A study of the development of frameworks of pharmacist prescribing in Qatar.

JEBARA, T.

2019

A study of the development of frameworks of pharmacist prescribing in Qatar

Tesnime Jebara

PhD **2019**

A study of the development of frameworks of pharmacist prescribing in Qatar

Tesnime Jebara

BSc (Pharm, Distinction), PgCert (Distinction), AFHEA

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

This research programme was carried out in collaboration with:

Qatar University (QU), Qatar

Hamad Medical Corporation (HMC), Qatar

May 2019

Research is formalised curiosity. It is poking and praying with a purpose.

Zora Neale Hurston

Abstract

Several countries across the world have developed and implemented frameworks of non-medical prescribing. In the United Kingdom, pharmacist prescribing was introduced in 2003 as supplementary prescribing, with this extended to include independent prescribing in 2006. Pharmacist prescribing has been proven to be safe, clinically appropriate, and highly regarded by patients and other members of the healthcare team.

In Qatar, pharmacy practice is rapidly evolving in an attempt to better utilise pharmacists' skills thus improve patient health outcomes. Qatar National Vision 2030 aims to establish "a comprehensive world-class healthcare system whose services are accessible to the whole population". To facilitate achievement of this goal, there is potential for the development and implementation of frameworks of pharmacist prescribing in Qatar.

The overall aim of this doctoral research was to explore the development of pharmacist prescribing frameworks in Qatar.

A multi-modal research design was implemented across four phases with the findings of each phase informing the next.

The first phase was an umbrella review of published systematic reviews on non-medical prescribing. Seven systematic reviews reported aspects of prescribing decision-making, processes of prescribing, barriers, and facilitators to implementation. Three of the reviews explored patient outcomes that were noted to be equivalent or better to physician prescribing.

Given the absence of systematic review of views and experiences of key stakeholders, the second phase was a systematic review of 65 studies to address this gap in knowledge. The majority of studies pre- and post-implementation reported positive findings. One key limitation of the studies was the general lack of any consideration of theories of implementation in study design, execution, and reporting.

The third phase was grounded in the Consolidated Framework of Implementation Research, involving semi-structured qualitative interviews with key stakeholders in positions of power and influence in Qatar. Data saturation was achieved on completion of 37 interviews, the findings of which

highlighted support for the development and implementation of pharmacist prescribing in Qatar, with many potential benefits described.

Findings of all three phases were incorporated into a final phase Delphi study aiming to determine the levels of agreement amongst key stakeholders in Qatar around the development of pharmacist prescribing frameworks. The scope of the framework developed included: definitions, models and scope of prescribing; education and training; prescribing practice and governance. High levels of agreement were achieved for Delphi statements relating to the Collaborative Pharmacist Prescribing model, thus indicating it as being the most appropriate for Qatar.

In conclusion, this research has provided original, robust and rigorous findings which can support implementation of frameworks of pharmacist prescribing in Qatar and beyond. Further research-based developmental work is required to translate this framework into an approved education and training course and practice.

Keywords: pharmacy, professional role, multi-modal design, theory, Middle East

Acknowledgments

First of all, a special thank you goes to my principal supervisor, Prof Derek Stewart. His due diligence and commitment to this project, as well as to my academic and professional development, were amazing. His prompt replies to my emails, in addition to his detailed comments and feedback, were invaluable in strengthening this thesis and shaping my research skills. For that and much more, I am forever indebted.

I would also like to thank the rest of my supervisory team in Robert Gordon University and Qatar; Dr Scott Cunningham, Dr Katie MacLure, Prof Moza Al Hail, Dr Abdulrouf Pallivalipali, and Dr Ahmed Awaisu. Their continuous support, constructive input, and guidance have kept me motivated throughout this journey.

I would also like to express my gratitude to my family especially my parents and my brothers for always believing in me and supporting my dreams even if it meant traveling across the world to achieve them.

A big thank you goes to all those who helped me achieve this milestone whether it was through providing support or agreeing to take part in the different phases of this project.

Last but not least, I would also like to extend a huge thank you to everyone at the School of Pharmacy and Life Sciences at Robert Gordon University, both staff and research students in the Research Hub, for welcoming me to the ‘family’, helping me adjust to life away from home, and supporting me to grow and develop.

External output

Peer-reviewed publications:

Jebara, T. et al., 2016. *Stakeholders' views and experiences of pharmacist prescribing: a systematic review protocol*. [online]. York: PROSPERO. Available from: http://www.crd.york.ac.uk/PROSPERO_REBRANDING/display_record.asp?ID=CRD42016048072 [Accessed 06/12/2016].

Stewart D, Jebara T, et al., 2017. Future perspectives on nonmedical prescribing. *Therapeutic Advances in Drug Safety,* 8(6), pp. 183–197.

Jebara, T. et al., 2018. Stakeholders' views and experiences of pharmacist prescribing: A systematic review. *British Journal of Clinical Pharmacology*, 84(9), pp. 1883-1905.

Oral presentations:

Jebara, T., et al., 2017. Views and Perceptions of Key Stakeholders in Qatar on Pharmacist Prescribing. (Oral presentation at the European Society of Clinical Pharmacy's Conference, Heidelberg, Germany, October 2017).

Jebara, T., et al., 2017. A study of the development of pharmacist prescribing framework in Qatar. (Oral presentation at the Robert Gordon University School of Pharmacy and Life Sciences' Postgraduate Research Student Symposium, Aberdeen, UK, December 2017).

Jebara, T., et al., 2018. A study of the development of pharmacist prescribing framework in Qatar. (Oral presentation at the Robert Gordon University 3 Minutes Thesis Competition, Aberdeen, UK, June 2018). *Runner up.

Jebara, T., et al., 2018. A Delphi study to determine the level of agreement relating to the development of pharmacist prescribing frameworks in Qatar. (Oral presentation at the Robert Gordon University School of Pharmacy and Life Sciences' Students and Staff Seminar Series, Aberdeen, UK, October 2018).

Press release:

Smith, P. 2018. *Should pharmacists be allowed to write prescriptions? Prescribing of medications has traditionally been restricted to physicians, but there is growing support to allow pharmacists to do so as well*. [online]. Chichester: Wiley. Available from https://newsroom.wiley.com/press-release/should-pharmacists-be-allowed-write-prescriptions [Accessed 28/11/2018].

Posters:

Jebara, T., et al., 2016. A study of the development of pharmacist prescribing framework in Qatar. (Poster presentation at Robert Gordon University's Postgraduate Research Night, Aberdeen 2016).

Jebara, T., et al., 2017. Stakeholders' Views and Experiences of Pharmacist Prescribing: A Systematic Review. (Poster presentation at the European Society of Clinical Pharmacy's Conference, Heidelberg, Germany, October 2017).

Jebara, T., et al., 2017. Views and Perceptions of Key Stakeholders in Qatar on Pharmacist Prescribing. (Poster presentation at the European Society of Clinical Pharmacy's Conference, Heidelberg, Germany, October 2017).

Jebara, T., et al., 2017. A Study of the Development of Pharmacist Prescribing Framework in Qatar. (Poster presentation at the 4th Qatar International Pharmacy Conference, Doha, Qatar, November 2017).

Jebara, T., et al., 2018. Stakeholders' Views and Experiences of Pharmacist Prescribing: A Systematic Review. (Poster presentation at the Excellence in Pharmaceutical Care in Grampian Conference, Aberdeen, March 2018).

Jebara, T., et al., 2018. A Study of the Development of Pharmacist Prescribing Framework in Qatar. (Poster presentation at Robert Gordon University's School of Pharmacy and Life Sciences Postgraduate Research Day, Aberdeen, May 2018). *Won 1st prize for best poster

Jebara, T., et al., 2018. Views and Perceptions of Key Stakeholders in Qatar on Pharmacist Prescribing. (Poster presentation at the International

Pharmaceutical Federation Congress, Glasgow, United Kingdom, September 2018).

Jebara, T., et al., 2018. Views and Perceptions of Key Stakeholders in Qatar on Pharmacist Prescribing. (Poster presentation at the International Pharmacy Education Symposium, Aberdeen, United Kingdom, September 2018).

Jebara, T., et al., 2018. Future Perspective on Non-medical Prescribing: An Umbrella Review. (Poster presentation at the European Society of Clinical Pharmacy, Belfast, United Kingdom, October 2018).

Jebara, T., et al., 2018. Stakeholders' Views and Experiences of Pharmacist Prescribing: A Systematic Review. (Poster presentation at Hamad Medical Corporation Annual Research Day 2018, Doha, Qatar, December 2018).

Jebara, T., et al., 2019. Views and Perceptions of Key Stakeholders in Qatar on Pharmacist Prescribing. (Poster presentation at the 5th Qatar International Pharmacy Conference, Doha, Qatar, February 2019).*Won 1st prize for best poster

Further published outputs are planned for chapters 5 and 6.

Forward

This thesis describes the research undertaken in pursuit of a PhD degree from Robert Gordon University (RGU), Aberdeen, UK.

During the past three years, I investigated aspects of non-medical prescribing with a focus on the potential to implement pharmacist prescribing in Qatar. I obtained my Bachelor of Science (Pharmacy) with Distinction from the College of Pharmacy at Qatar University in 2015. During my studies, I was exposed to clinical pharmacy research and co-authored a published study around developing pharmacists' research capacity in Qatar. As well as this experience developing my research skills, I realised that my future career path lay in academia thus required me to further develop my research knowledge and skills. There is a need to provide high quality evidence of the contribution that pharmacists can make to healthcare. Due to the above reasons, I have decided to pursue a PhD in Pharmacy Practice.

The developments in pharmacist prescribing globally have provided evidence of the contribution of that pharmacists can make as front line clinicians. Given the reputation of RGU in the field of pharmacist prescribing, I chose this as a base for the PhD.

Throughout my journey at RGU, I have been introduced to a range of research philosophies, methodologies, and methods which have shaped and extended my research expertise. I have had the opportunity to present the research at national and international forums, and network with a range of people. This, along with constant feedback from my research team and fellow students, has further enhanced my research experience.

I believe that the programme of research reported in thesis has the potential to make a positive impact on the healthcare system in Qatar, in line with the Qatar National Vision 2030 of making healthcare more accessible and affordable by utilising the skills and expertise of the healthcare workforce.

A multi-modal research design was adopted, and the thesis reported in seven chapters as follows:

Chapter 1 provides a brief overview of the healthcare structure in the 'Arab World' and specifically in Qatar, and describes the concept of pharmacist

prescribing, citing the UK experience. The overall doctoral research aim and the aims of the four linked phases are described.

Chapter 2 describes and justifies the research philosophies, methodologies, methods, and theoretical frameworks employed in the programme of studies. Measures to enhance research robustness and rigour are described as well.

Chapter 3 presents Phase 1, an original umbrella review of systematic reviews of aspects of non-medical prescribing. Detailed coverage of the search strategy and findings are reported. Gaps in published systematic reviews informed the remainder of the doctoral research.

Chapter 4 is Phase 2, a systematic review of stakeholders' views and experiences of pharmacist prescribing. The systematic review protocol was registered in the PROSPERO database at the University of York. The review findings identified a lack of the consideration of theories of implementation and qualitative research on this topic.

Chapter 5 is Phase 3, which was grounded in the Consolidated Framework of Implementation Research. This was a qualitative study of semi-structured interviews with key individuals in positions of power and influence related to healthcare. Their views were sought on the potential to develop and implement frameworks of pharmacist prescribing in Qatar.

Chapter 6, the final phase, is a consensus-based Delphi study. Statements relating to frameworks of pharmacist prescribing were developed from previous research phases.

The final chapter (Chapter 7) summarises the overall aim and key findings of the doctoral research, and outlines the pharmacist prescribing framework (as per the Delphi findings) which could be adopted in Qatar. The originality, potential impact, and future research are described.

Abbreviations

°C	Degree Celsius
A & E	Accident & Emergency
BNF	British National Formulary
CFIR	Consolidated Framework for Implementation Research
CIA	Central Intelligence Agency
CMP	Clinical Management Plan
CP	Collaborative Prescribing
CPD	Continuing Professional Development
E	East
ENT	Ear, Nose and Throat
GB	Great Britain
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GP	General Practitioner
HGH	Hamad General Hospital
HMC	Hamad Medical Corporation
ICU	Intensive Care Unit
IP	Independent Prescribing
MoPH	Ministry of Public Health
MRC	Medical Research Council
N	North
NCCCR	National Centre for Cancer Care & Research
NHS	National Health Service
NI	Northern Ireland
NICU	Neonatal Intensive Care Unit
NMP	Non-Medical Prescribing
NZ	New Zealand
OPEC	Organisation of the Petroleum Exporting Countries
OSCEs	Objective Structured Clinical Examinations
PARiHS	Promoting Action on Research Implementation
PCNZ	Pharmacy Council of New Zealand
PHCC	Primary Health Care Corporation
PhD	Doctor of Philosophy
PICU	Paediatric Intensive Care Unit
PP	Pharmacist Prescribing
QNV	Qatar National Vision
QP	Qatar Petroleum
QU	Qatar University
QUERI	Diabetes Quality Enhancement Research Initiative
SD	Standard Deviation
SP	Supplementary Prescribing
UK	United Kingdom
US$	United States Dollars
USA	United States of America
VA	Veterans Affairs
WHO	World Health Organization
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

Table of content

List of tables

List of figures

List of appendices

Chapter 1:
Introduction

1. Introduction to the chapter

The overall aim of this doctoral research was to explore the development of frameworks for pharmacist prescribing in Qatar. This introductory chapter, therefore, provides a brief overview of pharmacy practice in the 'Arab World' and describes the current healthcare system in Qatar. The concept of pharmacist prescribing along with the different models practised internationally is described in the chapter. The chapter ends with the overall aim of the doctoral research and the specific aims of each of the study phases.

1.1. Pharmacy practice in the 'Arab World'

1.1.1. Background

In 2016, the total population of the 'Arab World' was estimated at just over 400 million (World Bank 2016). Geographically, the 'Arab World' is defined as extending from the Arabian Gulf to the Atlantic Ocean, from Iraq and the Gulf states in the east to Morocco's Atlantic coast in the west. From north to south, the 'Arab World' extends from Syria to Sudan. It consists of 22 nations: Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, the United Arab Emirates, Yemen, Somalia, Djibouti, Mauritania, Comoros, and Palestine (Figure 1.1).

The latest World Bank statistics published in 2016 revealed that the 'Arab World' continues to grow economically, with an estimated aggregated Gross Domestic Product (GDP) of $2.869 trillion in 2014.

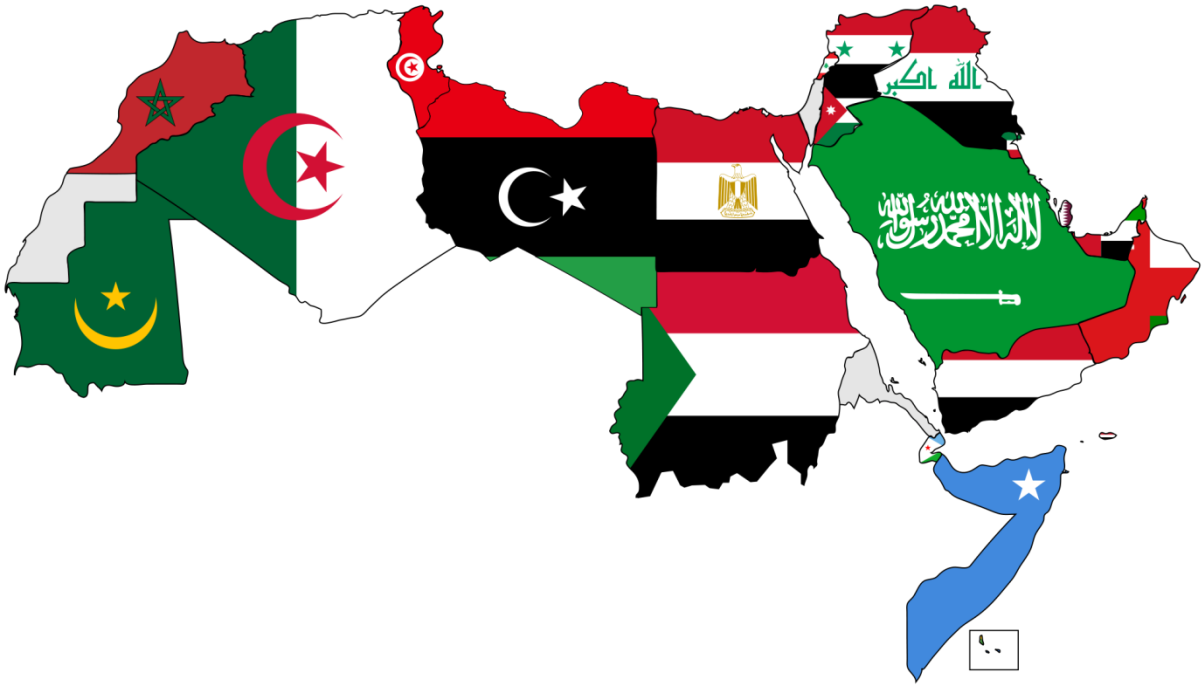


Figure 1.1: Map of the ‘Arab World’ (Wikimedia Commons 2016)

1.1.2. Description of health indicators in the ‘Arab World’

Health indicators in the ‘Arab World’ have improved significantly during the last decade. Oman, Saudi Arabia, Tunisia, Algeria, and Morocco rank among the top 10 world leaders in development gains, mostly due to advances in their health and education systems. Non-communicable diseases are the main causes of mortality in the ‘Arab World’, attributed largely to high tobacco use (cigarettes and waterpipes), calorie consumption, and low levels of physical activity (Jabbour 2013). The key health indicators are summarised in Table 1.1.

