conducted on the importance of clinical pharmacy services in healthcare system. Such activities would provide an opportunity to recognize the accomplishments and limitations of pharmacist's clinical role.

Acknowledgements We extend our gratitude to all the participants for their contribution in the study. We acknowledge the support of Khan and colleagues from Pakistan in completing the data collection.

Funding None.

Conflicts of interest The Authors declares that they have no conflicts of interest to disclose for this study.

References

1. Cipolle RJ, Strand LM, Morley PC. Pharmaceutical care practice: the patient-centered approach to medication management services. 3rd ed. New York: McGraw-Hill Education, LLC; 2012. ISBN 978-0-07-175638-9.
2. World Health Organization. The role of the pharmacist in self-care and self-medication: report of the 4th WHO Consultative Group on the Role of the Pharmacist. The Hague: World Health Organization; 1998.
3. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. Am J Hosp Pharm. 1990;47(3):533–43.
4. Hepler CD. Pharmaceutical care. Pharm World Sci. 1996;18:233. https://doi.org/10.1007/BF00735965.
5. Hepler CD. Clinical pharmacy, pharmaceutical care, and the quality of drug therapy. Pharmacotherapy. 2004;24(11):1491–8.
6. Legislation.Gov.UK. The Medicines for Human Use (Prescribing) (Miscellaneous) Amendments) Order. 2006. No. 915. Retrieved December, 2018. Available from: http://www.legislation.gov.uk/uksi/2006/915/contents/made
7. Naqvi AA, Hassali MA, Naqvi SBS, Aftab MT. Impact of pharmacist educational intervention on disease knowledge, rehabilitation and medication adherence, treatment-induced direct cost, health-related quality of life and satisfaction in patients with rheumatoid arthritis: study protocol for a randomized controlled trial. Trials. 2019;20:488. https://doi.org/10.1186/s13063-019-3540-z.
8. Matowe L, Abahussain EA, Al-Saffar N, Bihzad SM, Al-Foraih A, Al-Kandery AA. Doctors' perceptions and expectations of pharmacists' professional duties in government hospitals in Kuwait. Med Princ Pract. 2006;15(3):185–9.

9. Smith WE, Ray MD, Shannon DM. Doctors' expectations of pharmacists. Am J Health Syst Pharm. 2002;59(1):50–7.
10. Bradley CP. The future role of pharmacists in primary care. Br J Gen Pract. 2009;59(569):891–2. https://doi.org/10.3399/bjgp09X473105.
11. Bhagavathula AS, Sarkar BR, Patel I. Clinical pharmacy practice in developing countries: focus on India and Pakistan. Arch Pharma Pract. 2014;5:91–4.
12. George PP, Molina JA, Cheah J, Chan SC, Lim BP. The evolving role of the community pharmacist in chronic disease management—a literature review. Ann Acad Med Singap. 2010;39(11):861–7.
13. Gallagher RM, Gallagher HC. Improving the working relationship between doctors and pharmacists: is inter-professional education the answer? Adv Health Sci Educ. 2012;17(2):247–57.
14. Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, Kistnasamy B. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. The Lancet. 2010;376(9756):1923–58.
15. Rosenthal MM, Breault RR, Austin Z, Tsuyuki RT. Pharmacists' self-perception of their professional role: insights into community pharmacy culture. J Am Pharm Assoc. 2011;51(3):363–8.
16. Khan N, Abbas A, McGarry K, Shahid S. Perceptions and experiences of doctors regarding integration of clinical pharmacists in health practices: a survey of hospitals of Karachi. Int J Allied Med Sci Clin Res. 2014;2(3):222–34.
17. Kassam R, Collins JB, Berkowitz J. Comparison of patients' expectations and experiences at traditional pharmacies and pharmacies offering enhanced advanced pharmacy practice experiences. Am J Pharm Educ. 2010;74(5):90.
18. Mann C. Doctors need to give up professional protectionism. BMJ. 2018;361:k1757.
19. Atiq MA. Epidemiology of non-communicable diseases in Pakistan: are we on the right track? Pak J Med Dent. 2018;6(4):52–6.
20. Naqvi AA, Naqvi SBS, Zehra F, Verma AK, Usmani S, Badar S, et al. Estimation of the direct cost of poliomyelitis rehabilitation treatment to pakistani patients: a 53-year retrospective study. Appl Health Econ Health Policy. 2018;16(6):871–88. https://doi.org/10.1007/s40258-018-0422-6.
21. Naqvi AA, Naqvi SBS, Zehra F, Ahmad R, Ahmad N. The cost of poliomyelitis: lack of cost-of-illness studies on poliomyelitis rehabilitation in Pakistan. Arch Pharm Pract. 2016;7(4):182–4. https://doi.org/10.4103/2045-080X.191988.
22. UK Health Accounts. Office for National Statistics. 2015. https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthcaresystem/bulletins/ukhealthaccounts/2015. Accessed Dec 2018.
23. World Health Organization (WHO). Health service delivery Pakistan. 2019. http://www.emro.who.int/pak/programmes/service-delivery.html. Accessed Dec 2018.
24. Hassan A, Mahmood K, Buksh HA. Healthcare system of Pakistan. IJARP. 2017;1(4):170–3.
25. Hussain M, Naqvi SBS, Khan MA, Rizvi M, Alam S, Abbas A, et al. Direct cost of treatment of diabetes mellitus type 2 in Pakistan. Int J Pharm Sci. 2014;6:261–4.
26. The Medicines Act 1968. 2019. https://www.legislation.gov.uk/ukpga/1968/67. Accessed Dec 2018.
27. Khan MU. A new paradigm in clinical pharmacy teaching in Pakistan. Am J Pharm Educ. 2011;75(8):166. https://doi.org/10.5688/ajpe758166.
28. Abbas A. The catch-22 of pharmacy practice in Pakistan's pharmacy education. Pharmacy. 2014;2(3):202–4. https://doi.org/10.3390/pharmacy2030202.
29. Khan TM. Challenges to pharmacy and pharmacy practice in Pakistan. Australas Med J. 2011;4(4):230–5. https://doi.org/10.4066/AMJ.2011.488.
30. Naqvi AA. Evolution of clinical pharmacy teaching practices in Pakistan. Arch Pharma Pract. 2016;7:26–7.
31. Pharmacy Council of Pakistan. 2019. http://www.pharmacycouncil.org.pk/. Accessed Dec 2018.
32. Rosenthal M, Austin Z, Tsuyuki RT. Are pharmacists the ultimate barrier to pharmacy practice change? Can Pharm J Rev Pharm Can. 2010;143(1):37–42.
33. Adnan S, Tanwir S, Abbas A, Beg AE, Sabah A, Safdar H, et al. Perception of doctors regarding patient counseling by pharmacist: a blend of quantitative and qualitative insight. Int J Pharm Ther. 2014;5:117–21.
34. Calculator, R. (2014). Raosoft. Retrieved December, 2018. Available from: http://www.raosoft.com/samplesize.html.
35. Total number of doctors/dental surgeons (G.P's with basic degree only), registered up to 30th June, 2019. Pakistan Medical and Dental Council (PM & DC). 2019. Retrieved July, 2019. http://www.pmdc.org.pk/Statistics/tabid/103/Default.aspx.
36. Waterfield J. Is pharmacy a knowledge-based profession? Am J Pharm Educ. 2010;74(3):50.
37. Farrell B, Pottie K, Woodend K, Yao V, Dolovich L, Kennie N, et al. Shifts in expectations: evaluating doctors' perceptions as pharmacists become integrated into family practice. J Interprof Care. 2010;24(1):80–9.
38. Klopotowska JE, Kuiper R, van Kan HJ, de Pont AC, Dijkgraaf MG, Lie-A-Huen L, et al. On-ward participation of a hospital pharmacist in a Dutch intensive care unit reduces prescribing errors and related patient harm: an intervention study. Crit Care. 2010;14(5):174.
39. Azhar S, Hassali M, Ibrahim M. Doctors' perception and expectations of the role of the pharmacist in Punjab. Pakistan. Trop J Pharm Res. 2010;9(3):205–22.
40. Shekhani SS, Moazam F. The myth of 'Doctor Brides'. Dawn.com. 2019. https://www.dawn.com/news/1460104. Accessed Dec 2018.
41. Zakaria R. The doctor brides. Dawn.com. 2013. https://www.dawn.com/news/1032070. Accessed Dec 2018.
42. Ilyas F. From 'doctor brides' to practicing doctors. The Express Tribune. 2015. https://tribune.com.pk/story/969805/docthers-from-doctor-brides-to-practicing-doctors/. Accessed Dec 2018.
43. Annual Report 2016. Asian Development Bank. https://www.adb.org/sites/default/files/institutional-document/414776/adb-annual-report-2016.pdf. Accessed Dec 2018.
44. The Global Gender Gap Report 2018. World Economic Forum (WEF). http://www3.weforum.org/docs/WEF_GGGR_2018.pdf. Accessed Dec 2018.
45. Afridi FK, Baloch QB, Baloch VQ. Preventing and reversing Pakistan's medical brain drain through diaspora option and diaspora network. J Postgrad Med Inst. 2016;30(2):115–8.
46. Sheikh A, Abbas Naqvi SH, Sheikh K, Shiraz Naqvi SH. Physician migration at its roots: a study on the factors contributing towards a career choice abroad among students at a medical school in Pakistan. Glob Health. 2012;8:43. https://doi.org/10.1186/1744-8603-8-43.
47. Naqvi AA, Zehra F, Naqvi SBS, Ahmad R, Ahmad N, Usmani S, et al. Migration trends of pharmacy students of pakistan: a study investigating the factors behind brain drain of pharmacy professionals from Pakistan. Indian J Pharm Educ Res. 2017;51(2):192–206. https://doi.org/10.5530/ijper.51.2.25.
48. Mekonnen AB, McLachlan AJ, Joanne EB. Effectiveness of pharmacist-led medication reconciliation programmes on clinical outcomes at hospital transitions: a systematic review and meta-analysis. BMJ open. 2016;6(2):e010003. https://doi.org/10.1136/bmjopen-2015-010003
49. El-Ibiary SY, Yam L, Lee KC. Assessment of burnout and associated risk factors among pharmacy practice faculty in the United States. Am J Pharm Educ. 2017;81(4):75.