Table 1.1: Health indicators of the Arab World (Jabbour 2013)	
Health Indicator	**Description**
Population growth	-Over 354 million (more than tripled since 1970)
Population characteristics	-Youthful: • 31% under the age of 15 years • over 50% under 25 years of age
Life expectancy	-Increased from 51 years to almost 70 years -Ranges from 50 to 57.1 years in Somalia and Sudan and 78.2 to 81.5 in Qatar and Lebanon
Maternal mortality ratio (per 100 000 live births)	-Ranges from less than 15 in several Gulf countries to between 1044 and 1107 in Somalia and Sudan
Mortality rates of children under five years (per 100 000 live births)	-Ranges from 8.5 in Qatar to 180 in Somalia
Non-communicable diseases (NCDs)	-Dominant causes of mortality -Causes of more than 50% of deaths, at least a third of which are premature, occurring before the age of 70 years -Expected to see the second largest increase in NCDs (second to Africa) this decade -Three of the top 20 countries in the world with the highest prevalence of overweight/ obesity are in the 'Arab World' -Four of the top countries in the world with the highest prevalence of diabetes mellitus are in the 'Arab World'

1.1.3. Overview of pharmacy practice in the 'Arab World'

Pharmacy education in the 'Arab World' has advanced considerably in recent years with the launch of new schools of pharmacy, fuelled, in part, by an increased demand for pharmacists. Egypt has the highest number of schools of pharmacy and ranks highest in terms of the number of pharmacists per capita, with the majority of graduates working in the community setting (Abdel-Latif and Sabra 2016).

Pharmacists' scope of practise vary greatly across the 'Arab World', driven partly by differences in legislative frameworks. To understand these differences, a review of the legislation governing pharmacy practise in each of the 'Arab World' countries was conducted. Table 1.2 gives the key findings as per various Ministries of Health websites in June 2016. This information

should be interpreted with caution as several countries did not have a Ministry of Health website and in some cases, access required login details. Furthermore, it could be that the information is not current or no longer reflects the pharmacy practise.

Table 1.2: Pharmacists' scope of practice in Arab countries

Country	Scope of practise	Legislation Year
Algeria	• No information available on scope of practise	----
Bahrain	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Al Khalifa 1997)	1997
Comoros	• Website could not be accessed	----
Djibouti	• Website could not be accessed	----
Egypt	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Council of Ministers 1955)	1995
Iraq	• Pharmacists are allowed to dispense any drug with or without a prescription • If licensed, they can also perform chemical analysis (Al Bakr 1970)	1970
Jordan	• Pharmacists are allowed to dispense any drug with or without a prescription except narcotics and hallucinators (Al Hussein 2013)	2001
Kuwait	• Website could not be accessed	----
Lebanon	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Al Hariri 1994, Ministry of Public Health 2016)	1994
Libya	• Website could not be accessed (website has been hacked)	----
Mauritania	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Al-Hariri 2004)	2004
Morocco	• No information available on scope of pharmacist in legislations	----
Oman	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Directorate General of Medical Supply 2009)	2009
Palestine	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Fatouh 2004)	2004
Qatar	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Al Thani 1983)	1983
Saudi Arabia	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Al Saud 2006)	2005
Somalia	• Website could not be accessed	----
Sudan	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Federal Ministry of Health 2001)	2001

Syria	• No information available on scope of pharmacist in legislations	----
Tunisia	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Bourquiba 1973, Bourquiba 1975)	1973
United Arab Emirates	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Al Nahian 1983)	1983
Yemen	• Dispensing role only for drugs approved by the Ministry (no prescribing allowed) (Bajmal 2004)	2005

1.2. Qatar's profile and its healthcare system

Given that data generation and collection for the doctoral research was conducted in Qatar, this section provides further detail on the country's profile, with focus on its healthcare structure.

1.2.1. Geography and climate

The State of Qatar is a peninsula situated halfway along the western coast of the Arabian Gulf, covering an area of 11,521 square kilometres (Figure 1.2). While the Kingdom of Saudi Arabia is the only neighbouring country by land boarder, Qatar shares marine borders with Bahrain, the United Arab Emirates and Iran (infoqat.com 2016).

Figure 1.2: Location of Qatar

Doha, the capital of Qatar, is located on the east coast, the setting of the major commercial and cultural institutions, the ministries and governmental establishments, and specialised healthcare facilities (Qatar Statistics Authority 2009a). Other major cities in Qatar are Al Wakrah, Al Khor, Dukhan, Al Shamal, Mesaieed, and Ras Lafan (Qatar Ministry of Interior 2015).

Qatar's terrain is flat, with deserts occupying the majority of land from east to central regions. Vegetation is only found in the northern sectors, where farming areas are located. The soil in the remainder of Qatar is calcareous hence cannot support agricultural processes (Crystal 2015).

The climate in Qatar is hot and humid with temperatures reaching over 40°C during summer months and humidity levels up to 70% in January, February and December (World Weather and Climate Information 2015). In winter, temperatures can fall to around 15°C; rainfall is rare, occurring mostly in September (Weather Online 2016).

1.2.2. Major sources of economic development

According to the World Bank (2016), Qatar's GDP per capita has been the highest globally for the past 10 years, reaching US$96,732.4 in 2014 (Figure 1.3).

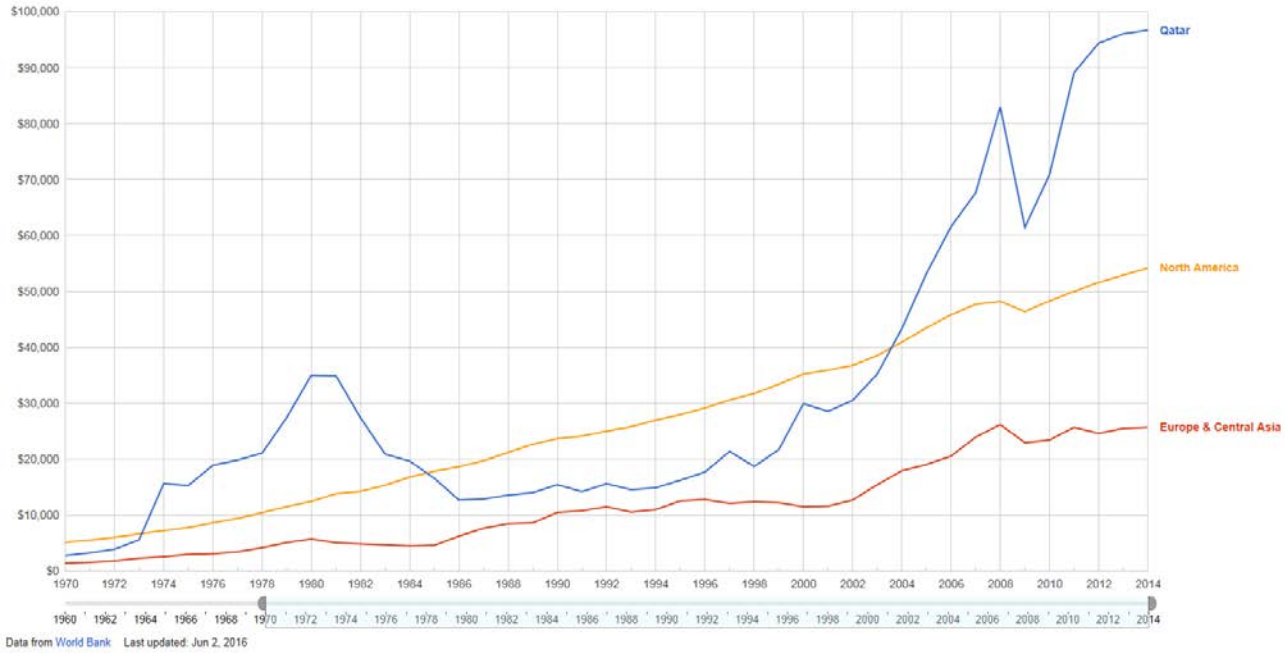


Figure 1.3: Qatar's GDP per capita compared to Europe and North America (World Bank 2016)

Oil and natural gas are the major sources of income in Qatar, with 2014 figures of an estimated 25 billion barrels of oil and 25 trillion cubic metres of natural gas reserves. Oil and natural gas account for more than 50% of the GDP, approximately 85% of export earnings and 50% of government revenues. Qatar has around a 1.5% share of the global oil reserves and 13% of global gas reserves making it the third largest globally (Index Mundi 2015).

In 2014, the expenditure on health was 2.2% of the GDP, equivalent to US$ 3071 (World Health Organization 2019).

1.2.3. Political structure

The State of Qatar is a monarchy ruled by an Emir, with power being inherited from father (the Emir) to the son (Heir Apparent). His Highness Sheikh Tamim Bin Hamad Bin Khalifa Al Thani is currently the Emir of Qatar and the Commander-in-Chief of the armed forces (Qatar Civil Aviation Authority 2013).

Executive power is entrusted to the Emir, the Heir Apparent and the Council of Ministers. Legislative authority is delegated to the Advisory Council which

is responsible for drafting and approving laws, with judicial affairs delegated to the Supreme Judicial Council (Hukoomi: Qatar e-Government 2016).

Qatar's constitution was drafted in 1999, stating that Qatar is independent, follows the instructions of Islam, uses Arabic as its first language and follows the principles of democracy where people are the source of power (Qatar Ministry of Foreign Affairs 2013).

Currently, Qatar is an active member of many regional and global organisations including:

- Organization of the Petroleum Exporting Countries (OPEC) (1961)
- Arab League (1971)
- World Intellectual Property Organization (WIPO) (1976)
- Gulf Cooperation Council (GCC) (1981)
- World Trade Organization (WTO) (1996)

1.2.4. Demographics of the population

In 2015, the population of Qatar was 2.23 million (Abdul-Hamid et al. 2015), with almost 40% residing in the capital, Doha (Ministry of Development Planning and Statistics 2015).

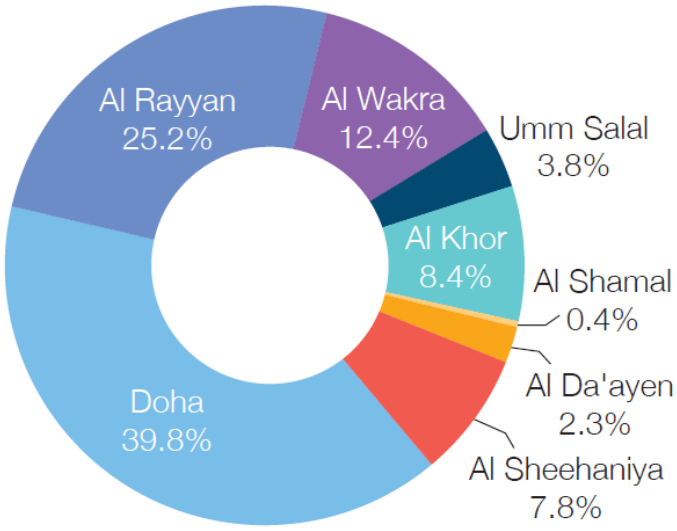


Figure 1.4: Percent of Qatar's population municipality
(Qatar Ministry of Development Planning and Statistics 2015)

Around 40% of the population (Qatari and expatriates) is Arab, 18% Indian, 18% Pakistani, 10% Iranian and 14% other ethnic groups, with the most prevalent religion in Qatar being Islam (Muslim 77.5%) followed by Christianity (8.5%) (Central Intelligence Agency 2016).

1.2.5. Qatar National Vision 2030: Healthcare focus

Over the past decade, Qatar has taken action to transform healthcare in order to achieve better patient care outcomes for current and future generations. The Qatar National Vision 2030 aims to “transform Qatar into an advanced country by 2030, capable of sustaining its own development and providing for a high standard of living for all of its people for generations to come” by “balancing the accomplishments that achieve economic growth with the human and natural resources” (Qatar General Secretariat for Development Planning and Statistics 2008). The National Vision seeks to address five main challenges:

- Modernisation while preserving traditions
- Needs of current and future generations
- Managed growth and uncontrolled expansion
- Size and quality of the expatriate labour force
- Economic growth, social development and environmental management

The Vision is based on four key pillars as illustrated in Figure 1.5 (Qatar General Secretariat for Development Planning and Statistics 2008).

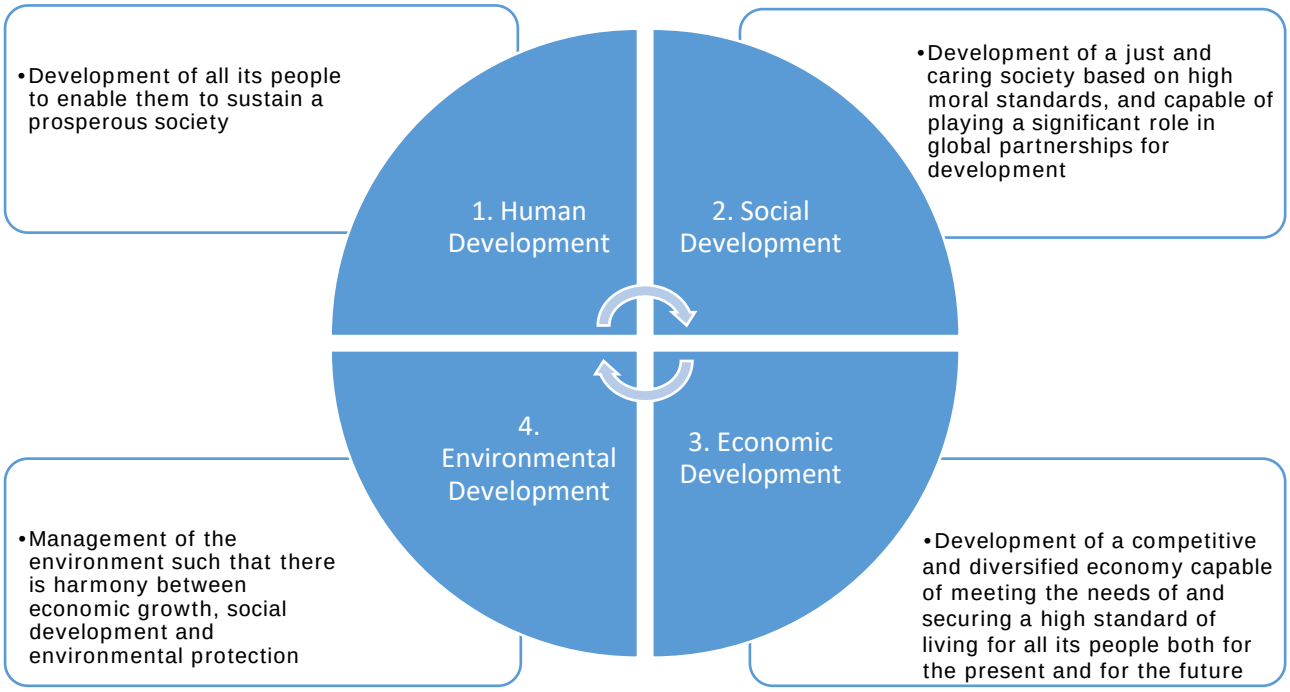


Figure 1.5: Pillars of Qatar National Vision 2030 (Qatar General Secretariat for Development Planning and Statistics 2008)

Healthcare system development is a main goal stated within the first pillar, Human Development. The strategic goals and desired outcomes related to this pillar are presented in Table 1.3. Under the second strategic goal of "A Healthy Population", the government aims to establish "a comprehensive world-class healthcare system whose services are accessible to the whole population". There is emphasis on a shift in care from secondary and tertiary care to primary care. The second outcome of this strategic goal relates to creating "an integrated system of healthcare offering high-quality services through public and private institutions operating under the direction of a national health policy that sets and monitors standards for social, economic, administrative and technical aspects of health care". Early diagnosis, effective treatment and research are the three main pillars for improving disease management. The third outcome also includes improving care through skilled and motivated workforce by encouraging continuing professional education and training as well as regulating licensing (Qatar Supreme Council of Health 2013a, Qatar National Research Fund 2014).

Table 1.3: Goals of the Human Development Pillar of the Qatar National Vision 2030 (Qatar General Secretariat for Development Planning and Statistics 2008)	
Strategic Goal	**Outcomes**
An Educated Population	-A world-class educational system that equips citizens to achieve their aspirations and to meet the needs of Qatar's society, including: • Educational curricula and training programmes responding to the current and future needs of the labour market • High quality educational and training opportunities appropriate to each individual's aspirations and abilities • Accessible educational programmes for life-long learning -A national network of formal and non-formal educational programmes that equip Qatari children and youth with the skills and motivation to contribute to society, fostering: • A solid grounding in Qatari moral and ethical values, traditions and cultural heritage • A strong sense of belonging and citizenship • Innovation and creativity • Participation in a wide variety of cultural and sports activities -Well-developed, independent, self-managing and accountable educational institutions operating under centrally-determined guidelines. -An effective system for funding scientific research shared by the public and private sectors and conducted in cooperation with specialised international organisations and leading international research centres. -A significant international role in cultural and intellectual activity and scientific research.
A Healthy Population: Physically and Mentally	-A comprehensive world-class healthcare system whose services are accessible to the whole population, including: • Effective and affordable services in accordance with the principle of partnership in bearing the costs of healthcare • Coverage of preventive and curative healthcare, both physical and mental, taking into account the differing needs of men, women and children • High quality research directed at improving the effectiveness and quality of healthcare

	-An integrated system of healthcare offering high-quality services through public and private institutions operating under the direction of a national health policy that sets and monitors standards for social, economic, administrative and technical aspects of healthcare. -A skilled national workforce capable of providing high quality health services. -Continued commitment by the State to provide sufficient funds for maintaining the health of Qatar's population in accordance with the principle of partnership in bearing the costs of healthcare.
A Capable and Motivated Workforce	-Increased and diversified participation of Qataris in the workforce through: • Broad investments in certification and training programmes by public and private institutions • Incentives for Qataris to enter professional and management roles in business, health and educational sectors • High quality training opportunities for all citizens, corresponding to their ambitions and abilities • Increased opportunities and vocational support for Qatari women -Targeted participation of expatriate labour: • Recruitment of the right mix of expatriate labour, protecting their rights, securing their safety, and retaining those who are outstanding among them

To realise the ambitions of the National Vision for a healthy population, Qatar launched its National Health Strategy in 2011, providing guidance to transform the entire healthcare system (Qatar Supreme Council of Health 2013a). In order to achieve a comprehensive world-class healthcare system, the government initiated six projects, as summarised in Table 1.4. Project 1.1 aims to establish primary care as the foundation for healthcare, while Project 1.6 aims to strengthen the role of pharmacists in supporting patients, as well as improving the quality of healthcare system by making it more accessible and less costly.