50. Naqvi AA, Hassali MA, Shyum Naqvi SBS, Aftab MT, Zehra F, Nadir MN, et al. Assessment of patient satisfaction following pharmacist counselling session by a novel patient satisfaction feedback on counselling questionnaire. JPHSR. 2019;10(2):243–54. https://doi.org/10.1111/jphs.12294.
51. Shah A, Naqvi AA, Ahmad R. The need for providing pharmaceutical care in geriatrics: a case study of diagnostic errors leading to medication-related problems in a patient treatment plan. Arch Pharm Pract. 2016;7:87–94. https://doi.org/10.4103/2045-080X.186173.
52. Fathelrahman A, Ibrahim M, Wertheimer A. Pharmacy practice in developing countries: achievements and challenges. Cambridge: Academic Press; 2016.
53. Azhar S, Hassali MA, Ibrahim MI, Ahmad M, Masood I, Shafie AA. The role of pharmacists in developing countries: the current scenario in Pakistan. Hum Resour Health. 2009;7:54. https://doi.org/10.1186/1478-4491-7-54.
54. Olsson E, Kälvemark Sporrong S. Pharmacists' experiences and attitudes regarding generic drugs and generic substitution: two sides of the coin. Int J Pharm Pract. 2012;20(6):377–83.
55. Norwood CW, Wright ER. Integration of prescription drug monitoring programs (PDMP) in pharmacy practice: improving clinical decision-making and supporting a pharmacist's professional judgment. Res Soc Admin Pharm. 2016;12(2):257–66.
56. Spinewine A, Fialová D, Byrne S. The role of the pharmacist in optimizing pharmacotherapy in older people. Drugs Aging. 2012;29(6):495–510.
57. Abbas A, Shah A, Khan N, Nasir H, Khan MH. Perceptions of patients' care givers regarding clinical pharmacists and their practice in a developing country. Int J Pharm Pharm Sci. 2014;7(2):168–73.
58. Abbas A. Evidence based improvements in clinical pharmacy clerkship program in undergraduate pharmacy education: the evidence based improvement (EBI) initiative. Pharmacy. 2014;2(4):270–5. https://doi.org/10.3390/pharmacy2040270.
59. Abbas A, Khan N. Clinical trials involving pharmacists in Pakistan's healthcare system: a leap from paper to practice. Pharmacy. 2014;2(3):244–7. https://doi.org/10.3390/pharmacy2030244.

ANNEX: XII

Khan et al. BMC Health Services Research (2020) 20:610
https://doi.org/10.1186/s12913-020-05459-0

BMC Health Services Research

RESEARCH ARTICLE Open Access

Pharmacists' viewpoint towards their professional role in healthcare system: a survey of hospital settings of Pakistan

Nabeel Khan[1*], Ken McGarry[2], Atta Abbas Naqvi[3], Muhammad Shahid Iqbal[4] and Zaki Haider[5]

Abstract

Background: Pharmacy service is an essential part of a healthcare system. The profession of pharmacy is well recognized and is practiced to its full potential in developed countries however, it is underutilized in developing countries such as Pakistan. The recognition of pharmacist's role as healthcare professional is limited. This study aimed to document pharmacists' attitude towards their role in Pakistan's healthcare system, their experience with doctors and their perceptions towards involvement in medicines management.

Methods: A 4-month cross-sectional survey (Jan – Apr 18) was conducted targeting pharmacists practising in 26 tertiary care hospitals across Pakistan using a developed and validated questionnaire in both Urdu/English languages. Chi square (χ^2) test was used to report any associations between independent variables, i.e., education, type of hospital and work experience and, dependent variables, i.e., pharmacists' attitudes, experience, and perception. A *p*-value of ≤0.01 with value of Cramer's V ≥ 0.3 was considered cut-off for establishing statistical significance. The study was approved by ethical committee and local hospital committees.

Results: Three hundred ninety-six questionnaires were returned out of 500, i.e., response rate = 87.9%. Most participants (92.2%) interacted with doctors at least once daily. Most interactions were related to drug availability inquiry (72.5%). Most pharmacists (91.4%) mentioned that pharmacy duties are mostly clinical in nature. 93.4% of the respondents indicated that pharmacists are reliable source of information regarding general medicines. Furthermore, 87.4% reasoned inadequate training for not being able to discuss issues of clinical nature with doctors.

Conclusion: Pharmacists were willing to perform their duties and provide healthcare benefits to patients however, they seemed sceptical of advanced clinical pharmacy roles such as intervening in prescriptions and medication therapy, consultations and prescribing. There is a need to increase awareness regarding pharmacist's role. Therefore, it would be helpful if trainings and seminars are conducted on the importance of clinical pharmacy to improve the pharmacy services in Pakistan's healthcare system.

Keywords: Pharmacists, Clinical pharmacists, Hospital pharmacy service, Clinical pharmacy service, Pakistan

* Correspondence: nabeel.khan@research.sunderland.ac.uk
[1]School of Pharmacy and Pharmaceutical Sciences, University of Sunderland, Sunderland, UK
Full list of author information is available at the end of the article

Introduction

The profession of pharmacy has evolved from a product-focused practice to a patient-oriented one [1]. In general, the primary duties of the pharmacist include providing drug information, medicines management, preparation and dispensing of medicines, counselling of patients, and formulating pharmaceutical care plan for patients [2]. Pharmaceutical care plan is an individualized service provided by pharmacist that aims to improve the quality of patient's health [3, 4]. Pharmaceutical care involves a collaborative relationship between the pharmacist and the physicians to improve the health status of patients [5]. It was envisioned that in future, pharmacists would be greatly involved in clinical and administrative roles and, their traditional roles of pill counting, packaging, and dispensing would be performed by technicians and trainees [6]. Literature suggests that pharmaceutical care practice has a substantial positive effect on healthcare and disease management in developed countries [7, 8]. However, the situation is different in developing countries as the application of pharmaceutical care is hindered due to time constraints, lack of standard reimbursement, less access to patients' records, poor communication among healthcare professionals, insufficient number of qualified pharmacists and absence of policies [8].

A pre-requisite to establishing effective pharmaceutical care services would be the greater involvement of hospital pharmacist as a member of allied health team with increased interaction with other healthcare professionals. Effective implementation of this service requires an understanding of a hospital pharmacist's perception towards the concept of pharmaceutical care, their role in direct patient care and, the extent and level of interaction with other healthcare professionals [9]. The traditional role of pharmacist has always been procurement and inventory management of medicines along with ensuring their safety and efficacy [10]. However, with the introduction of 'Pharmaceutical care' concept by Hepler and Strand during the 90s, the tradition role of pharmacist has transcended from medicine provider to a patient care provider [11]. During the last few decades, pharmacists have practiced pharmaceutical care to improve patients' treatment outcomes and maximize the benefits of medication therapy to patients [5, 12].

According to the World Health Organization (WHO), pharmacists are expected to advise allied health team regarding medication therapy management in patient care and must have specialized knowledge and skills needed to execute clinical pharmacy services [13, 14]. In Pakistan, the health authorities have resolved to introduce the pharmaceutical care services within the healthcare system to improve patient's quality of life [15]. However, pharmaceutical care model is a novel concept within pharmacy practice domain and is not clear to a majority of health professionals and public [16]. Besides, there are few pharmacists with knowledge of pharmaceutical care and clinical pharmacy services in healthcare system. In addition, clinical guidelines are either not updated or not available, that could highlight pharmacist's role in patient care. These are few notable determinants of an enhanced clinical role of pharmacist in Pakistan's healthcare system [9, 17]. In addition, there is an acute shortage of pharmacists in all healthcare sectors of the country. Hospital pharmacists are involved to a greater extent in traditional pharmacy services and administrative activities. Furthermore, it has been observed that pharmacy graduates in Pakistan preferred to join pharmaceutical marketing and sales jobs [17–19].

Pharmacy curriculum in Pakistan has traditionally been inclined towards drug manufacturing and dispensing. During the last decade, the healthcare policymakers envisioned a clinical role of pharmacist and since then, the pharmacy curriculum has been modified to incorporate courses related to clinical pharmacy practice [20–22]. Moreover, the current pharmacy practice model in Pakistan requires modifications concerning collaborative practice supported by evidence and should have a clear perspective in its application and conceptualisation [23, 24]. As this paradigm is novel in Pakistan, it requires more planning for future perspectives suitable to the country's health policies. At the same time, it is imperative to find out what pharmacists perceive about pharmaceutical care service and their supposed engagement with the other medical staff, to understand the determinants that hinder their clinical role in Pakistani healthcare settings.

Available literature highlights that interprofessional relationship between doctors and pharmacists was not satisfactory in the past. One of the reasons was education and training of pharmacists [20–24]. Azhar and colleagues identified that the primary reasons for doctors' low expectations with pharmacists were deficiency in knowledge of therapeutics and inadequate clinical pharmacy training [23]. In addition, Khan and colleagues highlighted that workplace and experience of healthcare professionals could influence views towards pharmacists and their services [24]. Hence, having pharmacy education that includes clinical courses is vital in shaping the perception and expectations of pharmacists regarding healthcare system of Pakistan.

In the past, adequate attention was not paid to update pharmacy curriculum and thus, it could not contribute significantly in achieving the healthcare objectives. The 4-year Bachelor of Pharmacy (BPharm) degree was upgraded to a 5-year Doctor of Pharmacy (PharmD) program by the Higher Education Commission (HEC) of Pakistan in 2004. The course introduces an intensive knowledge of clinical aspects of pharmacy. The updated

program had courses that provided the knowledge of; clinical and social aspects of pharmacy, such as drug abuse, geriatric pharmacy, patient counselling, patient compliance, research methods, and evidence-based medicine, that have been largely ignored previously [9, 21, 22].

The health authorities of Pakistan should implement pharmaceutical care practices in the health system of the country, to promote safe use of medicines and improve patients' quality of life [23, 24]. The present study was conducted to evaluate the acceptability of pharmacists as a patient care provider, their interaction with the doctors and, their perception about performing medicines management services. Thus, the study evaluated pharmacists' viewpoint regarding their professional role in the healthcare system of Pakistan.

Methodology

Study objective

The primary objective of this study was to document attitude of pharmacists towards their role in Pakistan's healthcare system, their experience with doctors and their perceptions towards involvement in medicines management.

Study design, duration, and venues

This study was a cross-sectional survey that was conducted for a period of 4 months, i.e., from January 2018 up to April 2018. Pakistan is located in South Asia and hosts a population over 220 million. The healthcare system of Pakistan consists of state funded and private sector healthcare facilities [25]. There are 968 state funded hospitals across 8 administrative units of the country. Since the state funded healthcare structure is inadequate to fulfil healthcare needs of the population, most of Pakistanis utilize private sector hospitals as well [21]. The study was conducted in 122 tertiry care hospitals in 27 cities of Pakistan that were in 6 administrative units of the country (Fig. 1).

Target population and eligibility criteria

The target population was pharmacists working in hospital settings in several cities of Pakistan. The eligibility criteria of pharmacists were adopted from Naqvi et al., i.e., licensed pharmacists who were currently working in healthcare settings of Pakistan for at least 1 year [14, 23]. All licensed pharmacists working in the pharmaceutical industry, academia and community pharmacies were excluded. They were excluded from study since they were not working in the healthcare settings and may have different perceptions that may not be representative.

Sampling strategy and sample size calculation

Data collection was conducted using convenience sampling technique due to the unavailability of a database that could highlight the exact number of pharmacists practising in various hospitals across Pakistan. The study sample size was estimated using an online sample size calculator (RAOSOFT) [26]. As per the country's pharmaceutical data obtained from WHO 2010 report, there were roughly 10,000 licensed pharmacists working in all settings of Pakistan [25]. This figure was considered as target population. A 5% margin of error and 95% confidence level was set. The required sample size was 370. A 2% drop-out rate ($N = 8$) was added to yield the final number of 378 pharmacists.

Research instrument development and validation

The questionnaire was formulated for this study with help from previous literature by a panel of experts including two academicians and two clinical pharmacists [7, 23, 24]. There were four sections in the questionnaire that included demographic information about participants, the interactions of pharmacists with doctors, the reasons for their interactions and, the perception of pharmacists regarding their professional role in Pakistan's healthcare settings. Apart from demographic questions, it included questions related to professional acceptance of pharmacists in the healthcare system, pharmacists' experience of working with doctors and, the involvement of pharmacists in medicines management. The final questionnaire contained a total of 45 items and it took about 25 min on an average to fill in the response. The options for questions except for demographics were dichotomous, i.e., in yes/no format. The questionnaire was formulated in both English and Urdu languages. The English version of questionnaire is available as a supplementary file (additional file 1: Questionnaire).

The questionnaire was subjected to content validation by a panel of experts that included three academicians, two clinical pharmacists and three pharmacists. Each member of the panel reviewed the questions and indicated them as essential/non-essential. Content validation was conducted using the methodology described by Lawshe and Rungtusanatham [27, 28]. The content validity index was reported at 0.81 which was greater than the cut-off value 0.75 required for establishing validity [27]. The reliability of questionnaire was estimated using Cronbach alpha (α). The overall reliability for all items ($N = 45$) was reported at 0.889. The intraclass correlation coefficient was 0.889 (95% CI: 0.873–0.904). The reliability for the section of professional acceptance of pharmacists in the healthcare system that contained 17 items was 0.908. The intraclass correlation coefficient was 0.908 (95% CI: 0.894–0.920). Besides, the reliability for the section of pharmacists' experience of working with

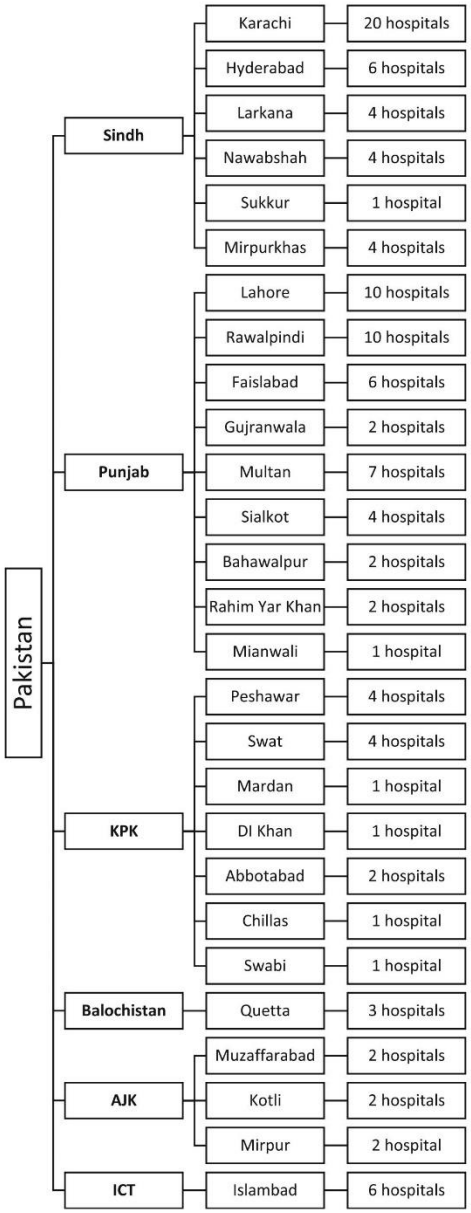


Fig. 1 Study venues

doctors that had 15 items, was 0.861 and intraclass correlation coefficient was 0.861 (95% CI: 0.840–0.880). Moreover, the reliability for the section of involvement of pharmacists in medicines management that had 13 items, was 0.831 and intraclass correlation coefficient was 0.830 (95% CI: 0.810–0.850). All were in acceptable range [29, 30].

Data collection

The questionnaire was delivered as hardcopy by hand and, were either completed at the same date or, collected later as indicated by the respondent. Prior to handing the questionnaire the participants were briefed about study purpose.

Data analyses

The data were analysed using statistical software, (SPSS, Chicago, IL, USA, version 24.0). The results were reported, as sample count (N) and frequency (%). Cross tabulation and chi square (χ^2) test was applied to assess the association between the independent variables (education, type of hospital and experience of pharmacists) and dependent variables (attitude, experiences of pharmacists with doctors and involvement of pharmacists in medicines management in the hospitals). The cut-off for statistical significance was p-value ≤0.01 with value for Cramer's V ≥ 0.3. A p-value of ≤0.01 was set to reduce the likelihood type 1 errors [31]. The Cramer's V indicated the strength of association and the value ranged from 0 to 1 with latter indicating a strong association. It was therefore selected as one of the cut-off criteria [32].

Consent and ethics approval

All those who agreed to participate had to provide their consent before data collection. The study was approved by the Research Ethics Committee of the University (Reference Number 00286). In addition, approval letters from the local hospitals were also obtained before data collection.

Results

Of total 500 pharmacists approached, 396 questionnaires were completed giving a response rate of 79.2%, the results of which were then taken forward for analysis. Most respondents were male (64.1%) and had Pharm. D (Doctor of Pharmacy) degree (74.5%). Almost equal proportions of respondents worked in state-funded (50.3%) and private hospitals (49.7%) respectively. As per the job titles of respondents, most respondents were working in capacity of pharmacist (91.7%). Among all respondents, almost 60% had experience of 5–10 years. Majority (66.9%) were associated with in-patient pharmacy. Almost all (99.2%) respondents were registered with Pakistan Pharmacy Council. The demographic information data are tabulated in Table 1.