Table 1.4: Projects as described in 'A comprehensive world-class healthcare system' outcome of Qatar National Strategy (Qatar Supreme Council of Health 2013a)

Project	Targets
Establish primary care as the foundation for healthcare	-Increase the number of general practice physicians from 0.193 per 1,000 population to 0.555 per 1,000 -Ensure that the percentage of patients seen at secondary and tertiary healthcare facilities only after referral from primary healthcare facilities is no more than 50% for outpatients and 40% for inpatients
Improve the configuration of hospital services	-Prepare a national clinical services framework -Establish national centres of excellence for three of the top five priority areas
Improve continuing care design	-Increase the number of rehabilitation beds to 25 per 100,000 population -Increase the number of continuing care beds to 8.23 per 1,000 population
Improve mental health services design	-Ensure that the number of psychiatric beds is at least 12.5 per 100,000 population -Implement the approved model of care by 2016
Improve the provision of emergency and trauma services	-Ensure that the response time for emergency medical services calls from patients with potentially life threatening conditions is within 10 minutes for 75% of calls and within 15–20 minutes for 95% of calls in urban areas, and within 15 minutes for 75% of calls in rural areas -Keep the number of deaths among patients reporting to the emergency department with a diagnosis of heart attack below 77.5 per 1,000 population
Improve the efficiency of and access to community pharmacies	-Bring the number of community pharmacies to 0.17 per 1,000 population, dispensing 70% of all prescriptions

Recently, the Ministry of Public Health published an updated strategy for 2018-2022 entitled “Our Health, Our Future: Improved health for Qatar’s population, meeting the needs of existing and future generations” (Qatar Ministry of Public Health 2018). As shown in Figure 1.6, this strategy aims to change the healthcare structure from disease-centred to a more integrated patient-oriented care.

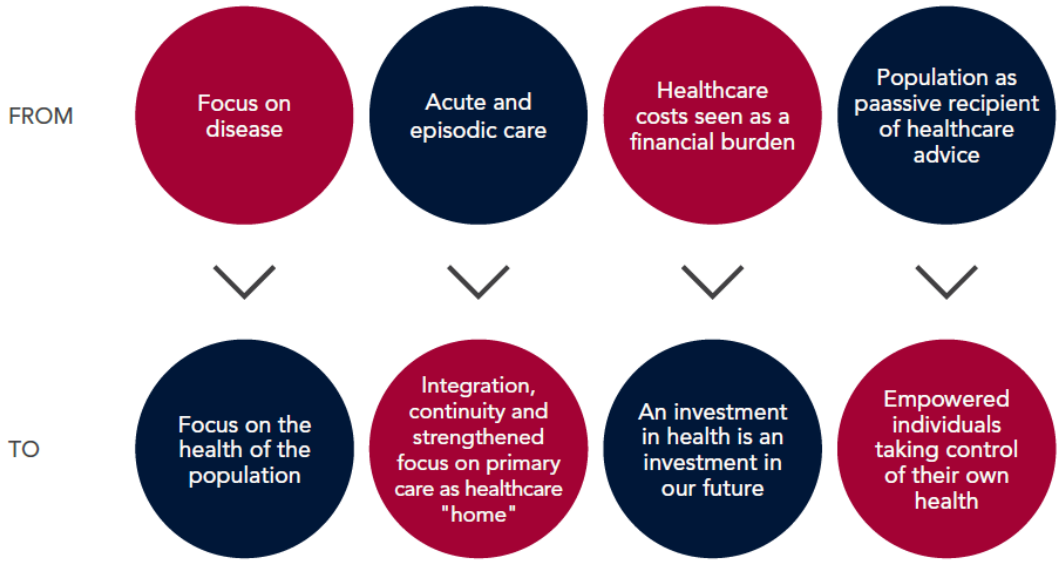


Figure 1.6: Health vision according to the 2018-2022 strategy (Qatar Ministry of Public Health 2018)

1.2.6. Qatar’s healthcare challenges and priorities

According to the recently published Qatar National Health Strategy 2018-2022, a number of medical conditions are highly prevalent, namely cardiovascular diseases, cancer, and diabetes as shown in Figure 1.7.

The Qatar National Research Strategy prioritises research in these areas in order to improve healthcare and outcomes (Qatar National Research Fund 2014).

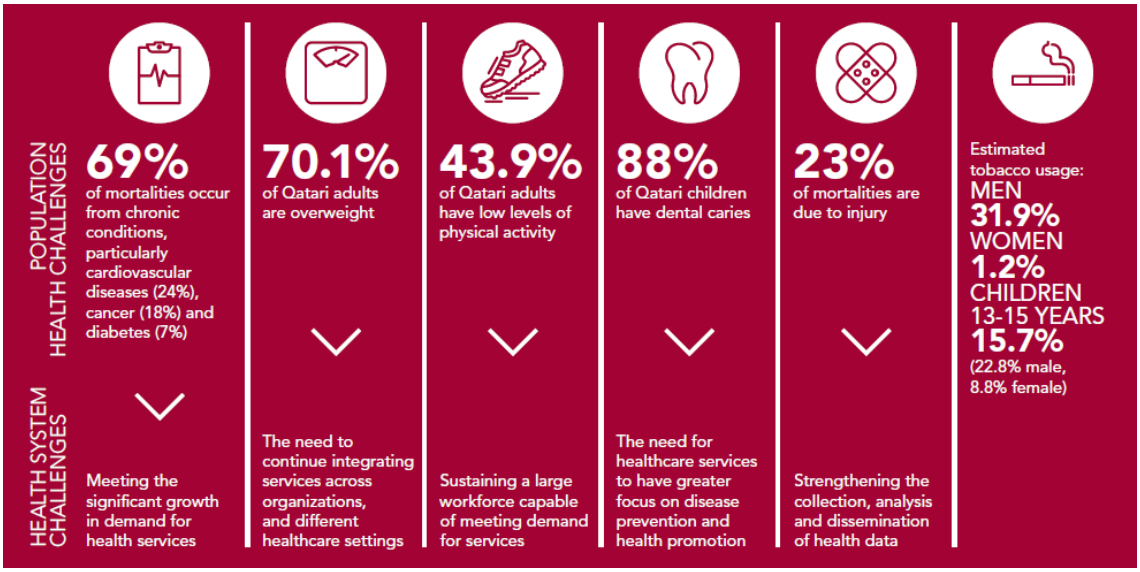


Figure 1.7: Challenges to the healthcare system (Qatar Ministry of Public Health 2018)

1.2.7. Healthcare structure

All health-related matters in Qatar are regulated by the Ministry of Public Health (MoPH), previously known as the Supreme Council of Health. MoPH is responsible for guiding reform in Qatar's healthcare system by setting a clear health vision and leading policy development. MoPH oversees the quality and effectiveness of services delivered by primary care, hospitals and other public and private health providers to ensure that standards are met and performance targets are achieved (See Figure 1.8). It also oversees public health programmes related to the control of infectious diseases and coordinates with other agencies on environmental and public safety promotion (Qatar Ministry of Public Health 2016).

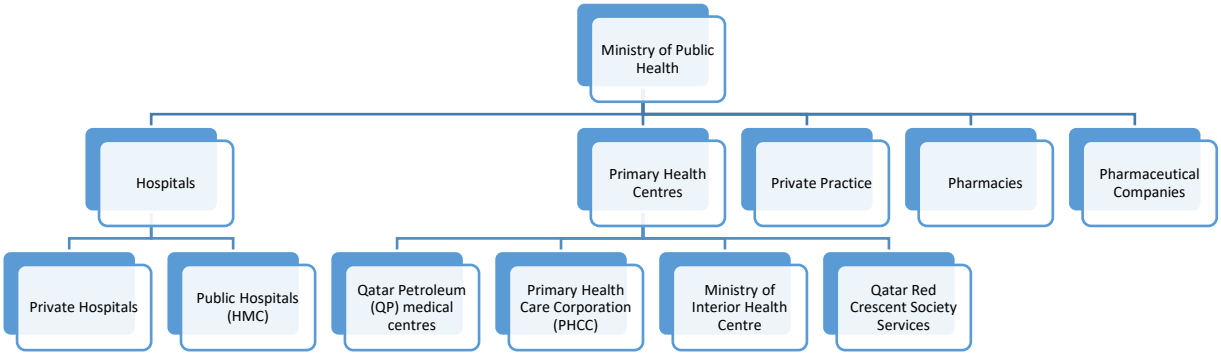


Figure 1.8: Healthcare structure in Qatar

As part of the Qatar Healthcare Facilities Master Plan 2013-2033, the Ministry has developed a model detailing the most appropriate setting in which to deliver patient care (Qatar Supreme Council of Health 2014). This model of care is designed to guarantee:

- Continuity, coordination, timeliness, accessibility and effectiveness of care
- Primary care as the foundation
- Availability of clinical information at all clinical encounters
- Patient-centred approach
- Patient experience
- Focus on prevention
- Focus on wellness
- Transparency

This model is summarised in the following Figure 1.9.

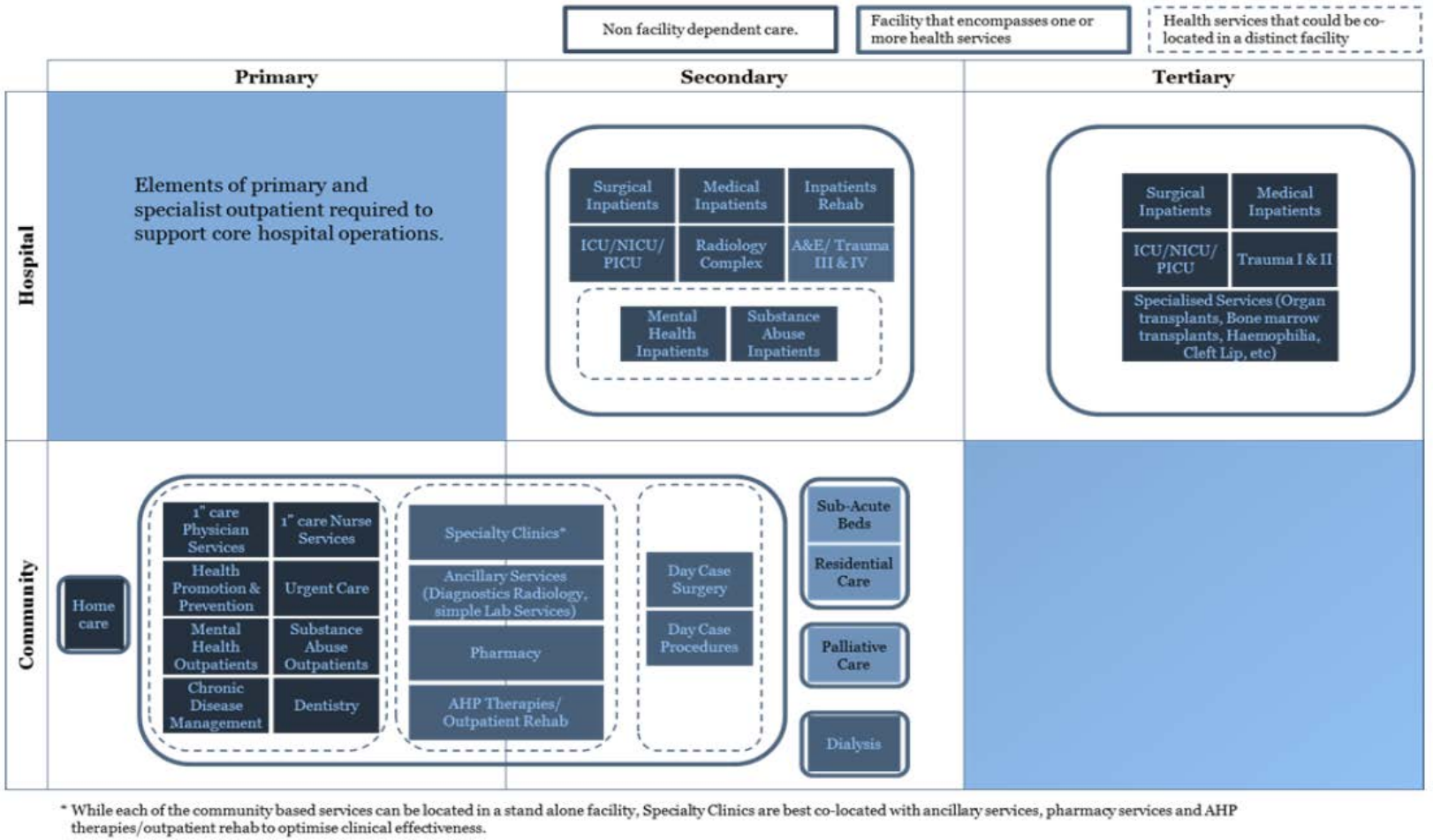


Figure 1.9: The agreed model of care in Qatar (Qatar Supreme Council of Health 2014)

*ICU: Intensive Care Unit, NICU: Neonatal Intensive Care Unit, PICU: Paediatric Intensive Care Unit, A&E: Accident & Emergency

a. Hospitals

Hospital provision, services and bed capacity currently available in Qatar are summarised in Table 1.5. Public and private hospitals in Qatar are available for all citizens and residents of the State.

As part of its efforts to make healthcare more accessible, the government opened four new specialised hospitals in 2017 which are expected to be fully operational by the end of 2018 (Hamad Medical Corporation 2018, Sidra Medicine 2018). These include:

- Ambulatory Care Centre, an innovative facility that offers patients the latest and advanced clinical and surgical practices within the same day and in a single dedicated location
- Qatar Rehabilitation Institute, the region's largest tertiary rehabilitation hospital that offers integrated rehabilitation services to patients with stroke, traumatic brain or spinal cord injury or any other event
- Sidra Medicine, a care centre that addresses the growing need for more comprehensive patient-focused medical services for women and children in Qatar
- Women Wellness and Research Centre, the largest women's tertiary hospital in the country that provides services from preconception to childbirth, post-natal care, to women's wellness and beyond the reproductive phase of life. Once fully operational, it will replace the current Women's Hospital in caring for Qatar's female population

Table 1.5: Services provided by each hospital in Qatar (Qatar Supreme Council of Health 2014)				
Hospital	**Level of Care**	**Services**		**Bed Capacity**
Public/Governmental: Hamad Medical Corporation Hospitals				
Hamad General Hospital	Tertiary	• Trauma • Emergency Medicine • Paediatrics • Critical Care • Specialised Surgery	• Specialised Medicine • Laboratory Medicine • Radiology • Accident & Emergency (A & E)	595
Rumailah Hospital	Secondary	• Adult Rehabilitation • Children's Rehabilitation • Burns and Plastics • Dental, Ear, Nose and Throat and Ophthalmic Surgery	• Geriatric Medicine • Psychiatry • Residential Care	429
Women's Hospital	Tertiary	• Obstetrics • Gynaecology • Neonatal Care	• Emergency Care • New-born Screening	322
Al Wakra Hospital	Secondary	• General Medicine • General Surgery • Obstetrics	• Gynaecology • Paediatrics • A & E	139
Heart Hospital	Tertiary	• Specialist Cardiology • Cardiothoracic services		115
Al Khor Hospital	Secondary	• General Medicine • General Surgery • Emergency Medicine	• Paediatrics and Obstetrics • A & E	118

National Centre for Cancer Care & Research	Tertiary	• General Medicine • General Surgery • Emergency Medicine	• Paediatrics • Obstetrics	62
Cuban Hospital	Secondary	• General Medicine • General Surgery • Emergency Medicine	• Paediatrics • Obstetrics	80
Communicable Disease Centre	Tertiary	• Infectious conditions (caused by bacteria, viruses and other microbes) • Travel clinic		65
Semi-public				
Aspetar	Tertiary	• Family Medicine/ General Medicine • General Surgery	• Orthopaedics • Internal Medicine	50 (currently 25 available)
Private				
Al Ahli Hospital	Secondary	• Primary Care Family Medicine/ GP clinic • Cardiology • Cardiovascular and Thoracic Surgery • Dermatology • Endocrinology • Ear, Nose and Throat (ENT) • Family Medicine/ General Medicine • Gastroenterology • General Surgery	• Orthopaedics • Psychiatry • Pulmonology (respiratory medicine) • Rheumatology • Urology • Physical medicine and rehabilitation • Dentistry • General Paediatrics • Obstetrics and Gynaecology • Paediatric Subspecialties • Speech and language therapy	250

		• Haematology • Internal Medicine • Neurology • Ophthalmology	• A & E	
Al Emadi Hospital	Secondary	• Dentistry • General Paediatrics • Cardiology • Obstetrics and Gynaecology • Plastic Surgery • Dermatology • Endocrinology • ENT • Family Medicine/ General Medicine • General Surgery	• Infectious Diseases • Internal Medicine • Neurology • Ophthalmology • Orthopaedics • Pain clinic • Pulmonology (respiratory medicine) • Rheumatology • Urology • A & E	64
American Hospital	Secondary	• Dentistry • General Paediatrics • Obstetrics and Gynaecology • ENT	• Family Medicine/ General Medicine • General Surgery • Internal Medicine • Urology	20

Doha Clinic Hospital	Secondary	• Primary Care Family Medicine/ GP clinic • Cardiology • Cardiovascular and Thoracic Surgery • Dermatology • Endocrinology • ENT • Family Medicine/ General Medicine • General Surgery • Internal Medicine • Neurology • Ophthalmology • Orthopaedics	• Pain clinic • Well baby clinic • Psychiatry • Rheumatology • Urology • Physical medicine and rehabilitation • Dentistry • General Paediatrics • Obstetrics and Gynaecology • Paediatric Subspecialties • Plastic Surgery • A & E	51

b. Primary Healthcare Centres

Qatar has several public and private primary healthcare centres. All governmental (public) centres provide services for all citizens and residents. Private sector centres, such as Qatar Petroleum, provide services to their own employees (Qatar Petroleum 2015, Primary Health Care Corporation 2018b).