Upon eliciting opinion of pharmacists as to how they describe the pharmacy job, most of them ($N = 362$, 91.4%) mentioned that pharmacy duties are mostly clinical. However, a small number of pharmacists ($N = 34$, 8.6%) mentioned the duties as technical. In response to the question of how they would describe pharmacy as an occupation, most pharmacists ($N = 351$, 88.6%) mentioned it as a professional occupation while some pharmacists ($N = 20$, 5.1%) believed it to be a business profession. Similar number of pharmacists ($N = 25$, 6.3%) mentioned pharmacy job as both professional and business occupation.

Most participants ($N = 365$, 92.2%) reported that they interacted with doctors daily while some pharmacists ($N = 18$, 4.5%) reported that their interactions with doctors were on a weekly basis. Few pharmacists ($N = 13$, 3.3%) reported that they rarely interacted with doctors during their duty hours. In response to the question regarding most common reasons for these interactions, most pharmacists ($N = 287$, 72.5%) mentioned drug availability queries while some ($N = 39$, 9.8%) mentioned queries regarding drug alternatives. A small number of pharmacists ($N = 29$, 7.3%) mentioned queries related to drug interactions while a similar number of participants ($N = 25$, 6.3%) highlighted queries regarding dosage. Few pharmacists ($N = 16$, 4%) mentioned queries related to adverse drug reactions as one of the most common reasons for interactions. The data regarding pharmacists' attitude towards their role in the healthcare system and their experience with doctors are tabulated in Tables 2 and 3. In addition, data related to the perception of pharmacists about their involvement in medicines management are tabulated in Table 4. All items were cross tabulated with three independent variables namely level of education of doctors, the nature of hospitals, and work experience of pharmacist.

Discussion

Pharmaceutical care is an integral part of pharmacy practice in any healthcare setting, and its application varies from one country to another depending upon health regulations. The pharmaceutical care services are advanced in developed countries and involve pharmacists in more clinical and patient-oriented roles. However, the involvement of pharmacists in pharmaceutical care service and the extent of service coverage is limited in developing countries such as Pakistan as there are less pharmacists employed in hospitals. Their duties at most times, are confined to drug dispensing, procurement, and inventory management services, i.e., traditional pharmacy services [33–39]. It has been mentioned earlier that greater involvement of pharmacist in direct

Table 1 Participants' information ($N = 396$)

Characteristics	N (%)
Gender	
Male	254 (64.1%)
Female	142 (35.9%)
Professional Education	
Bachelor of Pharmacy/ Master of Pharmacy	87 (22%)
Doctor of Pharmacy (Pharm.D)	295 (74.5%)
Overseas Qualification	14 (3.5%)
Place of Work	
State Funded Hospital	199 (50.3%)
Private Hospital	197 (49.7%)
Current Job Title	
Pharmacist	363 (91.7%)
Senior Pharmacist	26 (6.6%)
Chief Pharmacist	7 (1.8%)
Years of Experience	
Less than 5 years	68 (17.2%)
5–10 years	236 (59.6%)
More than 10 years	92 (23.2%)
Area of Practice	
Inpatient	265 (66.9%)
Outpatient	105 (26.5%)
Oncology pharmacy	26 (6.6%)
State of Practice	
Sindh	143 (36.1%)
Punjab	175 (44.2%)
Baluchistan	9 (2.3%)
KPK	44 (11.1%)
Capital Territory	17 (4.3%)
AJK	8 (2.0%)
Are you registered with Pharmacy Council?	
Yes	393 (99.2%)
In process	3 (0.8%)

KPK Khyber Pakhtunkhwa, *AJK* Azad Jammu and Kashmir

patient care and extensive interaction of pharmacists with allied health members would set the platform for improved pharmaceutical care services thereby benefiting the patients. This could only be achieved when pharmacists are involved in traditional duties to a lesser extent. The traditional duties could be performed by pharmacy technicians [10].

Most pharmacists mentioned that their role was clinically oriented and interacted with doctors on a daily basis. This response was significantly associated with workplace as pharmacists working in state funded hospitals interacted more often with doctors. This occurrence could be attributed to the change in healthcare policy that envisioned such role for pharmacists. This occurrence further highlights that Pakistani pharmacists now have a better understanding of pharmaceutical care and consider themselves as member of allied health team. Besides, they regard their work as clinical and patient-oriented.

Most pharmacists agreed that their role and duties in the primary health practice is of clinical nature. This indicates that they were aware of their role as a healthcare professional and, considered participation in drug prescribing and therapeutic procedures as must. This finding was linked to their education status as graduates with PharmD degree or overseas degree in pharmacy, as opposed to BPharm, had better acceptance towards these tasks. This finding could be attributed to the introduction of PharmD degree with clinical pharmacy courses. It is in line with the concept of enhancing pharmacists' capabilities and allowing them to contribute to the primary healthcare system is being promoted, especially in developing countries [39, 40]. Henceforth, the introduction of PharmD degree has led to a positive change in pharmacists working in Pakistani healthcare settings. Pharmacists with a PharmD degree were observed to be better acquainted with their clinical responsibilities. Moreover, this finding is also in line with the role envisioned by the WHO for pharmacists, that is, to serve in an advisory capacity for other healthcare professionals in ensuring safe and appropriate use of medicines [14].

The data pertaining to the experience of pharmacists with the doctors highlighted that pharmacists were willing to collaborate with doctors to discuss patients' condition and medication therapy. This occurrence was linked to education status and workplace of pharmacists as pharmacists with PharmD and working in state funded healthcare facilities, were exercising these tasks more often. However, the general perception of doctors was negative. Available evidence indicates that doctors perceived that pharmacists were incapable of providing direct healthcare service to patient [38–40]. This negative perception is still prevalent among doctors despite considering pharmacists as knowledgeable and experts in counseling patients about drug dosage and its safe use [24]. Besides, most patients in Pakistan are unaware that they can consult pharmacists if they experience any drug related problem during therapy [22, 24]. Due to this negative perception among doctors and public incognizance, the pharmacists have limited opportunities to assume the role of a direct patient care provider and mainly resort to practising managerial and administrative tasks in public and private healthcare sectors.

It was observed that the perception of pharmacists about their role in medicine management was quite positive. The pharmacists believed that they were capable of providing this service however, number of pharmacists who had such expertise and training was low.

Table 2 Attitude of pharmacist regarding their role in the healthcare system ($N = 396$)

Roles	Education	Agree	Disagree	*P*-Value	Type	Agree	Disagree	*P*-Value	Experience	Agree	Disagree	*P*-Value
To educate patients and carers about the safe and appropriate use of medicines	B/M Pharm	71 (17.9%)	16 (4%)	0.000*	State funded	172 (43.4%)	27 (6.8%)	0.035	< 5 years	65 (16.4%)	3 (0.8%)	0.001
	Pharm.D	275 (69.4%)	20 (5.1%)		Private	183 (46.2%)	14 (3.5%)		5–10 years	217 (54.8%)	19 (4.8%)	
	Overseas	9 (2.3%)	5 (1.3%)		–	–	–		> 10 years	73 (18.4%)	19 (4.8%)	
To monitor and report patients' response to drug therapy	B/M Pharm	74 (18.7%)	13 (3.3%)	0.002	State funded	176 (44.4%)	23 (5.8%)	0.086	< 5 years	64 (16.2%)	4 (1.0%)	0.022
	Pharm.D	276 (69.7%)	19 (4.8%)		Private	184 (46.5%)	13 (3.3%)		5–10 years	219 (55.3%)	17 (4.3%)	
	Overseas	10 (2.5%)	4 (1.0%)		–	–	–		> 10 years	77 (19.4%)	15 (3.8%)	
To be available for clinician consultation during ward rounds	B/M Pharm	71 (17.9%)	16 (4.0%)	0.031	State funded	169 (42.7%)	30 (7.6%)	0.031	< 5 years	65 (16.4%)	3 (0.8%)	0.009
	Pharm.D	268 (67.1%)	27 (6.8%)		Private	181 (45.7%)	16 (4%)		5–10 years	211 (53.3%)	25 (6.3%)	
	Overseas	11 (2.8%)	3 (0.8%)		–	–	–		> 10 years	74 (18.7%)	18 (4.5%)	
To communicate or liaise with other healthcare professionals delivering patient care to facilitate positive health outcomes	B/M Pharm	78 (19.7%)	9 (2.3%)	0.005	State funded	193 (48.7%)	6 (1.5%)	0.000*	< 5 years	67 (16.9%)	1 (0.3%)	0.031
	Pharm.D	269 (67.9%)	26 (6.6%)		Private	163 (41.2%)	34 (8.6%)		5–10 years	209 (52.8%)	27 (6.8%)	
	Overseas	9 (2.3%)	5 (1.3%)		–	–	–		> 10 years	80 (20.2%)	12 (3.0%)	
To collaborate with other healthcare professionals as part of a multidisciplinary team	B/M Pharm	71 (17.9%)	16 (4.0%)	0.001	State funded	172 (43.4%)	27 (6.8%)	0.293	< 5 years	65 (16.4%)	3 (0.8%)	0.001
	Pharm.D	269 (67.9%)	26 (5.5%)		Private	177 (44.7%)	20 (5.1%)		5–10 years	213 (53.8%)	23 (5.8%)	
	Overseas	9 (2.3%)	5 (1.3%)		–	–	–		> 10 years	71 (17.9%)	21 (5.3%)	
To provide advice to patients about their medication/s and/or health conditions	B/M Pharm	71 (17.9%)	16 (4.0%)	0.000*	State funded	175 (44.2%)	24 (6.1%)	0.083	< 5 years	64 (16.2%)	4 (1.0%)	0.000*
	Pharm.D	278 (70.2%)	17 (4.3%)		Private	184 (46.5%)	13 (3.3%)		5–10 years	222 (56.1%)	14 (3.5%)	
	Overseas	10 (2.5%)	4 (1.0%)		–	–	–		> 10 years	73 (18.4%)	19 (4.8%)	
To dispense and check supply of medicines to patient (counting pills, labelling, and accuracy checking)	B/M Pharm	67 (16.9%)	20 (5.1%)	0.036	State funded	161 (40.7%)	38 (9.6%)	0.018	< 5 years	63 (15.9%)	5 (1.3%)	0.021
	Pharm.D	259 (65.4%)	36 (9.1%)		Private	176 (44.4%)	21 (5.3%)		5–10 years	203 (51.3%)	33 (8.3%)	
	Overseas	11 (2.8%)	3 (0.8%)		–	–	–		> 10 years	71 (17.9%)	21 (5.3%)	
To provide a "closed shop" service: receiving prescriptions from a practitioner and dispense medicine to a patient only	B/M Pharm	11 (2.8%)	76 (19.2%)	0.001	State funded	54 (13.6%)	145 (36.6%)	0.000	< 5 years	16 (4.0%)	52 (13.1%)	0.623
	Pharm.D	59 (14.9%)	236 (59.6%)		Private	24 (6.1%)	173 (43.7%)		5–10 years	46 (11.6%)	190 (48.0%)	
	Overseas	8 (2.0%)	6 (1.5%)		–	–	–		> 10 years	16 (4.0%)	76 (19.2%)	
To check that prescriptions are written for the correct dose for the patient	B/M Pharm	60 (15.2%)	27 (6.8%)	0.000*	State funded	152 (38.4%)	47 (11.9%)	0.955	< 5 years	52 (13.1%)	16 (4.0%)	0.014
	Pharm.D	239 (60.4%)	56 (14.1%)		Private	150 (37.9%)	47 (11.9%)		5–10 years	190 (48.0%)	46 (11.6%)	

Table 2 Attitude of pharmacist regarding their role in the healthcare system ($N = 396$) *(Continued)*

Roles	Education	Agree	Disagree	*P*-Value	Type	Agree	Disagree	*P*-Value	Experience	Agree	Disagree	*P*-Value
	Overseas	3 (0.8%)	11 (2.8%)		–	–	–		> 10 years	60 (15.2%)	32 (8.1%)	
To check that prescriptions do not have any drug-drug interactions	B/M Pharm	55 (13.9%)	32 (8.1%)	0.017	State funded	156 (39.4%)	43 (10.9%)	0.093	< 5 years	61 (15.4%)	7 (1.8%)	0.004
	Pharm.D	231 (58.3%)	64 (16.2%)		Private	140 (35.4%)	57 (14.4%)		5–10 years	173 (43.7%)	63 (15.9%)	
	Overseas	10 (2.5%)	4 (1.0%)		–	–	–		> 10 years	62 (15.7%)	30 (7.6%)	
To check that a prescription is not contraindicated for the patient	B/M Pharm	67 (16.9%)	20 (5.1%)	0.036	State funded	161 (40.7%)	38 (9.6%)	0.018	< 5 years	63 (15.9%)	5 (1.3%)	0.021
	Pharm.D	259 (65.4%)	36 (9.1%)		Private	176 (44.4%)	21 (5.3%)		5–10 years	203 (51.3%)	33 (8.3%)	
	Overseas	11 (2.8%)	3 (0.8%)		–	–	–		> 10 years	71 (17.9%)	21 (5.3%)	
To advise clinicians and others about the cost-effectiveness of medicines	B/M Pharm	74 (18.7%)	13 (3.3%)	0.002	State funded	176 (44.4%)	23 (5.8%)	0.086	< 5 years	64 (16.2%)	4 (1.0%)	0.022
	Pharm.D	276 (69.7%)	19 (4.8%)		Private	184 (46.5%)	13 (3.3%)		5–10 years	219 (55.3%)	17 (4.3%)	
	Overseas	10 (2.5%)	4 (1.0%)		–	–	–		> 10 years	77 (19.4%)	15 (3.8%)	
To formally review a patient's therapy and to make necessary changes to help promote positive health outcomes	B/M Pharm	71 (17.9%)	16 (4.0%)	0.031	State funded	169 (42.7%)	30 (7.6%)	0.031	< 5 years	65 (16.4%)	3 (0.8%)	0.009
	Pharm.D	268 (67.7%)	27 (6.8%)		Private	181 (45.7%)	16 (4.0%)		5–10 years	211 (53.3%)	25 (6.3%)	
	Overseas	11 (2.8%)	3 (0.8%)		–	–	–		> 10 years	74 (18.7%)	18 (4.5%)	
To supervise repeat prescriptions for patients according to agreed protocols	B/M Pharm	71 (17.9%)	16 (4.0%)	0.000*	State funded	172 (43.4%)	27 (6.8%)	0.035	< 5 years	65 (16.4%)	3 (0.8%)	0.001
	Pharm.D	275 (69.5)	20 (5.1%)		Private	183 (46.2%)	14 (3.5%)		5–10 years	217 (54.8%)	19 (4.8%)	
	Overseas	9 (2.3%)	5 (1.3%)		–	–	–		> 10 years	73 (18.4%)	19 (4.8%)	
To make dose adjustments to a patient's medicine using protocols established with prescribers	B/M Pharm	71 (17.9%)	16 (4.0%)	0.000*	State funded	175 (44.2%)	24 (6.1%)	0.062	< 5 years	64 (16.2%)	4 (1.0%)	0.000*
	Pharm.D	278 (70.2%)	17 (4.3%)		Private	184 (46.5%)	13 (3.3%)		5–10 years	222 (56.1%)	14 (3.5%)	
	Overseas	10 (2.5%)	4 (1.0%)		–	–	–		> 10 years	73 (18.4%)	19 (4.8%)	
To prescribe therapy for a patient following a clinician's diagnosis (partnership or supplementary prescribing)	B/M Pharm	79 (19.9%)	8 (2.0%)	0.001	State funded	187 (47.2%)	12 (3.0%)	0.816	< 5 years	66 (16.7%)	2 (0.5%0	0.032
	Pharm.D	282 (71.2)	13 (3.3%)		Private	184 (46.5%)	13 (3.3%)		5–10 years	224 (56.6%)	12 (3.0%)	
	Overseas	10 (2/5%)	4 (1.0%)		–	–	–		> 10 years	81 (20.5%)	11 (2.8%)	
To prescribe therapy for a patient independent of clinician's diagnosis following an initial patient assessment (independent prescribing)	B/M Pharm	55 (13.9%)	32 (8.1%)	0.017	State funded	156 (39.4%)	43 (10.9%)	0.093	< 5 years	61 (15.4%)	7 (1.8%)	0.004
	Pharm.D	231 (58.7%)	64 (16.2%)		Private	140 (35.4%)	57 (14.4%)		5–10 years	173 (43.7%)	63 (15.9%)	
	Overseas	10 (2.5%)	4 (1.0%)		–	–	–		> 10 years	62 (15.7%)	30 (7.6%)	

* = significant *p*-value with Cramer V

Table 3 Experience of pharmacists with doctors ($N = 396$)