Table 1.6: Services provided by all primary healthcare settings in Qatar (Qatar Supreme Council of Health 2014, Qatar Petroleum 2015, Primary Health Care Corporation 2017)		
Provider	**Services**	
Primary Health Care Centres (PHCC): 23 centres currently operational with 4 more expected to open within the next year	Depending on branch: • Disease management • Dental clinic • Ultrasound • Diabetic clinic • Radiology • Paediatric care • Smoking cessation • Weight management • Trauma	• Pharmacy • Laboratory services • Ophthalmology • Physiology • Dermatology • Premarital clinic • Psychiatry • Cardiology • Dialysis
Ministry of Interior Medical Clinic: 1 main centre and 6 outpatient clinics	• Dermatology • Endocrinology • Ear, Nose and Throat (ENT) • Family Medicine/ General Medicine • General Surgery • Dentistry • General Paediatrics • Obstetrics and Gynaecology • Haematology	• Internal Medicine • Ophthalmology • Orthopaedics • Psychiatry • Rheumatology • Urology • Physical medicine and rehabilitation • Urgent Care
Qatar Petroleum (QP) Clinics: 6 clinics	• Family Medicine/ General Medicine • Dentistry • General Paediatrics • ENT	• Gynaecology/Antenatal • Dermatology • Infectious Diseases • Psychiatry

Qatar Red Crescent Society Services: 4 clinics	• Family Medicine/ GP clinic • Ophthalmology	• Dentistry • Urgent Care
Private Clinics: 253 clinics either part of a private hospital or separate practice	• Family Medicine/ General Medicine • Cardiology • Dermatology • Internal Medicine • Orthopaedics • Paediatrics	• Urology • Obstetrics and Gynaecology • Dentistry • Physiotherapy • Ophthalmology • Diagnostics

c. Pharmacies

According to data published in 2014, there are over 250 community pharmacies in addition to hospital pharmacies (Qatar Supreme Council of Health 2014), distributed geographically as follows:

- Doha: 162 pharmacies
- Al Rayyan: 64 pharmacies
- Al Wakra: 11 pharmacies
- Al Khor: 8 pharmacies
- Umm Slal: 6 pharmacies

The scope of practise of pharmacists in the country largely depends on their setting, as outlined in Table 1.7. Note that practise may have advanced since publication of this paper.

Table 1.7: Services provided by pharmacists in Qatar (Kheir and Fahey 2011)

Hospital Pharmacist		**Community Pharmacist**
Clinical Pharmacist	**Inpatient/ Outpatient Pharmacist**	
• Attending rounds • Reviewing cases • Recommending medicines • Monitoring treatment • Counselling • Providing drug information	• Compounding • Dispensing • Counselling • Promoting healthy lifestyle • Offering preventative care • Providing drug information	• Prescribing over the counter medicines • Compounding • Dispensing • Counselling • Promoting healthy lifestyle • Offering preventative care • Providing drug information

1.2.8. Pharmacy practice in Qatar

In 2013, the number of pharmacists registered in Qatar was 1023 in the public and 991 in the private sectors giving an estimated 1.01 pharmacists per 1000 population (Qatar Ministry of Development Planning and Statistics 2013, Qatar Supreme Council of Health 2013b).

The Qatar Council for Healthcare Practitioners (QCHP) was established in 2013 to regulate all healthcare practitioners, including pharmacists, working in the State (registration and licensing) and to accredit governmental and private healthcare sectors (Qatar Council for Healthcare Practitioners 2016). A cross-sectional study, published in 2011, reported that 84% of respondent pharmacists had graduated more than five years previously, 86% held a baccalaureate degree in pharmacy as their highest qualification and was obtained mainly from one of five countries; Egypt, Jordan, India, Sudan, or Pakistan. Just under half (45%) were practising in hospitals and one third (33%) in community (El Hajj et al. 2011). As noted earlier, these data may no longer represent the current status.

A commentary published in 2011 by Kheir and Fahey reported that the pharmacists' role in Qatar had evolved over the past years. Practise had evolved from one mainly concerned with drug preparation and dispensing to being centred on patient care including counselling and treatment decisions.

In the same year, a cross-sectional study was conducted in Hamad Medical Corporation to identify physicians' perceptions and expectations of pharmacists. The majority of physicians surveyed (89%) expected the pharmacist to educate patients about safe and appropriate use of drugs, while 57% expected the pharmacist to be available for healthcare team consultation during bedside rounds (Zaidan et al. 2011).

These first two sections of the introduction have provided information on the key healthcare challenges and priorities in Qatar, described the healthcare structures, and the position of pharmacy within those structures. The National Vision 2030 and the National Health Strategy highlight an ambitious plan of development. Hence, there is real potential to extend further the clinical role of pharmacists in Qatar to include prescribing. The next introductory section describes the developments in pharmacist prescribing globally, with particular emphasis on the UK. Many of the models and processes around pharmacist prescribing, training, and governance could be relevant to Qatar and are the subject of the doctoral research.

1.3. Pharmacist prescribing

1.3.1. Background

The roles and responsibilities of all health professionals have undergone tremendous transformation in recent years. One key development has been the implementation of prescribing by non-medical health professionals, including pharmacists, across many countries including the United Kingdom (UK), United States of America (USA), Canada, and New Zealand. It is believed that, due to their extensive knowledge and skills, pharmacists involved in prescribing will impact positively on patient care by reducing prescribing errors, improving adherence to guidelines, reducing waiting time for the public, thus providing higher quality patient-centred care (Tonna et al. 2007, Rosenthal et al. 2015).

There are varying models of pharmacist prescribing (PP) globally in terms of legal restrictions and regulations. Depending on the level of pharmacist responsibility, there are three different levels of prescribing: independent prescribing (IP); supplementary prescribing (SP); and collaborative prescribing (CP) (Dawoud et al. 2011). Details of the models of pharmacist prescribing which have been implemented in the UK, USA, Canada and New Zealand are given in Table 1.8, highlighting the diverse scope of prescribing rights.

Table 1.8: Summary of the different models of pharmacist prescribing practise globally		
Country	**Models of Prescribing Available**	**Definition**
United Kingdom (UK)	Supplementary Prescribing (SP)	The UK Department of Health defines SP as "A voluntary partnership between an independent prescriber (e.g. doctor or dentist) and a supplementary prescriber to implement an agreed patient-specific clinical management plan (CMP) with the patient's agreement" (2003). Likewise, the Health & Care Professions Council states that "A supplementary prescriber is able to prescribe medicines in accordance with a clinical management plan (CMP) for a specific patient. The CMP is agreed between the supplementary prescriber, a doctor and the patient" (2016).
	Independent Prescribing (IP)	The UK Department of Health defines independent prescribing as "prescribing by a practitioner (e.g. doctor, dentist, nurse, pharmacist) responsible and accountable for the assessment of patients with undiagnosed or diagnosed conditions and for decisions about the clinical management required, including prescribing" (UK Department of Health 2006). Another definition defines "an independent prescriber is someone who is able to prescribe medicines on their own initiative from the British National Formulary (BNF). Independent prescribers include doctors and dentists, as well as some non-medical health professionals" (Health & Care Professions Council 2016). Qualifying as an independent prescriber permits practise as a supplementary prescriber.
United States of America (USA)	Collaborative Drug Therapy Management (CDTM)	Defined by the American College of Clinical Pharmacy as "a collaborative practice agreement between one or more physicians and pharmacists wherein qualified pharmacists working within the context of a defined protocol are permitted to assume professional responsibility for performing patient assessments; ordering drug therapy-related laboratory tests; administering drugs; and selecting, initiating, monitoring, continuing, and adjusting drug regimens" (Hammond et al. 2003, Centers for Disease Control and Prevention 2013). According to the Centers for Disease Control, in 2012, majority of states allow CDTM for health conditions as specified in a written provider protocol in any setting (Alaska, Arizona, Arkansas,

		California, Colorado, Connecticut, District of Columbia, Florida, Georgia, Hawaii, Idaho, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Virginia, Washington, Wyoming), some limit it to certain health settings (New Hampshire, New York, Nevada, North Dakota, Texas, West Virginia) while others authorise extremely limited collaborative practice for pharmacists under protocol such as immunisations and emergency contraception regardless of setting (Delaware, Illinois, Kansas, Maine, Wisconsin) (Centers for Disease Control and Prevention 2013).
Canada	According to Canadian Pharmacists Association (2016), the types and scope of practice of prescribing is variable according to province	Legislations in Canada now allow pharmacists to prescribe within their area of competence and with sufficient clinical knowledge of the patient. The prescribing practice differ from one province to another. Pharmacists with additional training are able to prescribe any schedule 1 drug (except drugs under the Controlled Drugs and Substances Act) or alter another prescriber's original prescription independently only in Alberta and under a collaborative agreement in Alberta, Saskatchewan, Manitoba, New Brunswick and Nova Scotia. Moreover, they can change a drug's dosage, formulation or regimen across the country, except in Northwest Territories, Yukon and Nunavut. Furthermore, in Alberta, Manitoba, Quebec and Nova Scotia, pharmacist are allowed to order and interpret laboratory tests (Canadian Pharmacists Association 2016).
New Zealand	Pharmacist Prescriber (Collaborative Prescribing)	According to Pharmacy Council of New Zealand (2010), "pharmacist prescribers work in a collaborative health team environment with other healthcare professionals and are not the primary diagnostician. They can write a prescription for a patient in their care to initiate or modify therapy (including discontinuation or maintenance of therapy originally initiated by another prescriber). They can also provide a wide range of assessment and treatment interventions which includes, but is not limited to: • Ordering and interpreting investigation (including laboratory and related tests) • Assessing and monitoring a patient's response to therapy • Providing education and advice to a patient on their medicine therapy"

1.3.2. Pharmacist prescribing: the UK model

Pharmacist prescribing in the UK is described within a framework of non-medical prescribing, which was first proposed in 1986 by the Cumberlege Report and later by two Crown Reports, published in 1998 and 1999, which recommended extending prescribing privileges to other health professions. Key driving forces were: the expanding clinical skills of many non-medical professions; the increased prevalence of multi-disciplinary team working; and changing patient expectations of seamless and safe care. The second Crown review (Review of Prescribing, Supply and Administration of Medicines) recommended prescribing rights should normally be limited to medicines in specific therapeutic areas related to the competence and expertise of the professional. The need for sharing of clinical information between prescribers was also highlighted. This review culminated in legislative changes enabling the implementation of supplementary prescribing (SP) in 2003 and independent prescribing (IP) in 2006 (Department of Health And Social Security 1986, Crown 1999, Cope, Abuzour and Tully 2016). Figure 1.10 illustrates key developments in non-medical prescribing.

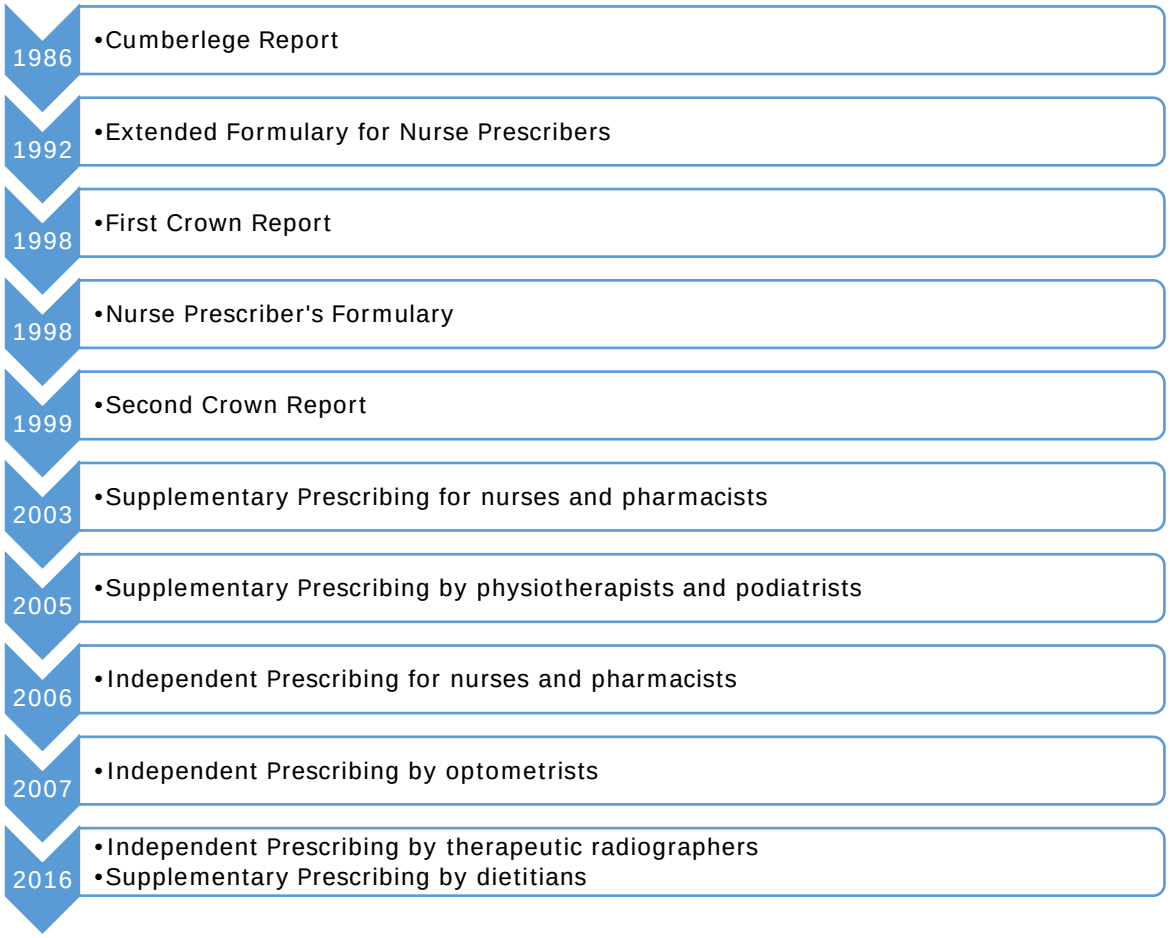


Figure 1.10: History of the development of non-medical prescribing in the UK (Cope, Abuzour and Tully 2016)

According to the UK Department of Health (2006), the aims of implementing non-medical prescribing are to:

- Improve patient care without compromising patient safety
- Make it easier for patients to get the medicines they need
- Increase patient choice in accessing medicines
- Make better use of the skills of health professionals
- Contribute to the introduction of more flexible team working across the National Health Service (NHS)

a. Models of non-medical prescribing in the UK

There are two models of non-medical prescribing; supplementary and independent. Both models require completion of an accredited supplementary or independent prescribing programme and that non-medical prescribers must practise within their competence. As of September 2016, there were approximately 383 supplementary and 3102 independent pharmacist prescribers registered in the UK (General Pharmaceutical Council, personal communication, 20 September 2016). Key similarities and differences between the two models of prescribing in the UK are presented in Table 1.9. While a range of health professionals can now train and register as non-medical prescribers, this doctoral research focuses solely on pharmacists.

Table 1.9: Differences between non-medical prescribing practices in the UK (Adapted from Stewart, MacLure and George 2012, Royal Pharmaceutical Society 2016)

	Supplementary Prescribing	**Independent Prescribing**
All eligible health professionals	Nurses, pharmacists, optometrists, physiotherapists, podiatrists, radiographers and dieticians	Nurses, pharmacists, optometrists, physiotherapists, therapeutic radiographers or podiatrists
Clinical conditions managed	Any, within their clinical competence	Any, within their clinical competence
Diagnosis responsibilities	A doctor (or dentist) must diagnose the condition before prescribing can commence	The independent prescriber can assess and manage patients with diagnosed or undiagnosed conditions
Need for Clinical Management Plan (CMP)	A written or electronic patient-specific CMP must be in place and be agreed with the doctor (or dentist) and patient before prescribing can commence	No need for a CMP
Drugs prescribed	Any, within their clinical competence	Any licensed medicines within their clinical competence. Nurse and pharmacist independent prescribers in particular can also prescribe unlicensed medicines and controlled drugs

b. Pharmacist prescribing training programmes

Pharmacist prescribing training programmes in the UK must be delivered by a higher education institution and accredited by a professional regulatory body (General Pharmaceutical Council 2018).

According to the General Pharmaceutical Council (2018), the training programme to gain prescribing authority typically compromises two components. The first is the educational component where participants must attend classes as well as use self-directed study for 26 days delivered over a period of between three and six months. The main learning outcomes of this component of the course are summarised in Table 1.10. Assessment methods are varied and may include examinations, written submissions and objective structured clinical examinations (OSCEs).

Table 1.10: Learning outcomes of prescribing course in the UK (Stewart, MacLure and George 2012, General Pharmaceutical Council 2018)

Context/ Topic	Content
Consultation, decision making, assessment and review	History taking, compliance, differential diagnosis, referral, decision making, monitoring and pharmacovigilance
Influences on and psychology of prescribing	Patients' needs and demands, local and national influences, personal attitudes
Prescribing in a team context	Understanding other team members, communication skills, conflict management and budget considerations
Applied therapeutics	Pathophysiology, pharmacokinetics and pharmacodynamics, selection and optimisation of drug regimens and adverse drug reactions
Evidence-based practice and clinical governance	Evidence-based practice, critical appraisal, clinical governance policies and procedures, risk management and clinical audit
Legal, policy, professional and ethical aspects	Professional competence, accountability and responsibility, statutory prescribing frameworks, ethics and continuing professional development
Prescribing in the public health context	Patient access to healthcare and medicines, public health policies and inappropriate use of medicines

The second component of the training programme is a 'period of learning in practice' of a minimum of 12 days under the supervision and support of a designated medical practitioner (DMP). This period aims to develop and assess competence in the specific therapeutic area in which they will prescribe (Stewart, MacLure and George 2012, General Pharmaceutical Council 2018).

c. Eligibility criteria for training programme

In order to be eligible to undertake the prescribing training programme, pharmacists must:

- Be registered with the corresponding regulatory body (such as the General Pharmaceutical Council (GPhC) or the Pharmaceutical Society of Northern Ireland (PSNI) for pharmacists)
- Have at least two years' appropriate patient-orientated experience in a UK hospital, community or primary care setting following their pre-registration year
- Have identified an area of clinical practice in which to develop their prescribing skills and have up-to-date clinical, pharmacological and pharmaceutical knowledge relevant to their intended area of prescribing practice
- Demonstrate how they reflect on their own performance and take responsibility for their own continuing professional development (CPD)
- Have a DMP with training and experience appropriate to their role and have agreed to provide supervision, support and shadowing opportunities, and be familiar with GPhC requirements and learning outcomes for the programme

1.3.3. UK prescribers' competency framework

After the introduction of non-medical prescribing in the UK, an updated single competency framework was designed to support all prescribers (medical and non-medical). The framework sets out the skills and characteristics prescribers should possess in order to ensure effective performance (Royal Pharmaceutical Society 2016).

The competencies of prescribers are grouped into two domains; the consultation and the prescribing governance as shown in Figure 1.11.

Figure 1.11: Competency framework for all UK prescribers (Royal Pharmaceutical Society 2016)

The specific competencies of each domain are presented in Table 1.11.

Table 1.11: The prescribing competency framework's domains (Royal Pharmaceutical Society 2016)

Domains	Competencies
The consultation	**1.** Assess the patient
	2. Consider the options
	3. Reach a shared decision
	4. Prescribe
	5. Provide information
	6. Monitor and review
Prescribing governance	**7.** Prescribe safely
	8. Prescribe professionally
	9. Improve prescribing practice
	10. Prescribe as part of a team

Furthermore, in 2010, the British Pharmacological Society published 'Principles of Good Prescribing' for all prescribers (Table 1.12).

Table 1.12: Principles of good prescribing (British Pharmacological Society 2010)

- Be clear about the reasons for prescribing
- Take into account the patient's medication history before prescribing
- Take into account other factors that might alter the benefits and risks of treatment
- Take into account the patient's ideas, concerns and expectations
- Select effective, safe and cost-effective medicines individualised for the patient
- Adhere to national guidelines and local formularies were appropriate
- Write unambiguous legal prescriptions using the correct documentation
- Monitor the beneficial and adverse effects of medicines
- Communicate and document prescribing decisions and the reasons for them
- Prescribe within the limitations of your knowledge, skills and experience

Given the increasing workloads placed on physicians in Qatar, pharmacists are well positioned to take on a greater role in the management of diseases, health promotion and disease prevention. As such, regulated prescribing authority can be an important step in the evolution of pharmacy practice in the State in order to help achieve a more patient-centred model that is likely to generate additional value for the healthcare system in Qatar.

1.4. Aims and objectives of this doctoral research

The overall aim of the doctoral research was to explore the development of frameworks of pharmacist prescribing in Qatar. Table 1.13 describes each phase of the research in terms of the research designs and the associated aims and objectives.

Table 1.13: Design, aim and objectives of each phase of this doctoral project		
Phase / Design	**Aim**	**Objectives**
1. Umbrella review	Critically appraise, synthesise and present the evidence on aspects of non-medical prescribing	• To explore all aspects of non-medical prescribing, including, but not limited to: o Models and definitions of NMP: The legal frameworks that regulates NMP and allow allied healthcare professionals to practice prescribing o Outcomes and benefits of implementing NMP o Perceptions and satisfaction of different health stakeholders (such as public, patients, health professionals and decision makers) regarding NMP o Facilitators and barriers to implementing NMP
2. Systematic review	Systematically review the available evidence on the views and experiences of stakeholders pre- and post-implementation of pharmacist prescribing globally	• To determine the views of stakeholders (e.g. patients, the general public, health professionals, policy makers, educators etc.) on pharmacist prescribing, irrespective of implementation status • To explore the reported experiences of stakeholders in countries that have already implemented pharmacist prescribing • To report the potential barriers and facilitators of implementing pharmacist prescribing
3. Qualitative Study (face-to-face semi-structured interviews)	Determine key health stakeholders' (patients, physicians, nurses, pharmacists, hospital administrators, regulatory bodies' representatives) expectations, attitudes and beliefs around implementing pharmacist prescribing in Qatar	• To explore stakeholders' awareness, experiences and views of prescribing by non-medical health professionals • To determine stakeholders' views and perceptions of clinical roles of pharmacists in Qatar • To investigate stakeholders' views and perceptions of expanding the remit of pharmacists in Qatar to include prescribing

		• To examine stakeholders' views and perceptions of facilitators, barriers and solutions to the development and implementation of pharmacist prescribing in Qatar
4. Quantitative Study (Delphi)	Develop a pharmacist prescribing framework tailored to Qatar's setting	• To develop and validate a series of statements in relation to the framework of pharmacist prescribing • To determine the levels of agreement of key stakeholders around these statements • To determine any additional statements derived from the expert panel members' feedback • To determine any reasons for not achieving consensus

Chapter 2:

Methodology

2. Introduction to the chapter

This chapter describes the theoretical basis for the doctoral research, aligned to the Medical Research Council Framework for Developing and Evaluating Complex Interventions. Justification is provided for the selection of research paradigms, methodologies, key methodological approaches, and the use of the Consolidated Framework for Implementation Research (CFIR).

2.1. The Medical Research Council Framework for Developing and Evaluating Complex Interventions

2.1.1. Introduction

The Medical Research Council (MRC) is a non-departmental public body funded by the UK government, which aims to improve human health through world-class medical research (MRC 2016).

In 2000, the MRC published the first version of the Framework for Developing and Evaluating Complex Interventions, which was revised in 2008. The Framework intends to help: "researchers choose and implement appropriate methods, given the state of existing knowledge and the nature of their target intervention"; "research funders to understand the constraints on evaluation design and recognise appropriate methodological choices"; and "policy makers, practitioners and other commissioners and users of evaluation to weigh up the available evidence in the light of these methodological and practical constraints, and to consider carefully how their own decisions affect the quality of the evidence that evaluation of complex interventions can provide" (Craig et al. 2008).

Interventions of interest in this framework, according to Craig et al. (2008), must have some dimensions of complexity, which include:

- Number of and interactions between components within the experimental and control interventions
- Number and difficulty of behaviours required by those delivering or receiving the intervention
- Number of groups or organisational levels targeted by the intervention
- Number and variability of outcomes

- Degree of flexibility or tailoring of the intervention permitted

There are several reasons for considering the development and implementation of pharmacist prescribing in Qatar as a complex intervention; hence, providing justification for employing the MRC framework in this doctoral research. First, this expanded role for pharmacists can cause significant disruption to the already complex healthcare system in the State. Moreover, its implementation will require several policy changes which is often a laborious process. In addition, due to its novelty in the 'Arab World', it is also difficult to determine its most appropriate design and delivery as well as its expected outcomes on Qatar's population.

2.1.2. The MRC cycle

The MRC framework comprises the following key elements:

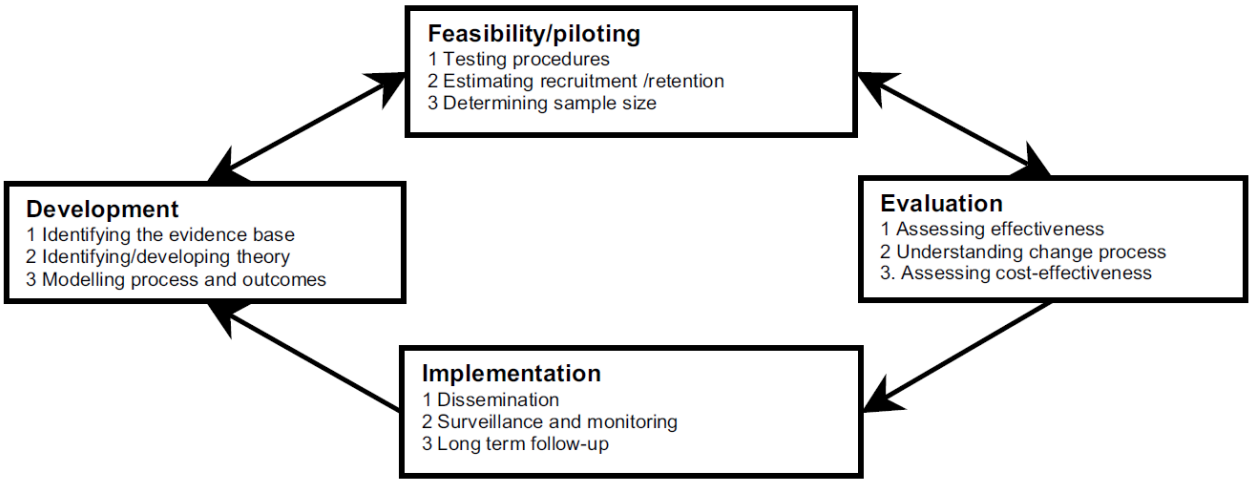


Figure 2.1: The development-evaluation-implementation process

a. Development

Sufficient emphasis should be placed on the stage of developing the intervention prior to any further testing. Development includes:

- Identifying the evidence base. Researchers must first identify existing literature (ideally through a systematic review) related to the topic researched.

- Identifying/developing appropriate theory. Developing a theoretical understanding of the likely process of change, by drawing on existing evidence and theory, supplemented if necessary by new primary research (e.g. interviews with stakeholders) is more likely to result in an effective intervention.
- Modelling process and outcomes. Modelling the intervention on a small scale can aid optimising the final design.

b. Assessing feasibility and piloting methods

The aim of this stage of the MRC framework is to test the intervention in order to determine acceptability, compliance, delivery and effect size. This can address the main uncertainties that were identified in the development phase. Depending on the results, a series of studies may be required to progressively refine the design, prior to full-scale evaluation.

c. Evaluation

Including a process evaluation is important to explain discrepancies between expected and observed outcomes, to understand how context influences outcomes, and to provide insights to aid implementation. Moreover, it is also essential to report a detailed account of the intervention and evaluation to enable replication or wider scale implementation.

d. Implementation

Implementation relates to three main elements: dissemination, monitoring, and long-term outcomes. Strategies to encourage implementation should be based on a scientific understanding of the behaviours that need to change, relevant decision-making processes, and the barriers and facilitators of change. Once translated to routine practice, monitoring is essential in order to detect adverse events or long-term outcomes that could not be observed directly in the original evaluation, or to assess whether the effects observed in the study are replicated in routine practice.

As described in Chapter 1, the aim of this doctoral research project is to explore the development of frameworks of pharmacist prescribing in Qatar. The research will therefore focus on the development phase of the MRC framework:

- Identifying the evidence base: In order to ensure the successful implementation of pharmacist prescribing in Qatar, the first two phases of the current project were to review the literature in order to identify the existing evidence base around non-medical prescribing in general and on views and experiences around pharmacist prescribing. This helped identify key facilitators and barriers to implementation that must be taken into consideration while designing this project.
- Identifying/developing appropriate theory: The subsequent phase was to then investigate key health stakeholders' views on this expanded role in Qatar in order to explore the feasibility and acceptability of implementation in the State. Additionally, this project also involved the use of a theoretical framework that will be later described in detail in order to investigate facilitators and barriers to pharmacist prescribing.
- Modelling process and outcomes: The last phase of this project was to determine the pharmacist prescribing framework best suited for Qatar healthcare system by exploring the most appropriate model for its implementation in the State.

2.2. Literature review (Phase 1 and 2)

2.2.1. Introduction

According to the first element of the MRC framework, it is important to review the existing literature to appraise the current knowledge base. Two separate reviews were conducted for this doctoral research. The first was an umbrella review of systematic reviews exploring any aspects of non-medical prescribing (NMP). This review aimed to summarise what was published and also helped identify the need for the second review, a systematic review of stakeholders' views and experiences of pharmacist prescribing. The findings of both reviews informed the later phases of the doctoral research.

A literature review has been described as an analysis of the available research outputs on a specific topic to either determine current evidence or provide justification for future research (Cronin, Ryan and Coughian 2008). According to Booth, Papaioannou and Sutton (2012), conducting a literature review can:

- Summarise the available information on a topic
- Place a body of work in context of available knowledge
- Identify new approaches to interpret or identify gaps in the literature
- Identify and resolve any conflicts in previous publications
- Avoid duplication in work by collating previous efforts

2.2.2. Categories of literature review

While the term 'literature review' is widely used, there are many classifications of review, the most common of which are described in Table 2.1.

Table 2.1: Categories of literature review (Grant and Booth 2009)

	Aim	Benefits	Limitations
Literature Review	Generic term: published materials that provide examination of recent or current literature. Can cover wide range of subjects at various levels of completeness and comprehensiveness. May include research findings.	-Can identify what has been accomplished previously. -Allows for consolidation, for building on previous work, for summation, for avoiding duplication and for identifying omissions or gaps.	-Lacks an explicit intent to maximise scope or analyse data collected. -Susceptible to bias.
Mapping Review/ Systematic Map	Maps out and categorises existing literature from which to commission further reviews and/or primary research by identifying gaps in research literature.	-Enables the contextualisation of in-depth systematic literature reviews. -Identifies gaps in the evidence base. -Characterises studies in other ways such as according to theoretical perspective. -Shows whether the total population of studies is sufficiently similar for a coherent synthesis.	-Characterises studies at a broad descriptive level. -Does not usually include a quality assessment process. -Characterises studies only based on study design.

Meta-analysis	Technique that statistically combines the results of quantitative studies to provide a more precise effect of the results.	-Assimilates individual studies, not in themselves enough to impact practice into a composite evidence base. -Time efficient for decision makers.	-Cannot be better than its included studies allow.
Overview	Generic term: summary of the literature that attempts to examine the literature and describe its characteristics.	-Provides a broad and often comprehensive summation of a topic area.	-Can have different degrees of rigour, robustness and quality.
Scoping Review	Preliminary assessment of potential size and scope of available research literature. Aims to identify nature and extent of research evidence (usually including ongoing research).	-Can inform decision on whether a full systematic review is needed. -Attempts to be systematic, transparent and replicable.	-Susceptible to bias due to limitations in rigour. -Does not include a process of quality assessment. -Findings cannot be used to recommend policy/practice changes.
Systematic Review	Seeks to search systematically for, appraise and synthesise research evidence, often adhering to guidelines on the conduct of a review.	-Draws together all known knowledge on a topic area. -Subjecting the resultant literature to critical review.	-Restricting studies for inclusion to a single study design can limit the application of this methodology.
Umbrella review	Specifically refers to compiling evidence from multiple reviews into one accessible and usable document. Focuses on broad condition or problem for which there are competing interventions and highlights reviews that address these interventions and their results.	-Allows the reader a quick overview (and an exhaustive list) of reviews relevant to the topic.	-Not suitable for many areas of library and information practice.

2.2.3. Review types selected for this doctoral research

Two literature reviews were conducted as part of this doctoral research, an umbrella review of systematic reviews and a targeted systematic review. Systematic reviews can generate the highest level of evidence, as highlighted in Figure 2.2. It should, however, be noted that this figure refers to systematic reviews of quantitative studies employing randomised controlled methodologies.