Experience	Education	Agree	Disagree	*P*-Value	Type	Agree	Disagree	*P*-Value	Experience	Agree	Disagree	*P*-Value
Pharmacists are a reliable source of general medicines information (i.e., specific facts about medicines, which can be found in standard references)	B/M Pharm	70 (17.7%)	17 (4.3%)	0.000*	State funded	180 (45.5%)	19 (4.8%)	0.016	< 5 years	68 (17.2%)	0 (0%)	0.000*
	Pharm.D	286 (72.2%)	9 (2.3%)		Private	190 (48%)	7 (1.8%)		5–10 years	224 (56.6%)	12 (3.0%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	78 (19.7%)	14 (3.5%)	
Pharmacists routinely counsel patients regarding the safe and appropriate use of medicines	B/M Pharm	72 (18.2%)	15 (3.8%)	0.002	State funded	181 (45.7%)	18 (4.5%)	0.606	< 5 years	64 (16.2%)	4 (1.0%)	0.007
	Pharm.D	277 (69.9%)	18 (4.5%)		Private	182 (46%)	15 (3.8%)		5–10 years	222 (56.1%)	14 (3.5%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	77 (19.4%)	15 (3.8%)	
Pharmacists routinely inform clinicians about the cost-effectiveness of therapy and give accurate advice regarding alternatives treatments	B/M Pharm	55 (13.9%)	32 (8.1%)	0.000*	State funded	171 (43.2%)	28 (7.1%)	0.005	< 5 years	63 (15.9%)	5 (1.3%)	0.004
	Pharm.D	249 (62.9%)	46 (11.6%)		Private	147 (37.1%)	50 (12.6%)		5–10 years	189 (47.7%)	47 (11.9%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	66 (16.7%)	26 (6.6%)	
Pharmacists are willing to take personal responsibility for resolving any medicines-related problems they discover	B/M Pharm	73 (18.4%)	14 (3.5%)	0.000*	State funded	180 (45.5%)	19 (4.8%)	0.008	< 5 years	67 (16.9%)	1 (0.3%)	0.001
	Pharm.D	284 (71.7%)	11 (2.8%)		Private	191 (48.2%)	6 (1.5%)		5–10 years	225 (56.8%)	11 (2.8%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	79 (19.9%	13 (3.3%)	
Pharmacists routinely inform clinicians if they discover clinical problems with prescriptions	B/M Pharm	78 (19.7%)	9 (2.3%)	0.005	State funded	193 (48.7%)	6 (1.5%)	0.000*	< 5 years	67 (16.9%)	1 (0.3%)	0.031
	Pharm.D	269 (67.9%)	26 (6.6%)		Private	163 (41.2%)	34 (8.6%)		5–10 years	209 (52.8%)	27 (6.8%)	
	Overseas	9 (2.3%)	5 (1.3%)		–	–	–		> 10 years	80 (20.2%)	12 (3.0%)	
Pharmacists frequently ask to clarify therapeutic objectives clinicians have for patients	B/M Pharm	56 (14.1%)	31 (7.8%)	0.000*	State funded	169 (42.7%)	30 (7.6%)	0.047	< 5 years	64 (16.2%)	4 (1.0%)	0.000*
	Pharm.D	279 (70.5%)	16 (4.0%)		Private	180 (45.5%)	17 (4.3%)		5–10 years	220 (55.6%)	16 (4.0%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	65 (16.4%)	27 (6.8%)	
Pharmacists frequently let medics know that patients have experienced some problem with their medications	B/M Pharm	71 (17.9%)	16 (4.0%)	0.000*	State funded	172 (43.4%)	27 (6.8%)	0.035	< 5 years	65 (16.4%)	3 (0.8%)	0.001
	Pharm.D	275 (69.4%)	20 (5.1%)		Private	183 (46.2%)	14 (3.5%)		5–10 years	217 (54.8%)	19 (4.8%)	
	Overseas	9 (2.3%)	5 (1.3%)		–	–	–		> 10 years	73 (18.4%)	19 (4.8%)	
Pharmacists are focused on ensuring the safety of patients with respect to the therapeutic use of medicines	B/M Pharm	70 (17.7%)	17 (4.3%)	0.014	State funded	184 (46.5%)	15 (3.8%)	0.023	< 5 years	66 (16.7%)	2 (0.5%)	0.008
	Pharm.D	270 (68.2%)	25 (6.3%)		Private	168 (42.4%)	29 (7.3%)		5–10 years	211 (53.3%)	25 (6.3%)	
	Overseas	12 (3.0%)	2 (0.5%)		–	–	–		> 10 years	75 (18.9%)	17 (4.3%)	
Pharmacists respect the autonomy of patients and act to promote the concept of concordance	B/M Pharm	73 (18.4%)	14 (3.5%)	0.000*	State funded	181 (45.7%)	18 (4.5%)	0.025	< 5 years	66 (16.7%)	2 (0.5%)	0.002
	Pharm.D	284 (71.7%)	11 (2.8%)		Private	190 (48%)	7 (1.8%)		5–10 years	226 (57.1%)	10 (2.5%)	

Table 3 Experience of pharmacists with doctors ($N = 396$) *(Continued)*

Experience	Education	Agree	Disagree	***P***-Value	Type	Agree	Disagree	***P***-Value	Experience	Agree	Disagree	***P***-Value
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	79 (19.9%)	13 (3.3%)	
Pharmacists are practicing as autonomous clinicians	B/M Pharm	77 (19.4%)	10 (2.5%)	0.005	State funded	173 (43.7%)	26 (6.6%)	0.075	< 5 years	65 (16.4%)	3 (0.8%)	0.021
	Pharm.D	269 (67.9%)	26 (6.6%)		Private	182 (46%)	15 (3.8%)		5–10 years	214 (54.0%)	22 (5.6%)	
	Overseas	9 (2.3%)	5 (1.3%)		–	–	–		> 10 years	76 (19.2%)	16 (4.0%)	

* = significant *p*-value with Cramer V

Table 4 Perception of pharmacists regarding their involvement in medicines management ($N = 396$)

Perceptions	Education	Agree	Disagree	*P*-Value	Type	Agree	Disagree	*P*-Value	Experience	Agree	Disagree	*P*-Value
Pharmacists should increase their involvement in medicines management	B/M Pharm	45 (11.4%)	42 (10.6%)	0.000*	State funded	135 (34.1%)	64 (16.2%)	0.028	< 5 years	54 (13.6%)	14 (3.5%)	0.000*
	Pharm.D	229 (57.8%)	66 (16.7%)		Private	153 (38.6%)	44 (11.1%)		5–10 years	182 (46.0%)	54 (13.6%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	52 (13.1%)	40 (10.1%)	
Current state or private funding does not support collaborative work between pharmacists and clinicians in medicines management	B/M Pharm	75 (18.9%)	12 (3.0%)	0.004	State funded	181 (45.7%)	18 (4.5%)	0.025	< 5 years	60 (15.2%)	8 (2.0%)	0.004
	Pharm.D	282 (71.2%)	13 (3.3%)		Private	190 (48%)	7 (1.8%)		5–10 years	229 (57.8%)	7 (1.8%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	82 (20.7%)	10 (2.5%)	
Other than dispensing prescriptions, pharmacists are on the periphery of the core healthcare team	B/M Pharm	69 (17.4%)	18 (4.5%)	0.000*	State funded	189 (47.7%)	10 (2.5%)	0.804	< 5 years	67 (16.9%)	1 (0.3%)	0.000*
	Pharm.D	292 (73.7%)	3 (0.8%)		Private	186 (47%)	11 (2.8%)		5–10 years	230 (58.1%)	6 (1.5%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	78 (19.7%)	14 (3.5%)	
Clinicians do not want pharmacists to provide medicines management services	B/M Pharm	63 (15.9%)	24 (6.1%)	0.000*	State funded	163 (41.2%)	36 (9.1%)	0.006	< 5 years	58 (14.6%)	10 (2.5%)	0.000*
	Pharm.D	273 (68.9%)	22 (5.6%)		Private	180 (45.5%)	17 (4.3%)		5–10 years	217 (54.8%)	19 (4.8%)	
	Overseas	7 (1.8%)	7 (1.8%)		–	–	–		> 10 years	68 (17.2%)	24 (6.1%)	
Patients would not subscribe to enhanced pharmacy practice services	B/M Pharm	38 (9.6%)	49 (12.4%)	0.000*	State funded	156 (39.4%)	43 (10.9%)	0.002	< 5 years	66 (16.7%)	2 (0.5%)	0.000*
	Pharm.D	281 (71.0%)	14 (3.5%)		Private	177 (44.7%)	20 (5.1%)		5–10 years	219 (55.3%)	17 (4.3%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	48 (12.1%)	44 (11.1%)	
Medicines management by implication calls the clinician's judgment into question	B/M Pharm	87 (22%)	0 (0%)	0.000*	State funded	181 (45.7%)	18 (4.5%)	0.031	< 5 years	59 (14.9%)	9 (2.3%)	0.021
	Pharm.D	250 (63.1%)	45 (11.4%)		Private	165 (41.7%)	32 (8.1%)		5–10 years	199 (50.2%)	37 (9.3%)	
	Overseas	9 (2.3%)	5 (1.3%)		–	–	–		> 10 years	88 (22.2%)	4 (1.0%)	
Medicines management challenges the clinician's authority	B/M Pharm	60 (15.2%)	27 (6.8%)	0.051	State funded	152 (38.4%)	47 (11.9%)	0.189	< 5 years	46 (11.6%)	22 (5.6%)	0.478
	Pharm.D	217 (54.8%)	78 (19.7%)		Private	139 (35.1%)	58 (14.6%)		5–10 years	177 (44.7%)	59 (14.9%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	68 (17.2%)	24 (6.1%)	
This enhanced clinical practice de-skills the clinicians/ practitioners	B/M Pharm	48 (12.1%)	39 (9.8%)	0.000*	State funded	154 (38.9%)	45 (11.4%)	0.000	< 5 years	62 (15.7%)	6 (1.5%)	0.000*
	Pharm.D	272 (68.7%)	23 (5.8%)		Private	180 (45.5%)	17 (4.3%)		5–10 years	215 (54.3%)	21 (5.3%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	57 (14.4%)	35 (8.8%)	
I do not have time to discuss patient-related medicine issues with clinicians	B/M Pharm	87 (22%)	0 (0%)	0.000*	State funded	157 (39.6%)	42 (10.6%)	0.004	< 5 years	55 (13.9%)	13 (3.3%)	0.000*
	Pharm.D	232 (58.6%)	63 (15.9%)		Private	176 (44.4%)	21 (5.3%)		5–10 years	187 (47.2%)	49 (12.4%)	

Table 4 Perception of pharmacists regarding their involvement in medicines management (*N* = 396) *(Continued)*

Perceptions	Education	Agree	Disagree	*P*-Value	Type	Agree	Disagree	*P*-Value	Experience	Agree	Disagree	*P*-Value
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	91 (23.0%)	1 (0.3%)	
I feel inadequately trained to deal with clinicians on clinical medicine-related issues on behalf of patients	B/M Pharm	87 (22%)	0 (0%)	0.000*	State funded	193 (48.7%)	6 (1.5%)	0.000*	< 5 years	59 (14.9%)	9 (2.3%)	0.055
	Pharm.D	245 (61.9%)	50 (12.6%)		Private	153 (38.6%)	44 (11.1%)		5–10 years	200 (50.5%)	36 (9.1%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	87 (22.0%)	5 (1.3%)	
I have sufficient confidence in my clinical knowledge to provide this service	B/M Pharm	87 (22.0%)	0 (0%)	0.000*	State funded	191 (48.2%)	8 (2.0%)	0.000*	< 5 years	50 (12.6%)	18 (4.5%)	0.000*
	Pharm.D	208 (52.5)	87 (22%)		Private	118 (29.8%)	79 (19.9%)		5–10 years	170 (42.9%)	66 (16.7%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	89 (22.5%)	3 (0.8%)	
Patients will get conflicting information regarding medicines use if pharmacists develop their medicines management services	B/M Pharm	39 (9.8%)	48 (12.1%)	0.000*	State funded	77 (19.4%)	122 (30.8%)	0.585	< 5 years	19 (4.8%)	49 (12.4%)	0.009
	Pharm.D	95 (24%)	200 (50.5%)		Private	71 (17.9%)	126 (31.8%)		5–10 years	83 (21.0%)	153 (38.6%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	46 (11.6%)	46 (11.6%)	
Enhanced clinical input will further develop my current relationship with clinicians	B/M Pharm	51 (12.9%)	36 (9.1%)	0.000*	State funded	162 (40.9%)	37 (9.3%)	0.001	< 5 years	66 (16.7%)	2 (0.5%)	0.000*
	Pharm.D	280 (70.7%)	15 (3.8%)		Private	183 (46.2%)	14 (3.5%)		5–10 years	219 (55.3%)	17 (4.3%)	
	Overseas	14 (3.5%)	0 (0%)		–	–	–		> 10 years	60 (15.2%)	32 (8.1%)	

* = significant *p*-value with Cramer V

This occurrence is logical given the previous pharmacy curriculum that was focused on educating and training pharmacy graduates in drug manufacturing and dispensing. Thus, pharmacy graduates were mostly inclined towards pharmaceutical manufacturing and medicines dispensing. In India, a neighboring country, the situation was similar to Pakistan's pharmacy education scenario as Indian pharmacy graduates and practicing pharmacists, despite being in a large number, were educated in preparation and dispensing of medicine only [37].

Pakistan's pharmacy curriculum was revised in 2004; the 4 year degree of Bachelor of Pharmacy (B.Pharm) was upgraded to a full-time 5 year Doctor of Pharmacy (Pharm.D) degree program. It was upgraded to strengthen pharmacy graduates' clinical knowledge and practice [37–42]. Studies mentioned that on an average 2587 pharmacy students graduated from Pakistan's pharmacy schools every year. However, this number is not sufficient to meet the demands of pharmacy profession in country's healthcare system [40]. According to available evidence, currently, 8102–10,000 pharmacists are working in Pakistan, of which 55% are involved in the production of pharmaceuticals, and only 15% are engaged in community pharmacy [23, 40]. Moreover, in addition to inadequate and untrained resource, doctors were reluctant to engage the pharmacists in medicine prescribing and related tasks [40, 41].

There is a need of understanding the role of pharmacists in Pakistani healthcare system and focus on their training and utilization in the health sector. The issue of under-recognized role could be addressed by attaching pharmacy schools with hospitals similar to medical schools so that pharmacy students may be able to practice their clinical knowledge in patient care and improve their clinical skills [37–41]. Moreover, PharmD graduates must be given extensive duties in the clinical pharmacy services so that they can progress and play their role as healthcare professionals effectively [43].

Apart from traditional pharmacy roles, pharmacists must assume the clinical role that contemporary healthcare service demands. Khan and colleagues highlighted that most doctors in Pakistan do not consider pharmacist as an integral member of allied healthcare team [42, 43]. There is a need to increase their awareness regarding the role pharmacists could play in Pakistan's healthcare system. Evidence highlights that pharmacist's inclusion in disease management as member of allied health team have improved patients' treatment outcomes [44]. Randomized controlled trials involving pharmacist – driven pharmaceutical care model in Pakistani patients with chronic illnesses such as diabetes, hypertension, rheumatoid arthritis, etc., have shown significant improvements in treatment outcomes [44–47]. This evidence base would improve pharmacists' standing in healthcare. In addition, allowing clinical pharmacists to accompany allied health members during clinical rounds and participation of pharmacists in continuous medical education activities alongside other healthcare professionals would be beneficial for recognition of pharmacists as a clinical member of allied health team. Additionally, spreading awareness about pharmacist's role through regional and national pharmacy societies would also highlight pharmacists and their responsibilities among health professionals and public.

Furthermore, pharmacists would have to increase patient awareness about their role. They would have to perform their role as disease educator and counsellor. The patients would not be able to understand the impact a pharmacist could make in healthcare system unless the pharmacists take initiative. Patient education and counselling may not be clinically effective if the pharmacists do not have pharmaceutical care skills [22]. Therefore, it is essential to teach these skills to pharmacy students in PharmD curriculum and provide them with opportunities to practice during summer attachments or experiential training [22, 39]. This would be helpful as the pharmacy students would assume the role of pharmacists in future. There is a need to add provision of a counselling room in regulations for healthcare settings as this would provide opportunity for dissemination of information regarding disease and therapy. Moreover, such provision would enhance patient satisfaction and improve the recognition of pharmacists as a patient care provider [22, 39, 42, 43].

Limitations of the study

The results of this study may be interpreted with caution as pharmacist from primary care hospitals, and community pharmacies were not included. Therefore, the findings of this study reflect the opinion of pharmacists from clinical settings only. The views may differ among pharmacist based on workplace. The study was a survey-based research and involved close-ended questions. Qualitative studies could investigate extensively and may provide in-depth explanation of expectations as well as experiences of pharmacists within the healthcare system of Pakistan.

Conclusion

Pharmacists in Pakistan are willing to perform their duties and provide direct patient care using their clinical knowledge and expertise, pharmaceutical care skills and, experience for medicines management. It was observed that the updated curriculum improved their clinical knowledge and health policy regulations have provided more opportunities of pharmacists to collaborate with doctors in patient care. However, they seemed sceptical of performing advanced clinical pharmacy roles such as

intervening in prescriptions and medication therapy, consultations, prescribing, etc. This scepticism was mainly due to a prevalent negative perception about pharmacists' clinical capabilities among most doctors.

It is essential to integrate pharmacists' clinical rotations with doctors to inculcate a professional relationship. Moreover, it would be helpful if training and seminars are conducted on the importance of clinical pharmacy services in Pakistan's healthcare system. Such activities would provide an opportunity to recognize the accomplishments as well as identify limitations of pharmacists' clinical role. Further studies are recommended to explore the concerns of pharmacists regarding these services so that they can be adequately addressed.

Supplementary information

Supplementary information accompanies this paper at https://doi.org/10.1186/s12913-020-05459-0.

Additional file 1.

Abbreviations

SPSS: Statistical Package for Social Sciences; USA: United States of America; Pharm.D: Doctor of Pharmacy; KPK: Khyber Pakhtunkhwa; AJK: Azad Jammu & Kashmir; WHO: World Health Organization; ACCP: American College of Clinical Pharmacy

Acknowledgements

We extend our gratitude to all the participants for their contribution in the study. We acknowledge the support of Khan and colleagues from Pakistan in completing the data collection.

Authors' contributions

NK conceived the idea and designed the study with KM. NK and AA and MS wrote the introduction. NK collected and entered the data in SPSS with AA. NK and KM analysed the data and wrote the results section with assistance from AA, ZH and MS. NK and AA formulated the tables in results section. AA assisted discussion and conclusion writing with NK, MS, ZH and KM. Methods section was written by NK with assistance from AA and MS. AA, NK, MS and ZH significantly contributed to the revision of the manuscript. Whole work was supervised by KM. All authors read and approved final manuscript.

Funding

No funding was sought for this study.

Availability of data and materials

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Ethics approval and consent to participate

The study was approved by Ethics Committee of University of Sunderland, UK. Based on this approval, the study was approved by the Institutional Review Board of Clifton Hospital Karachi, Pakistan (Reference#10–17). The respondents were explained about the study at the time of invitation. They were informed that their participation was voluntary and were sought an informed written consent for participation as well as publishing their responses.

Consent for publication

Not applicable.

Competing interests

The authors declared that they have no competing interests.

Author details

[1]School of Pharmacy and Pharmaceutical Sciences, University of Sunderland, Sunderland, UK. [2]Faculty of Technology, School of Computer Science, University of Sunderland, Sunderland, UK. [3]Department of Pharmacy Practice, College of Clinical Pharmacy, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia. [4]Department of Clinical Pharmacy, College of Pharmacy, Prince Sattam bin Abdulaziz University, Alkharj, Saudi Arabia. [5]Department of Health and Science Management, Bahria University, Karachi, Pakistan.