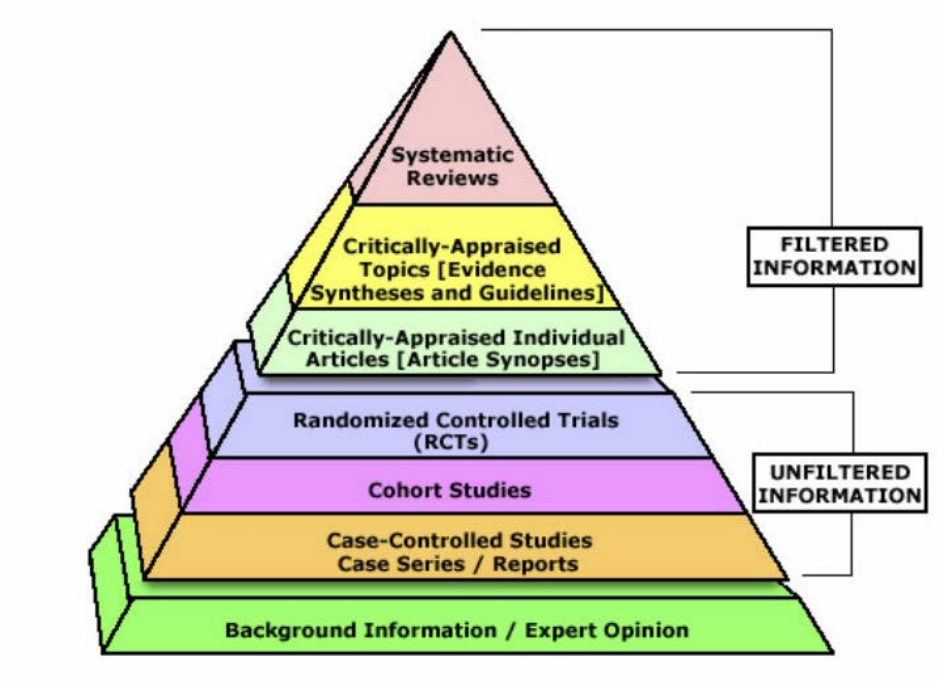


Figure 2.2: Hierarchy of evidence in the context of evidence-based medicine (Glover et al. 2006)

The methods, results and conclusions from these reviews are described in detail in Chapters 3 (umbrella review) and Chapter 4 (systematic review).

2.3. Quantitative and qualitative approaches

2.3.1. Introduction

The two main classifications of research approaches are qualitative and quantitative. Green and Thorogood (2009) state that these approaches cannot be characterised by the type of data collected (language vs numerical data), sample size (small or large) or by the data collection method used since these can be shared between the different approaches. They argue, however, that the most basic way to define and characterise these is through consideration of the research aims and questions. Qualitative researchers seek answers related to the 'what', 'how' or 'why', while quantitative researchers focus on the 'how many' or 'how much'. Onwuegbuzie and Frels (2016) similarly state that quantitative studies primarily involve numerical data with goals that include describing, explaining and predicting, while qualitative studies primarily involve non-numerical data generated from

documents, talk, observations and drawings/photographs/videos. Increasingly, mixed methodological approaches (quantitative and qualitative used sequentially or concurrently) are being employed.

A comparison of quantitative and qualitative approaches is given in Table 2.2.

Table 2.2: Difference between quantitative and qualitative methods (Polgar and Thomas 2013, Yilmaz 2013, O'Leary 2014)

	Quantitative	**Qualitative**
Main paradigm	-Positivism	-Constructivism
Perception of variables in question	-Reductionistic, identifying and defining concepts	-Holistic, studied in its social context
Researcher	-Objective observer	-Subjective observer
Database	-Quantitative, interrelationships among specific variables	-Qualitative, personal meaning of actions
Theories	-Normative, explaining causal relationships between variables	-Interpretive, providing insights into the nature and social contexts of variables
Theory testing	-Controlled, supporting or opposing hypotheses deduced from theories	-Consensual, linking researcher's interpretations to participants
Analysis	-Statistical	-Thematic exploration
Applications	-Prediction and control of health-related factors in applied settings	-Interacting with persons in a consensual, value-consonant fashion in healthcare settings
Assumptions	-Reality is single and tangible -Inquiry is objective -Variables can be identified and measured	-Realities are multiple and holistic -Inquiry is subjective -Variables are complex and difficult to measure
Purpose	-Generalisability -Prediction -Causal explanations	-Contextualisation -Interpretation -Understanding perspectives
Approach	-Begins with hypothesis -Deductive -Seeks consensus or the norm -Reduces data to numerical indices -Abstract language in write-up	-Often ends with hypothesis -Inductive -Seeks pluralism or complexity -Makes minor use of numerical indices -Descriptive write-up
Research role	-Detachment and impartiality -Objective portrayal -Etic (outsider's point of view)	-Personal involvement and partiality -Empathic understanding -Emic (Insider's point of view)

2.3.2. Defining the research terminologies

A variety of terminologies are used in describing both quantitative and qualitative research (Table 2.3).

Table 2.3: Terminologies used in research (Corbin and Strauss 2008 p. 1, Cambridge Dictionary 2016)

Term	Definition
Hypothesis	An idea or explanation for something that is based on known facts but has not yet been proven.
Theory	A formal statement of the rules on which a subject of study is based or of ideas that are suggested to explain a fact or event or, more generally, an opinion or explanation.
Methodology	A way of thinking about and studying social phenomena.
Methods	Techniques and procedures for collecting, gathering and analysing data.
Philosophical orientation	A worldview that underlines and informs methodology and methods.
Paradigm	A set of theories that explain the way a subject is understood at a particular time.

2.3.3. Paradigms used in research

Research paradigms are selected appropriate to the research aim, questions and approach (Table 2.4).

Table 2.4: Paradigms in quantitative and qualitative research (Creswell 2013, Mills and Birks 2014)

Paradigm	Definition
Positivism	-The researcher in this approach asserts the existence of a single reality that is there to be discovered. -This paradigm more commonly underlines a quantitative approach.
Postpositivism	-This approach is logical and emphasises robust data collection and analysis. -It is also cause-and-effect oriented and depends on *a priori* theories. -Inquiry is viewed from multiple perspectives rather than a single reality.
Constructivism	-Researchers investigate different views rather than place ideas into narrow categories. -A theory may be generated at the end of the research. -It also focuses on the context of the answers (historical and cultural settings). -Researchers' background and experience can also influence their interpretation.
Advocacy / Participatory	-The major characteristic of this approach is that it focuses on marginalised groups. -The researchers collaborate with the participants to provide the participants' voice.
Pragmatism	-The focus of this approach is the outcome of the research rather than the process. -Researchers often use mixed methods to answer their inquiry.

2.3.4. Research approaches and paradigms selected

Following the literature review phases, a multi-modal research approach was selected for the generation and collection of primary research data presented in Table 2.5.

Table 2.5: Multi-modal research design of Phase 3 and 4 of the doctoral project

	Phase 3	Phase 4
Aim	Determine key health stakeholders' expectations, attitudes and beliefs around implementing pharmacist prescribing in Qatar	Develop a pharmacist prescribing framework tailored to Qatar's setting
Methodology used	Phenomenological qualitative approach	Survey-based quantitative approach (Delphi consensus technique)
Paradigm	Constructivism	Positivism
Methods employed	Face-to-face semi-structured interviews	A modified Delphi technique

While at the outset of the doctoral studies, the student was more comfortable with a positivist, quantitative approach, this was not considered most appropriate for all phases of the research. Furthermore, it was considered by the supervisory team beneficial to challenge the student on this stance and further develop research awareness and skills through also adopting a qualitative constructivist approach.

In order to explore stakeholders' views and perceptions around the possibility of implementing pharmacist prescribing in Qatar, a qualitative approach was considered more appropriate due to many advantages as outlined by Saks and Allsop (2013). First, qualitative research provides researchers with new ways of thinking by allowing them to make observations and generate new ideas rather than just testing pre-existing notions. Moreover, they can adjust their interpretation approach if they find themes or patterns contradicting their initial assumptions. Furthermore, due to the lack of current literature on pharmacist prescribing, qualitative approach is more appropriate since it allows the investigators to gain an in-depth insight into the participants' views by exploring their responses and asking for clarification or feedback thus enriching the findings of the project.

A quantitative approach was also utilised in this doctoral work since it can aid in the development of a framework for pharmacist prescribing in Qatar. Moreover, this method was chosen for multiple reasons as reported by Saks and Allsop (2013) which will be discussed in details later in this chapter. In addition, this phase complemented the previous research done by the investigation team utilising qualitative method to gain an in-depth insight into the possible implementation of pharmacist prescribing in Qatar. Thus, it helped in testing the statements collected in order to conclude whether they are appropriate and relevant.

All phases of this doctoral research are underpinned by a theoretical framework that will be discussed later in the chapter, which was highlighted in the first element of the UK MRC Framework for the Development and Evaluation of Complex Interventions.

The employed multi-modal study design is summarised in Figure 2.3.

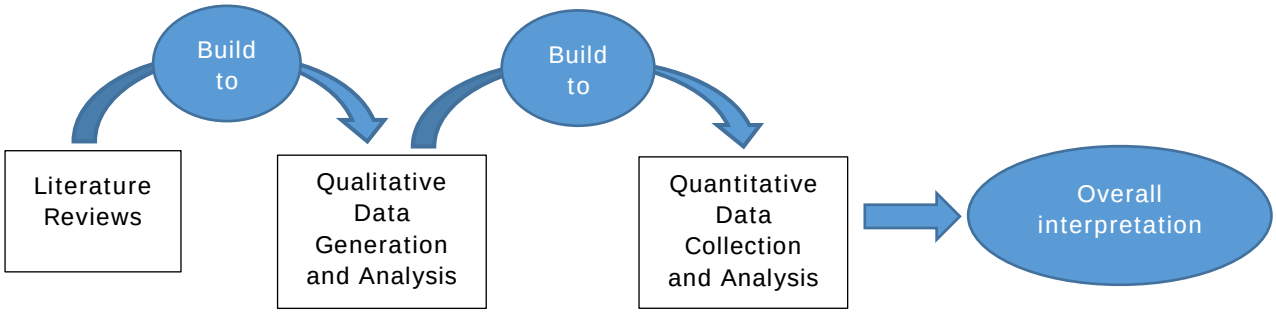


Figure 2.3: Multi-modal design employed in this doctoral research

2.4. Qualitative Approach (Phase 3)

2.4.1. Philosophical assumptions

In addition to considering research approaches and paradigms, philosophical assumptions should also be considered prior to selecting specific methodologies and methods. Table 2.6 describes key assumptions in relation to qualitative research, as adopted for Phase 3.

Table 2.6: Philosophical assumptions in qualitative research (Creswell 2013)			
Philosophical assumptions	**Question**	**Characteristics**	**Implications for practice**
Ontological	What is the nature of reality?	Reality is subjective based on participants in the study.	Researcher uses quotes and provides evidence of multiple views.
Epistemological	What is the relationship between the researcher and the participant?	Researcher tries to get closer to participants.	Researcher spends time in field with participants, and becomes a member.
Axiological	What is the role of value?	Research is value-laden and biases are present.	Researcher includes his/her interpretation with that of subjects.
Methodological	What is the process of research?	Research is inductive and involves the environment surrounding the participants.	Researcher describes in detail the context of the study and continually revises questions from experiences in the field.

Phase 3 of this research was based on an ontological philosophy since the aim of this phase was to determine key health stakeholders' expectations, attitudes and beliefs around implementing pharmacist prescribing in Qatar.

2.4.2. Research methodologies in qualitative approach

The most common qualitative research methodologies include narrative, phenomenology, grounded theory, ethnography, and case study. These different methodologies are described in Table 2.7.

Table 2.7: Characteristics of the different qualitative methodologies (Creswell 2013)					
characteristics	**Narrative research**	**Phenomenology**	**Grounded theory**	**Ethnography**	**Case study**
Focus	Exploring the life of an individual	Understanding the essence of the experience	Developing a theory grounded in data from the field	Describing and interpreting a culture-sharing group	Developing an in-depth description and analysis of a case or multiple cases
Type of study best suited for design	Aiming to tell stories of individual experiences	Aiming to describe the essence of a lived phenomenon	Grounding a theory in the views of participants	Describing and interpreting the shared patterns of culture of a group	Providing an in-depth understanding of a case or cases
Discipline background	Drawing from the humanities including anthropology, literature, history, psychology and sociology	Drawing from philosophy, psychology and education	Drawing from sociology	Drawing from anthropology and sociology	Drawing from psychology, law, political science and medicine
Unit of analysis	Studying one or more individuals	Studying several individuals who have shared the experience	Studying a process, an action or an interaction involving many individuals	Studying a group that shares the same culture	Studying an event, a programme, an activity or more than one individual
Forms of data generation	Using primarily interviews and documents	Using primarily interviews with individuals although documents, observations and art may also be considered	Using primarily interviews	Using primarily observations and interviews but perhaps collecting other sources during extended time in field	Using multiple sources such as interviews, observations, documents and artefacts
Data analysis strategies	Analysing data for stories, “restoring” stories and developing themes often using a chronology	Analysing data for significant statements, meaning units, textual and structural description and description of the “essence”	Analysing data through open coding, axial coding and selective coding	Analysing data through description of the culture-sharing group and themes about the group	Analysing data through description of the case and themes of the case as well as cross-case themes
Written report	Developing a narrative about the stories of an individual’s life	Describing the “essence” of the experience	Generating a theory illustrated in a figure	Describing how a culture-sharing group works	Developing a detailed analysis of one or more cases

2.4.3. Phase 3 research methodology

The aim of Phase 3 of this doctoral project was to determine key health stakeholders' (patients, physicians, nurses, pharmacists, hospital administrators, regulatory bodies' representatives) expectations, attitudes and beliefs around implementing pharmacist prescribing in Qatar. Thus, it was deemed that a phenomenological approach was the most appropriate to address the research aim and enable better understand of this concept and the possible facilitators and barriers to the implementation of pharmacist prescribing in the State.

Different methods could be used in qualitative research as described in Table 2.8. However, based on the qualitative methodology chosen and to achieve the above stated aim, interviews were conducted to generate data since they permit full exploration of stakeholders' views and permit analysing their responses for significant statements and themes that could help in developing the next phase of the project.

Table 2.8: Types of qualitative research (Creswell 2014)

Data generation category	Choices within category	Strengths	Weaknesses
Observations	-Complete participant, researcher's role is concealed. -Observer as participant, researcher's role is known. -Participant as observer, observation is secondary to participant role. -Complete observer, researcher only observes.	-Investigator has a direct encounter with subjects. -Information is recorded as it happens. -Unusual aspects can be noted. -Useful for uncomfortable issues for discussion.	-Researcher may be seen as intrusive. -Private information cannot be recorded. -Researcher's skills can affect results. -Certain participants (e.g. children) may be difficult.
Interviews	-Face-to-face interview -Telephone interview -Focus group -Electronic interview	-Beneficial when participants cannot be observed. -Historical data can be collected. -Questioning can be controlled.	-Provides indirect information filtered through the views of interviewees. -Setting is designated and often not usual environment. -Researcher's presence may bias results. -Not all participants are expressive.

Documents	-Public documents, minutes of meetings or newspapers -Private documents, journals, diaries, or letters	-Language and words of participants can be obtained. -Convenient source of information. -No need for transcribing since it is written.	-Documents might be unavailable to public. -Information might be hard to locate. -Data may be incomplete. -Documents may not be dependable or precise.
Audio-visual materials	-Photographs -Videotapes -Art objects -Computer messages -Sounds -Film	-May be a convenient method of gathering data. -Allows participants to directly share information. -Creative and attractive.	-May be difficult to interpret. -May not be publicly available. -The presence of an observer may affect responses.

Compared to focus groups, interviews were more appropriate since they allow generation of data from individuals separately, thus, fully exploring their point of view. They also help to avoid logistical issues in organising for key stakeholders from different locations across the country to gather and attend focus group discussions. Given the seniority of the interviewees, face-to-face interviews were considered more appropriate than telephone or online interviews, allowing rapport building and detection of non-verbal cues.

2.4.4. Types of interviews

Face-to-face interviews, the method of data generation chosen for Phase 3 of this doctoral project, can either be structured, semi-structured or unstructured, as described in Table 2.9 (Stuckey, 2013).

Table 2.9: Types of interviews (Stuckey 2013)

	Definition
Structured	-The researcher follows a specific set of questions in a predetermined order with a limited number of response categories. -This is more appropriate when interviews require that the participant give a response to each ordered question. -Questions are usually short and very specific.
Semi-structured	-The researcher sets the outline for the topics covered, but the interviewee's responses determine the way in which the interview is directed. -This is the most commonly used type of interview in qualitative research.
Unstructured	-Involves stories that are based on the unfolding of events or actions from the perspective of a participant's life experience. -Unstructured interviews allow the participant to guide the interview, thus revealing information that could not have been predicted.

Semi-structured interviews were most appropriate for this phase of the doctoral research, allowing in-depth description and understanding of the participants' perspectives leading to the generation of very rich data (Jensen and Laurie, 2016). This approach allowed the doctoral student to probe responses further gaining further detail, to clarify any issues or ambiguities and to add additional questions.

2.4.5. Approaches to sampling

Probability and non-probability sampling are the two main techniques of selecting a sample from a population. While probability sampling is more commonly applied to quantitative research, both techniques are described in Table 2.10 for completeness.

Table 2.10: Types of sampling methods (Jensen and Laurie 2016)

	Definition	Advantages	Limitations
1- Probability sampling			
Simple random sampling	Process where members of a population are chosen using a random number generator to ensure all members of the population have an equal chance of being selected.	-Reduces risk of sampling bias. -Considered the most robust form of sampling. -Requires little or no information about the population's characteristics. -Can be affordable for easily accessible populations.	-Often difficult in practice to achieve a purely random sample. -Can be prohibitively expensive for dispersed populations. -May not yield enough respondents categories of interest for statistical analysis.
Stratified random sampling	Divides the sampling frame into categories relevant to the analysis.	-More targeted than simple random sampling. -Useful when comparing attitudes of groups is the primary motivation in the research. -Can be used to compare groups of different sizes.	-May still be relatively expensive. -Requires more knowledge about the population than simple random sampling. -Choice of variables to use to stratify the sample may be complicated.