Received: 21 October 2019 Accepted: 24 June 2020
Published online: 02 July 2020

References

1. Rosenthal MM, Breault RR, Austin Z, Tsuyuki RT. Pharmacists' self-perception of their professional role: insights into community pharmacy culture. J Am Pharm Assoc. 2011;51:363–7.
2. McGivney MS, Meyer SM, Duncan-Hewitt W, DL H, JVR G, Smith RB. Medication therapy management: its relationship to patient counseling, disease management, and pharmaceutical care. J Am Pharm Assoc. 2007;47:620–8.
3. Rossing C, Hansen EH, Traulsen JM, Krass I. Actual and perceived provision of pharmaceutical care in Danish community pharmacies: the pharmacists' opinions. Pharm World Sci. 2005;27:175–81.
4. Martin-Calero MJ, Machuca M, Murillo MD, Cansino J, Gastelurrutia MA, Faus MJ. Structural process and implementation programs of pharmaceutical care in different countries. Curr Pharm Des. 2004;10:3969–85.
5. Tice L. 2002 white paper on pharmacy technicians: needed changes can no longer wait. J Manag Care Pharm. 2003;9:72–83.
6. Strand LM, Cipolle RJ, Morley PC, Frakes MJ. The impact of pharmaceutical care practice on the practitioner and the patient in the ambulatory practice setting: twenty-five years of experience. Curr Pharm Des. 2004;10:3987–4001.
7. Awad A, Al-Ebrahim S, Abahussain E. Pharmaceutical care services in hospitals of Kuwait. J Pharm Pharm Sci. 2006;9:149–57.
8. Worley MM, Schommer JC, Brown LM, Hadsall RS, Ranelli PL, Stratton TP, Uden DL. Pharmacists' and patients' roles in the pharmacist-patient relationship: are pharmacists and patients reading from the same relationship script? Res Social Adm Pharm. 2007;3:47–69.
9. Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. Am J Hosp Pharm. 1990;47:533–43.
10. Farris KB, Fernandez-Llimos F, Benrimoj SI. Pharmaceutical care in community pharmacies: practice and research from around the world. Ann Pharmacother. 2005;39:1539–41.
11. van Mil JWF. Pharmaceutical care, the future of pharmacy: theory, research, and practice. Published 2000. https://www.rug.nl/research/portal/files/14524956/thesis.pdf. (date last accessed 2 Mar 2020).
12. Zammit D. How to make ethical decisions. Pharm J. 2003;271:16.
13. Nishtar S, Boerma T, Amjad S, Alam AY, Khalid F, Ul Haq I, Mirza YA. Pakistan's health system: performance and prospects after the 18th constitutional amendment. Lancet. 2013;381:2193–206.
14. Naqvi AA, Zehra F, Naqvi SBS, Ahmad R, Ahmad N, Usmani S, Badar S, Younus I, Khan SJ. Migration trends of pharmacy students of Pakistan: a study investigating the factors behind brain drain of pharmacy professionals from Pakistan. Ind J Pharma Educ Res. 2017;51(2):192–206. https://doi.org/10.5530/ijper.51.2.25.
15. Awan MU, Raouf A, Ahmad N, Sparks L. Total quality management in developing countries: a case of pharmaceutical wholesale distribution in Pakistan. Int J Pharm Healthc Mark. 2009;3:363–80.
16. Stewart D, Letendre DE. The pharmacy education: a historical perspective. In: Fathelrahman A, Ibrahim MI, Alrasheedy A, Wertheimer A, editors. Pharmacy education in the twenty first century and beyond. London: Academic Press; 2018. p. 11–20.
17. Ahmed A, Tanveer M, Siddiqui A, Khan GM. Bridging the gap for clinical pharmacist in developing countries like Pakistan. J Coll Physicians Surg Pak. 2018;28:229–32.
18. Naqvi AA, Zehra F, Khan N, Ahmad R, McGarry K. Interactions and conflicts of interests between prescribers and medical sales representatives (MSRs) regarding prescribing and drug promotion practices in Karachi, Pakistan. Pak J Pharm Sci. 2019;32(2):687–95.
19. Aziz MM, Fang Y, Babar ZU, Usman M. Hospital pharmacy services in Pakistan. Eur J Hosp Pharm. 2017;24:253.

20. Khowaja K. Healthcare systems and care delivery in Pakistan. J Nurs Adm. 2009;39:263–5. https://doi.org/10.1097/NNA.0b013e3181a96473.
21. Naqvi AA, Naqvi SBS, Zehra F, Verma AK, Usmani S, Badar S, Ahmad R, Ahmad N. Estimation of the direct cost of poliomyelitis rehabilitation treatment to Pakistani patients: a 53-year retrospective study. Appl Health Econ Health Policy. 2018;16:871–88. https://doi.org/10.1007/s40258-018-0422-6.
22. Naqvi AA, Hassali MA, Naqvi SBS, Aftab MT, Zehra F, Nadir MN, Jahangir A, Kachela B. Assessment of patient satisfaction following pharmacist counselling session by a novel patient satisfaction feedback on counselling questionnaire. JPHSR. 2019;10:243–54. https://doi.org/10.1111/jphs.12294.
23. Azhar S, Hassali MA, Mohamed Ibrahim MI. Doctors' perception and expectations of the role of the pharmacist in Punjab, Pakistan. Trop J Pharm Res. 2010;9:205–22.
24. Khan MU, Khan AN, Ahmed FR, Feroz Z, Rizvi SA, Shah S, Hussain R, Adil Z. Patients' opinion of pharmacists and their roles in health care system in Pakistan. J Young Pharm. 2013;5:90–4.
25. Pakistan Pharmaceutical Country Profile. World Health Organization. https://www.who.int/medicines/areas/coordination/pakistan.pdf. Accessed 15 Mar 2020.
26. Sample size calculator. Raosoft. http://www.raosoft.com/samplesize.html. Accessed 14 Mar 2020.
27. Lawshe CH. A quantitative approach to content validity. Pers Psychol. 1975; 28:563–75.
28. Rungtusanatham M. Let's, not overlook content validity. Decision Line. 1998. p. 10–3. http://file.qums.ac.ir/repository/snm/Let%E2%80%99s%20Not%20Overlook%20Content%20Validity.pdf.
29. Cohen JS. Statistical power analysis for the behavioral sciences. 2nd ed; 1998.
30. De Vellis RF. Scale development: theory and applications. 26th ed; 1991.
31. Banerjee A, Chitnis UB, Jadhav SL, Bhawalkar JS, Chaudhury S. Hypothesis testing, type I and type II errors. Ind Psychiatry J. 2009;18(2):127–31. https://doi.org/10.4103/0972-6748.62274.
32. Agresti A. Introduction to categorical data analysis. New York: Wiley; 1996.
33. Scahill SL, Atif M, Babar ZU. Defining pharmacy and its practice: a conceptual model for an international audience. Integr Pharm Res Pract. 2017;6:121–9.
34. Smith F. Community pharmacy in Ghana: enhancing the contribution to primary health care. Health Policy Plan. 2004;19:234–41.
35. Jesson J, Bissell P. Public health and pharmacy: a critical review. Crit Public Health. 2006;16:159–69.
36. Goel P, Ross-Degnan D, Berman P, Soumerai S. Retail pharmacies in developing countries: a behavior and intervention framework. Soc Sci Med. 1996;42:1155–61.
37. Bhagavathula AS, Sarkar BR, Patel I. Clinical pharmacy practice in developing countries: focus on India and Pakistan. Arch Pharma Pract. 2014;5:91.
38. Abbas A. The Catch-22 of pharmacy practice in Pakistan's pharmacy education. Pharmacy. 2014;2:202–4. https://doi.org/10.3390/pharmacy2030202.
39. Abbas A. Evidence based improvements in clinical pharmacy clerkship program in undergraduate pharmacy education: the Evidence Based Improvement (EBI) initiative. Pharmacy. 2014;2:270–5. https://doi.org/10.3390/pharmacy2040270.
40. Azhar S, Hassali MA, Ibrahim MI, Ahmad M, Masood I, Shafie AA. The role of pharmacists in developing countries: the current scenario in Pakistan. Hum Resour Health. 2009;7:54.
41. Azhar S, Hassali MA, Ibrahim MI. Perceptions of hospital pharmacist's role in Pakistan's healthcare system: a cross-sectional survey. Trop J Pharm Res. 2011;10:11–7.
42. Khan A. 15th international pharmacy conference and exhibition. Lahore: Pakistan Pharmacists Association; 2009.
43. Khan N, McGarry K, Naqvi AA, Holden K. Doctors' perceptions, expectations and experience regarding the role of pharmacist in hospital settings of Pakistan. Int J Clin Pharm. 2020. https://doi.org/10.1007/s11096-020-00991-9.
44. Khan N, Abbas A. Clinical trials involving pharmacists in Pakistan's healthcare system: a leap from paper to practice. Pharmacy. 2014;2:244–7. https://doi.org/10.3390/pharmacy2030244.
45. Naqvi AA, Hassali MA, Naqvi SBS, Aftab MT. Impact of pharmacist educational intervention on disease knowledge, rehabilitation and medication adherence, treatment-induced direct cost, health-related quality of life and satisfaction in patients with rheumatoid arthritis: study protocol for a randomized controlled trial. Trials. 2019;20:488. https://doi.org/10.1186/s13063-019-3540-z.
46. Bukhsh A, Nawaz M, Ahmed HS, Khan TM. A randomized controlled study to evaluate the effect of pharmacist-led educational intervention on glycemic control, self-care activities and disease knowledge among type 2 diabetes patients: A consort compliant study protocol. Medicine (Baltimore). 2018;97:e9847.
47. Saleem F, Hassali MA, Shafie AA, Ul Haq N, Farooqui M, Aljadhay H, Ahmad FU. Pharmacist intervention in improving hypertension-related knowledge, treatment medication adherence and health-related quality of life: a non-clinical randomized controlled trial. Health Expect. 2015;18:1270–81.

Publisher's Note