Cluster sampling	Random sampling of a geographical cluster.	-Enables face-to-face probability sampling when the researcher does not have contact details for the potential participants. -If structured effectively, it can have similar strengths to simple random sampling.	-Can be complicated to undertake. -Can be prohibitively expensive.
Multistage sampling	Represents a combination of different sampling techniques.	-Enables the researcher to address constraints and analysis requirements.	-Complex to define and implement. -Probably not a good choice for novice researchers.
Systematic sampling	Relies on selection rules but not random selection.	-Easy to implement or to ask others to do when collecting data. -Can be more efficient and easier to implement in real-world situations than any other form of random sampling. -Avoids risk of selection bias. -Widely considered good enough to treat data as if they were from a probability sample.	-Does not employ truly random selection. -It is possible that selecting every X^{th} person systematically excludes certain people.
2- Non probability sampling			
Convenience sampling	The researcher selects the members of a population that are easiest to access.	-Often the lowest-cost option. -Easy to do. -Useful for getting initial ideas.	-Major risk of non-representative sample. -Results probably cannot be generalisable.
Quota sampling	Selecting a convenience sample but within the bounds of predetermined quotas.	-Only a little harder to do than convenience sampling. -Quotas ensure that you have enough people from different categories relevant to the research.	-Unlikely to produce a more representative sample than convenience sampling.
Snowball sampling	Employs participants in the research as gatekeepers to find new participants.	-A useful means of locating participants among stigmatised or otherwise hard-to-access groups. -Helps establish some trust and credibility.	-Major risk of non-representative sample.

Purposive / theoretical sampling	Uses the researcher's judgement to select participants who will offer valuable insights.	-Can gain insights that are useful for developing theoretical explanations by targeting specific individuals or groups within a population. -Researcher can exercise explicit judgement in identifying who would be most interesting to include in the sample.	-Major risk of non-representative sample. -The researcher's judgement may inadvertently skew the selection of participants.

In Phase 3, two approaches to sampling were combined: purposive to recruit those individuals who could contribute most to the specific research aim and objectives; and by snowballing whereby interviewees were asked to suggest other key individuals they thought would be appropriate to interview. These interviewees were considered to be in positions of responsibility in Qatar related to the implementation of pharmacist prescribing.

2.4.6. Sample size determination in qualitative research

Sample size for qualitative research is commonly determined by the principle of data saturation. According to Sanders et al. (2018), saturation refers to the criterion for judging when to stop sampling, recruiting and generating data. There are four models of saturation which are commonly reported (Table 2.11).

Table 2.11: Models of saturation in qualitative research (Saunders et al. 2018)

Model	Description
Theoretical saturation	-Rooted in traditional grounded theory. -Uses the development of categories and the emerging theory in the analysis process as the criterion for additional data collection.
Inductive thematic saturation	-Focuses on the identification of new codes or themes rather than the completeness of existing theoretical categories. -Mainly confined to data analysis/generation.
A priori thematic saturation	-Data are collected to exemplify pre-determined codes or themes rather than to develop or refine theory.
Data saturation	-Identifies if new data repeat that expressed in previous data (redundancy in the data).

Based on the qualitative methodology chosen and the aim of this phase, data saturation was chosen as the stopping criteria for recruitment of stakeholders for Phase 3 (interviews) following the four principles described by Francis et al. (2010) (Figure 2.4).

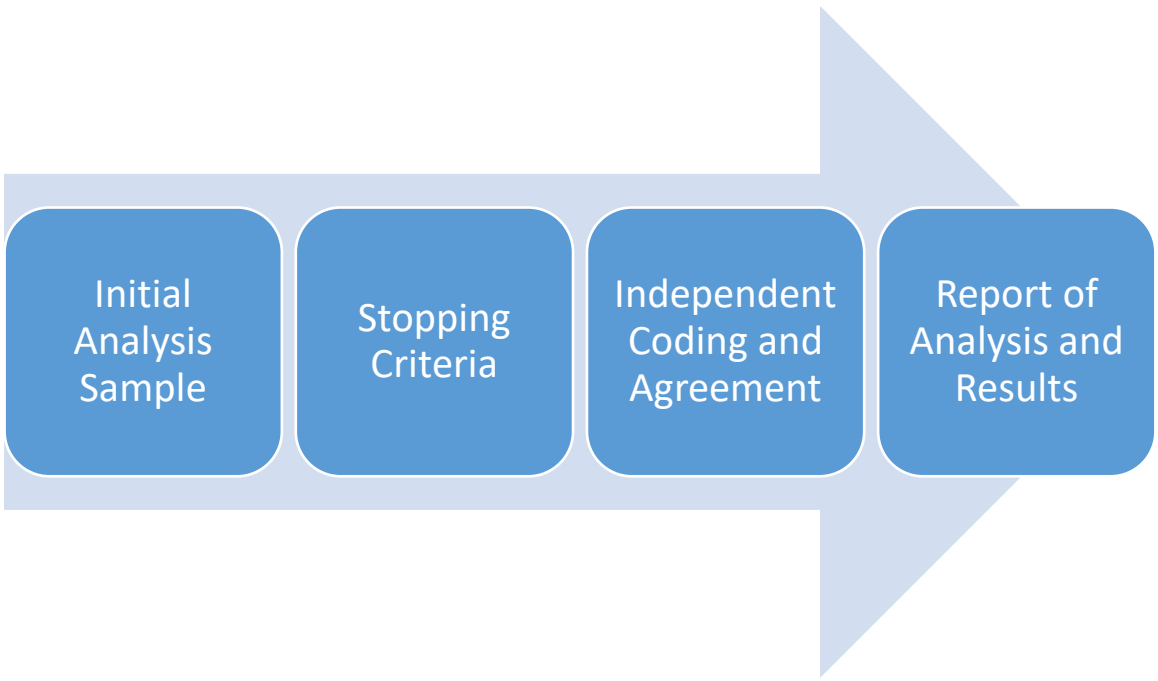


Figure 2.4: Principles for data saturation (Francis et al. 2010)

Initial analysis sample is the *a priori* sample size at which the first round of analysis is considered to be complete. This number is determined based on the complexity of the research question and interview topic guide, diversity of sample and the nature of the analysis.

Stopping criteria is referred to as the *a priori* number of interviews that will be conducted without any new ideas or themes emerging before concluding that data are saturated.

The third principle focuses on performing the analysis of responses by at least two independent coders. The level of agreement must be reported in order to ensure that the analysis is rigorous.

The last principle is concerned with reporting the methods and findings of the data saturation. This helps the reader to evaluate the evidence described.

For the purpose of Phase 3 of this doctoral research, five members from each professional group were interviewed as the initial analysis sample. This sample size was believed to represent adequate diversity based on the participants' professions. Afterwards, one additional interview was performed for each profession before the stopping criterion was tested. Responses were coded and analysed independently by two research team members in order to confirm that data saturation was achieved.

2.4.7. Types of transcription methods

Transcribing is a key element in qualitative studies, defined by Howitt (2016, p. 135) as "the process by which a sound or a video recording of the spoken word is turned into written language for subsequent analysis". According to Mann (2016), there are different reasons to produce a transcript for qualitative interviews:

- Prompting initial analysis by listening to the original interview data
- Encouraging close attention and noticing small details by closely looking at the data
- Considering what is said and what is not said through focusing not only on what is said but also on how it was said
- Offering interviewees the opportunity to review responses to avoid misrepresentation
- Inducing further comment in the following interviews
- Revisiting data at a later date

Standardised (or paraphrased) transcription reports only the content discussed and removes all non-verbal cues such as pauses and fillers. Verbatim (or exact) transcription records the interview word for word as well as includes non-verbal speech elements. This method allows those not present during the data

generation to gain more insight into the way the interviewees expressed themselves (Jensen and Laurie 2016).

For the purpose of this study, data were transcribed verbatim to also capture the non-verbal speech elements.

2.4.8. Data generation

According to Corbin and Strauss (2008), analysis is a dynamic process of "examining a substance and its components in order to determine their properties and functions, then using the acquired knowledge to make inferences about the whole" (p.45). This involves the creative use of different procedures to systematically construct a coherent and explanatory concepts.

According to Lyons and Coyle (2015), there are five main approaches to analysing qualitative data (Table 2.12)

Table 2.12: Approaches of qualitative data analysis (Lyons and Coyle 2015).

	Descriptions and aim(s)
Thematic analysis	Technique or method for identifying or interpreting patterns of meaning or themes in qualitative data.
Discourse analysis	How people use language to construct versions of their worlds to offer a critical interrogation of the status quo.
Narrative analysis	Focuses on analysing individual experience and meanings in depth rather than looking for commonalities between different people.
Interpretative phenomenological analysis	Provides detailed description of the participants' lived experiences and examines how participants are making sense of their personal and social world.
Grounded theory	Involve closely examining qualitative data in order to develop theory on a given topic inductively.

The thematic approach was selected and was carried according to the steps outlined by Ritchie and Spencer (1994) and Howitt (2016), summarised in Figure 2.5.

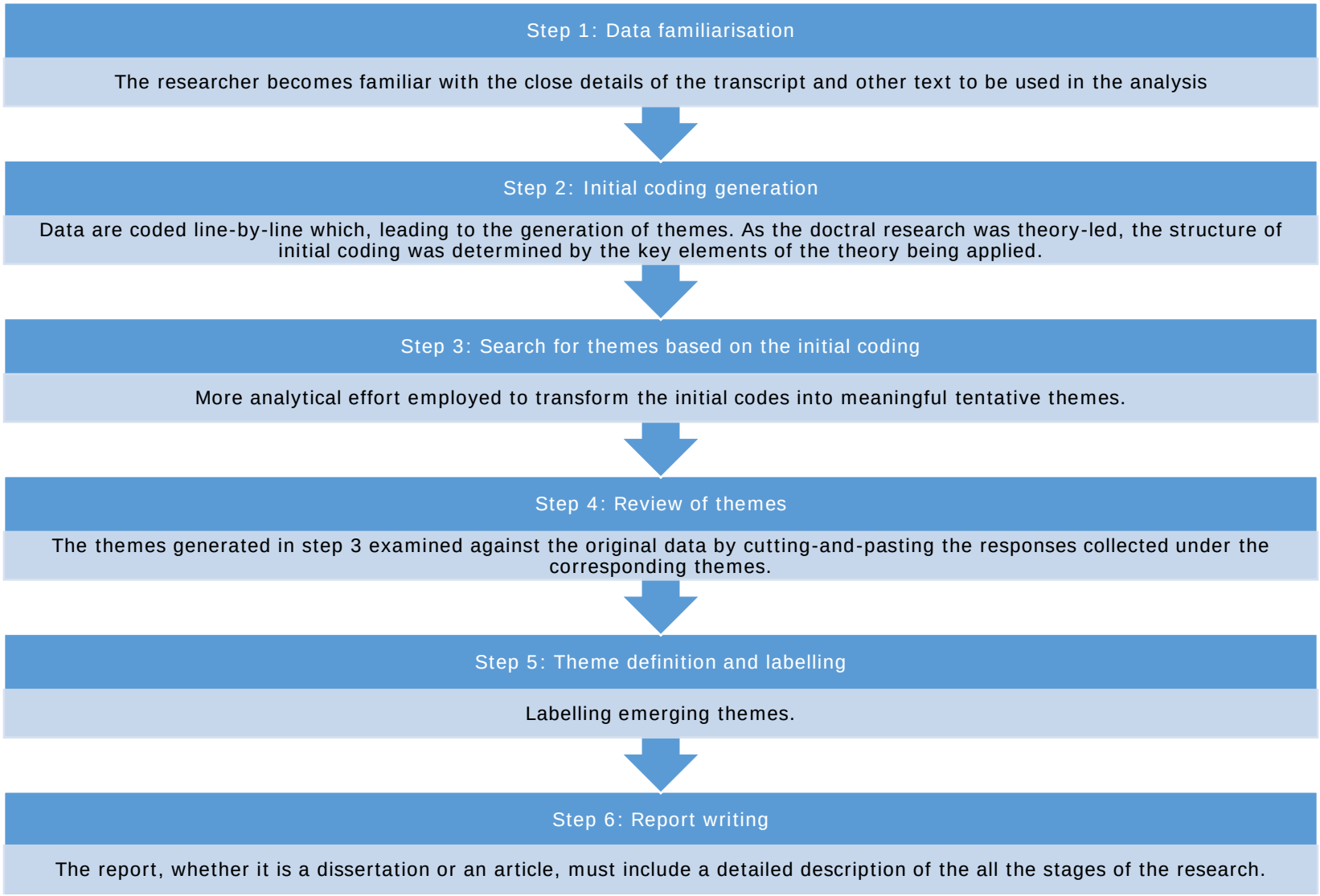


Figure 2.5: Stages of thematic analysis (Ritchie and Spencer 1994, Howitt 2016)

2.5. Quantitative approach (Phase 4)

2.5.1. Philosophical assumption

The main philosophical assumption underlying quantitative research is positivism which assumes that phenomena and behaviours can be observed and measured (Bowling 2009). According to Castellan (2010), positivism is the belief that reality is objective and independent of the researchers' influence. In quantitative approaches, investigators are considered as outside observers of events, with neutral and distant roles from those of research participants.

2.5.2. Advantages of quantitative research

Advantages of quantitative approaches are summarised by Saks and Allsop (2013) as follows:

- Measurement, output measuring quantity is often reliable
- Robustness, the methods are clear, logical, and mathematically and statistically sound
- Internal validity, the methods are often able to explain phenomena (e.g. cause and effect, inference and association)
- Generalisability (external validity), study findings can often be generalised to a larger population
- Replicability, methods are transparent hence studies can be replicated by others building knowledge. Replication increases the reliability and validity of research findings

2.5.3. Research methodologies in quantitative approach

The main methodologies in quantitative research are described in Table 2.13.

Table 2.13: Quantitative research methodologies (Song and Chung 2010, Watson 2015)

	Description
Randomised controlled trials	-Best method to test cause and effect in clinical interventions. -Employ randomisation and a control group. -Rated near the top of the hierarchy of evidence, as a method of providing high level evidence for clinical practice.
Cohort studies	-Collect data from a group of people with defined characteristics who are followed up to determine incidence of an outcome. -More informative about how individuals change over time and for simultaneously examining rare exposures or multiple outcomes. -Costly (needs large sample size, potentially long follow-up duration) and susceptible to attrition.
Case-control studies	-Collect data about exposure to a risk factor or several risk factors retrospectively from two different groups (exposed and non-exposed). -Investigate rare outcomes or outcomes with a long latency period, relatively quick and inexpensive. -Susceptible to selection and information bias and difficult to validate information.
Survey based studies (including consensus studies)	-Useful for gathering large amounts of data to describe samples and populations using a set of questions. -Cannot easily distinguish between cause and effect.

2.5.4. Phase 4 research methodology

The most appropriate methodology selected for Phase 4 was a quantitative, survey-based consensus approach. Given the prior work of literature reviews and qualitative interviews, all findings were collated into key statements for the final phase of the doctoral research. The responses to these statements from a panel of key experts in Qatar were considered to form a framework for the development and implementation of pharmacist prescribing in Qatar.

2.5.5. Defining the consensus approach

According to Campbell and Cantrill (2001), consensus methods are “group facilitation techniques designed to explore the level of consensus among a group of experts by synthesising and clarifying expert opinion”. The key features of consensus methods, as described by Jones and Hunter (1995), are:

- Anonymity, avoiding dominance
- Iteration, occurs in rounds allowing individuals to alter responses
- Controlled feedback, illustrating distribution of the group’s response
- Statistical group response, expressing judgment using summary measures of all responses

Consensus approaches gather together experts and/or the public in order to explore a topic and determine the extent of agreement. Since perfect agreement is rarely reached, variation is possible among individuals (Jones and Hunter 1995, Keeney, McKenna and Hasson 2011).

Consensus approaches are particularly useful in a number of circumstances (Campbell and Cantrill 2001, Nair, Aggarwal and Khanna 2011) which include:

- Enhancing decision-making and developing policies
- Facilitating the development of quality indicators or review criteria
- Supporting quality assessment, improvement and clinical governance
- Synthesising accumulated expert opinion/professional norms
- Identifying and stimulating debate around areas where there is uncertainty, controversy or incomplete evidence

2.5.6. Types of consensus approach

The key methods in consensus studies are described in Table 2.14.

Table 2.14: Types of consensus approach (Nair, Aggarwal and Khanna 2011)

	Description	Advantages	Limitations
Delphi method	Designed to obtain the most reliable consensus of opinion in a systematic manner. This is achieved by series of well-defined questionnaires.	-Involves large number of experts. -Opinions are expressed freely and impersonally. -No influence of highly opinionated individuals. -Moderator has minimal influence on experts. -Ability to express and reflect on ideas. -Cheap and convenient when experts cannot be grouped into a single room.	-Dependent on questionnaire design. -Coordinating large group can be complicated. -No personal contact between experts is allowed.
Nominal group technique	Face-to-face group meeting of experts which is led by a skilful moderator. Experts first independently generate ideas then share and rank them.	-All experts can voice opinions. -Personal contact between experts is allowed. -Group voting can occur if desired.	-Moderator must be skilful. -Few questions can be discussed since it is limited by time. -Arranging meetings can be costly. -Can be difficult to arrange for experts to meet face-to-face.
RAND/UCLA appropriateness method (RAM)	Mainly used to assess the appropriateness of medical procedures (e.g. coronary angiography). It involves two interdependent groups. The core panel provides information to the expert panel to reach consensus.	-Synthesis of published literature is performed. -Allows for individual as well as group rating. -Can be reproducible.	-Time consuming. -Can be costly. -Highly opinionated individual can dominate the discussion. -Complex issues can be difficult to discuss. -Potential bias in participant selection.
National institutes of health (NIH) consensus development conference (CDC) methodology	Involves experts as well as public to reach consensus on medical procedures, devices and drugs.	-Involves experts as well as consumers. -Unbiased panel.	-Interaction is unstructured. -Aggregation methodology lacks feedback. -Potential bias in participant selection.

Given the need to recruit key stakeholders in Qatar to the consensus study, and considering the logistics in getting such individuals together, the Delphi technique was selected. This would also maintain anonymity and allow for easy communication.

2.5.7. Types of Delphi technique

The Delphi technique was originally designed to increase the accuracy of forecasts by the RAND Air Force Corporation in America in the 1950s. The project 'Delphi' was established to estimate key nuclear targets in America from a Soviet perspective (Campbell and Cantrill 2001). However, over the years, it has evolved with a number of modifications, as shown in Table 2.15, and has become more widely used across a range of healthcare areas.

Table 2.15: Types of Delphi technique (Keeney, McKenna and Hasson 2011, Avella 2016)

Type of Delphi	Main characteristics
Classical Delphi	-Employs a first round to generate ideas and three or more rounds via post or email.
Modified Delphi	-Similar to the classical Delphi, except that the statements used are not generated after consulting the expert panel but through other means (e.g. literature review, face-to-face interviews or focus group).
Decision Delphi	-Similar to the classical Delphi, except that the aim is to make decisions rather than come to consensus.
Policy Delphi	-The main aim of this type of Delphi is to agree on future policy on a given topic.
Real Time or Conference Delphi	-Similar to the classical Delphi, except that the experts may be in the same room rather than using post.
e-Delphi	-Similar to the classical Delphi, except that it is conducted electronically (email or online web survey).
Technological Delphi	-Similar to the real time Delphi, except that the experts use technology (i.e. keypads) to receive instant feedback thus they can re-vote immediately.
Argument Delphi	-Derived from the policy Delphi, except that it focuses on the production of relevant factual arguments.
Disaggregative Delphi	-Conducts various scenarios of the future for discussion and it does not aim to reach consensus.

Since the aim of this phase was to reach consensus in order to develop a pharmacist prescribing framework tailored to Qatar's setting and given that the Delphi statements were derived from previous research phases, a modified Delphi technique was employed in Phase 4.

2.5.8. Panel of experts

Delphi studies do not always aim for representation of all the population, but mainly employ stakeholders or experts who are specialists or have knowledge of the area researched (Keeney, McKenna and Hasson 2011). A 'stakeholder' in the context of health research is defined by the Agency for Healthcare

Research and Quality (2014) as “persons or groups that have a vested interest in a clinical decision and the evidence that supports that decision”. Examples of health stakeholders include patients, caregivers, clinicians, researchers, advocacy groups and policy makers. Stakeholders are especially important when conducting research since they are considered the main individuals to either structure, deliver or experience a certain intervention.

Campbell and Cantrill (2001) reported that the panel of experts in a Delphi study must reflect the constituency of stakeholders it is intended to represent. Thus, it could include any individual with relevant knowledge/experience or individuals who are highly regarded in the topic studied. Likewise, Delbecq, Van de Ven and Gustafson (1975) also stated that the panel usually involves participants who:

- Feel personally involved in the problem of concern
- Have pertinent information to share
- Are motivated to include the Delphi task within their schedule of competing tasks
- Feel that the aggregation of judgements of a respondent panel will include information which they too value and to which they would not otherwise have access

2.5.9. Sample size determination

The sample size needed for a Delphi study varies, depending on the purpose of the research. Moreover, there is no consensus on the ideal number of experts to include in a given Delphi study nor has it ever been established what constitutes a large or small panel. However, Delphi panels usually involve 10 to 100 members and consist of either two or three expert groups (Avella 2016). Overall, it is recommended to restrict the number of participants to a minimally sufficient number of respondents to address the research objectives.

2.5.10. Delphi rounds

The Delphi technique employs questionnaires comprising of a list of statements which are updated and shared with the experts until consensus is

reached or the final scheduled round is complete. In each of the round of the Delphi, the questionnaire as well as the feedback from the previous rounds are sent for the expert panellists to review to aid them in reaching a final decision.

There is no consensus in the literature on the optimal number of rounds (Gerrish and Lathlean 2015). Traditionally, Delphi studies used four rounds, but this has been modified by many researchers given factors of study duration and sustaining the interest and involvement of the panellists (Keeney, McKenna and Hasson 2011).

2.5.11. Data analysis

According to Von der Gracht (2012), there are different descriptive and inferential methods to determine consensus described in Table 2.16.

Table 2.16: Consensus measurements (Von der Gracht 2012)

Methods	Description
Subjective criteria and descriptive statistics	
Stipulated number of rounds	The researchers estimate the number of iterations sufficient to identify points of consensus.
Subjective analysis	The researchers believe that another round would not significantly add to the results and therefore terminate the process.
Certain level of agreement	The researchers determine consensus based on previous studies employing a Delphi technique.
Average Percent of Majority Opinions (APMO) Cut-off Rate	The point of consensus is determine based on the majority of agreements and disagreements.
Mode, mean / median ratings and rankings, standard deviation	Measures of central tendency can also be used to determine consensus. However, this method is controversial since Likert data are ordinal and not interval.
Interquartile range (IQR)	For 10-unit scale, an IQR of 2 or less is considered a consensus while an IQR of 1 or less is regarded as a suitable consensus indicator for 4- or 5-unit scales.
Coefficient of variation	A consistent decrease of the coefficients of variation between the first and the second round, indicated an increase in consensus.
Post-group consensus	The extent to which individuals individually agree with the final group aggregate, their own final round estimates or the estimates of other panelists after the Delphi was complete.
Inferential statistics	
Chi square test of independence	A nonparametric test to assess whether there is a relationship between the Delphi rounds and the responses obtained in them.
McNemar change test	A nonparametric test used when Chi square cannot be used (if samples are dependent).

Wilcoxon matched-pairs signed-ranks test	A nonparametric alternative to the paired Student's t-test for repeated measurements on a single sample and compares two dependent samples, using the ranks of the pairs of scores formed by the matched pairs in the sample.
Intra-class correlation coefficient, kappa statistics	Designed to assess consistency or conformity of responses and the levels of agreement among panelists.
Spearman's rank-order correlation coefficient	Mainly used to indicate the extent to which a change in the value of one round is related to a change in the value of the other round in case of interval or ratio variables.
Kendall's W coefficient of concordance	A nonparametric statistic used to assess agreement among raters as well as its strength and change. A coefficient of 0.1 indicates very weak agreement, whereas 0.7 is referred to as strong agreement.
t-statistics	A parametric test for interval or ratio data that tests for significant differences between the means for Delphi's successive rounds and to compare subgroups or the data of two different Delphi studies.
F-tests	A parametric tests for interval or ratio data. F-test for the equality of more than two means (one-way ANOVA) can be used to examine the significant mean differences among more than two groups (or subgroups).

As discussed by Von der Gracht (2012), there are is no agreement on how to measure consensus. The most frequently reported technique is descriptive using the certain level of agreement, hence this was selected for Phase 4. Delphi consensus is typically set between 55 to 100% agreement, with 70% considered the standard, representing all agreements within +/- 1 standard deviation of the mean (Vernon 2009). Thus, a cut-off of 70% in the agreement (agree or strongly agree) and less than 15% disagreement (disagree/strongly disagree) was set as being consensus for each statement.

2.6. Theoretical frameworks in research

2.6.1. Introduction

According to the MRC framework described earlier, the consideration of theory is important in developing any intervention, ensuring that individual data have a meaningful context and contribute towards building an integrated body of knowledge (Nilsen 2015). Theory can be considered at any stage of research from justifying the rationale for the research, developing the data collection and generation tools to data analysis and interpretation (Stewart and Klein 2015).

According to Nilsen (2015), a theory is "a set of analytical principles or statements designed to structure our observation, understanding and

explanation of the world [thus] provides a clear explanation of how and why specific relationships lead to specific events". A framework usually denotes "a structure, overview, outline, system or plan consisting of various descriptive categories (e.g. concepts, constructs or variables) and the relations between them that are presumed to account for a phenomenon". The major difference between the two terminologies is that frameworks only describe, not explain, a phenomena whereas theories are both explanatory and descriptive.

There are five main categories of theoretical approaches, as described in Table 2.17.

Table 2.17: Main categories of theoretical frameworks (Nilsen 2015)

Theoretical Framework Category	Description
Process models	Describe and/or guide the process of translating research into practice. The action models, a subset of process models, offer practical guidance in the planning and execution of implementation endeavours and/or implementation strategies.
Determinant frameworks	Describe general types of determinants that are hypothesised or have been found to influence implementation outcomes such as the barriers and/or enablers that can impact on implementation outcomes.
Classic theories	Describe change mechanisms and explain how change occurs without ambitions to actually bring about change. They usually originate from other disciplines such as psychology or sociology.
Implementation theories	Developed or adapted by researchers for potential use in achieving enhanced understanding and explanation of certain aspects of implementation.
Evaluation frameworks	Provide a structure for evaluating implementation endeavours.

2.6.2. Implementation framework selected for this doctoral research

Determinant frameworks were selected for Phases 3 and 4 given that the overall aim was to explore the development of frameworks of pharmacist prescribing in Qatar by exploring the views and perceptions as well as determining the possible facilitators and barriers to implementing this role globally as well as in Qatar. The most commonly cited determinant frameworks that focus on the successful intervention implementation as an outcome are summarised in Table 2.18.

Table 2.18: Common determinant frameworks characteristics (adapted from Nilsen 2015)					
	Characteristics of the implementation object	**Characteristics of the users (e.g. health practitioners)**	**Characteristics of the end users (e.g. patients)**	**Characteristics of the context**	**Characteristics of strategy of facilitating implementation**
Promoting Action on Research Implementation in Health Services (PARIHS) Framework	Characteristics of the evidence	Characteristics of the clinical experience	Characteristics of patient experience	Characteristics of the context (culture, leadership and evaluation)	Characteristics of the facilitation (process of enabling the implementation)
Conceptual Model	Innovation attributes	Aspects of adopters and assimilation by organisations	Not addressed	Characteristics of the inner context (organisational readiness for innovation) and outer context (political directives)	Influences (opinion leaders) lying on a continuum from diffusion to dissemination
Ecological Framework	Characteristics of the innovation	Provider characteristics	Not addressed	Community level factors (general organisational features, specific staffing considerations)	Features of the prevention support system (comprising training and technical assistance)
Consolidated Framework for Implementation Research (CFIR)	Intervention characteristics	Characteristics of individuals	Patient needs and resources	Characteristics of the inner setting (structural characteristics, culture) and outer setting (incentives, external policies)	Effectiveness of process by which implementation is accomplished (comprising planning, engaging, executing, reflection and evaluating)

The Consolidated Framework for Implementation Research (CFIR) was considered the most appropriate and comprehensive, being based on other determinant frameworks and relevant theories in various disciplines such as Promoting Action on Research Implementation in Health Services (PARiHS) and the Conceptual Model.

2.6.3. Overview of the development of the Consolidated Framework of Implementation Research

While many implementation theories exist, they utilise different terminologies, are often overlapping and lack one or more key constructs. There was therefore a need for a comprehensive, overarching framework. CFIR was developed by implementation researchers affiliated with Veterans Affairs (VA) Diabetes Quality Enhancement Research Initiative (QUERI) in 2009 (Damschroder et al. 2009, Consolidated Framework for Implementation Research 2016). CFIR development involved reviewing all published models, theories and frameworks that facilitate translation of research findings into practice, mainly in the healthcare sector. Theories described in peer-reviewed papers on dissemination, innovation, organisational change, implementation, knowledge translation and research uptake were identified. Contact was also made with colleagues engaged in implementation research, all generating a list of the 19 theories and models (Table 2.19). Identified constructs were either combined or separated in order to develop readily operationalised definitions used in implementation studies, and repeated until theme saturation was reached. Thus, the CFIR embraces, not replaces, the significant and meaningful contribution of existing implementation theories.

CFIR is considered to be pragmatic meta-theoretical framework that can be utilised in order to identify potential influences on implementation. It has a comprehensive taxonomy of specific constructs that can positively or negatively influence implementation to synthesise and build knowledge across multiple settings thus providing a richer understanding of the complexities of implementing an intervention (Damschroder et al. 2009). Moreover, the CFIR “provides a menu of constructs that can be used in a range of applications such as a practical guide for systematically assessing

potential barriers and facilitators in preparation for implementing an innovation" (Consolidated Framework for Implementation Research 2016).

Table 2.19: Theories and models reviewed to develop the CFIR (Damschroder et al. 2009)

- Conceptual model for considering the determinants of diffusion, dissemination and implementation of innovations in health service delivery and organisation
- Conceptual model for implementation effectiveness
- Dimensions of Strategic Change
- Theory-based Taxonomy for Implementation
- PARiHS Framework: Promoting Action on Research Implementation in Health Services
- Ottawa Model of Research Use
- Conceptual Framework for Transferring Research to Practice
- Diagnositic/Needs Assessment
- Stetler Model of Research Utilisation
- Technology Implementation Process Model
- Replicating Effective Programs Framework
- Organisational Transformation Model
- Implementation of Change: A Model
- Framework of Dissemination in Health Services Intervention Research
- Conceptual Framework for Implementation of Defined Practices and Programs
- Will it Work Here? A Decision-maker's Guide to Adopting Innovations
- Availability, Responsiveness and Continuity: An Organisational and Community Intervention Model
- A Practical, Robust Implementation and Sustainability Model (PRISM)
- Multi-level Conceptual Framework of Organisational Innovation Adoption

2.6.4. Domains of the Consolidated Framework of Implementation Research

There are five main domains of CFIR (Damschroder et al. 2009): intervention characteristics, outer setting, inner setting, characteristics of the individuals involved, and the process of implementation.

a. Intervention characteristics

This domain encompasses:

- Intervention source: Whether the intervention is internally (developed as a good idea, solution to a problem) or externally (developed by a vendor or a research group) developed

- Evidence strength and quality: Quality and validity of evidence supporting the belief that the intervention will have desired outcomes
- Relative advantage: Advantage of implementing the intervention versus an alternative solution
- Adaptability: Degree to which an intervention can be adapted, tailored, refined or reinvented to meet local needs
- Trialability: Ability to test the intervention on a small scale in the organisation and to be able to reverse course if warranted
- Complexity: Difficulty of implementation reflected by duration, scope, radicalness, disruptiveness, centrality and intricacy and number of steps required to implement
- Design quality and packaging: Excellence in how the intervention is bundled, presented and assembled
- Cost: Cost of the intervention and costs associated with implementing that intervention (investment, supply, opportunity costs)

b. Outer setting

Changes in the outer setting can affect implementation. Examples include changes in economic, political and social structures. This domain has four main sub-constructs:

- Patient needs and resources: Accounting for patient characteristics and needs as well as barriers and facilitators to meet those needs
- Cosmopolitanism: The degree to which an organisation is networked with other external organisations
- Peer pressure: The degree of competitiveness with other organisations
- External policies and incentives: External strategies to spread interventions such as policy, regulation and incentives

c. Inner setting

This domain focuses on how the different constructs interact within the organisation comprising:

- Structural characteristics: The organisation's social architecture, administrative intensity, age, maturity, size, etc.
- Networks and communications: The nature and quality of social networks, formal and informal communications within an organisation, connections between individuals
- Culture: Norms, values and basic assumptions and thinking of an organisation
- Implementation climate: The absorptive capacity for change, the extent to which an intervention will be supported within a given organisation. Under this domain, a further six sub-constructs can influence implementation climate:
    1. Tension for change, degree of stakeholders' perception of current situation as intolerable or needing change
    2. Compatibility, how the value of an intervention align with existing workflow and individuals' own norms, value and perceived risks and needs
    3. Relative priority, individuals' perception of the importance of the implementation
    4. Organisational incentives and rewards, such as goal-sharing rewards, performance reviews, promotions, salary raise, increased stature or respect
    5. Goals and feedback, how goals are communicated, acted upon and fed back to staff
    6. Learning climate, does the climate allow leaders express their own fallibility and need for assistance and input, team members to feel that they are essential and valued in implementation, enough time and space for reflective thinking and evaluation

- Readiness for implementation: Indicators of organisation commitment to implementation which consists of three further sub-constructs:
    1. Leadership engagement, commitment, involvement and accountability of managers at any level within an organisation
    2. Available resources, including money, training, education, physical space and time
    3. Access to information and knowledge, such as from experts, other experienced staff, training, documentation, etc.

d. Characteristics of individuals

This domain focuses on understanding the dynamic interplay between individuals and the organisation within which they work and how it influences their behaviour change. Specifically, this construct includes:

- Knowledge and beliefs about the intervention: Individuals' familiarity with, attitudes toward and value placed on the intervention
- Self-efficacy: Individuals' belief in their own capabilities to perform tasks related to implementation
- Individual stage of change: The degree of individuals' skills and enthusiasm towards a sustained use of the intervention
- Individual identification with organisation: Individuals' perception of their organisation and their commitment to it
- Other personal attributes: Such as tolerance of ambiguity, intellectual ability, motivation, competence and innovativeness.

e. Process

The implementation process can be summarised in four essential steps:

- Planning: The degree and quality a scheme or method of behaviour and tasks for implementation are developed in advanced
- Engaging: The strategies of social marketing and education used to attract and involve appropriate individuals in the implementation

- Executing: The degree to which the implementation is accomplished according to plan
- Reflecting and evaluating: The feedback about the progress and quality of the implementation

A summary of the five CFIR constructs is presented in Figure 2.6.

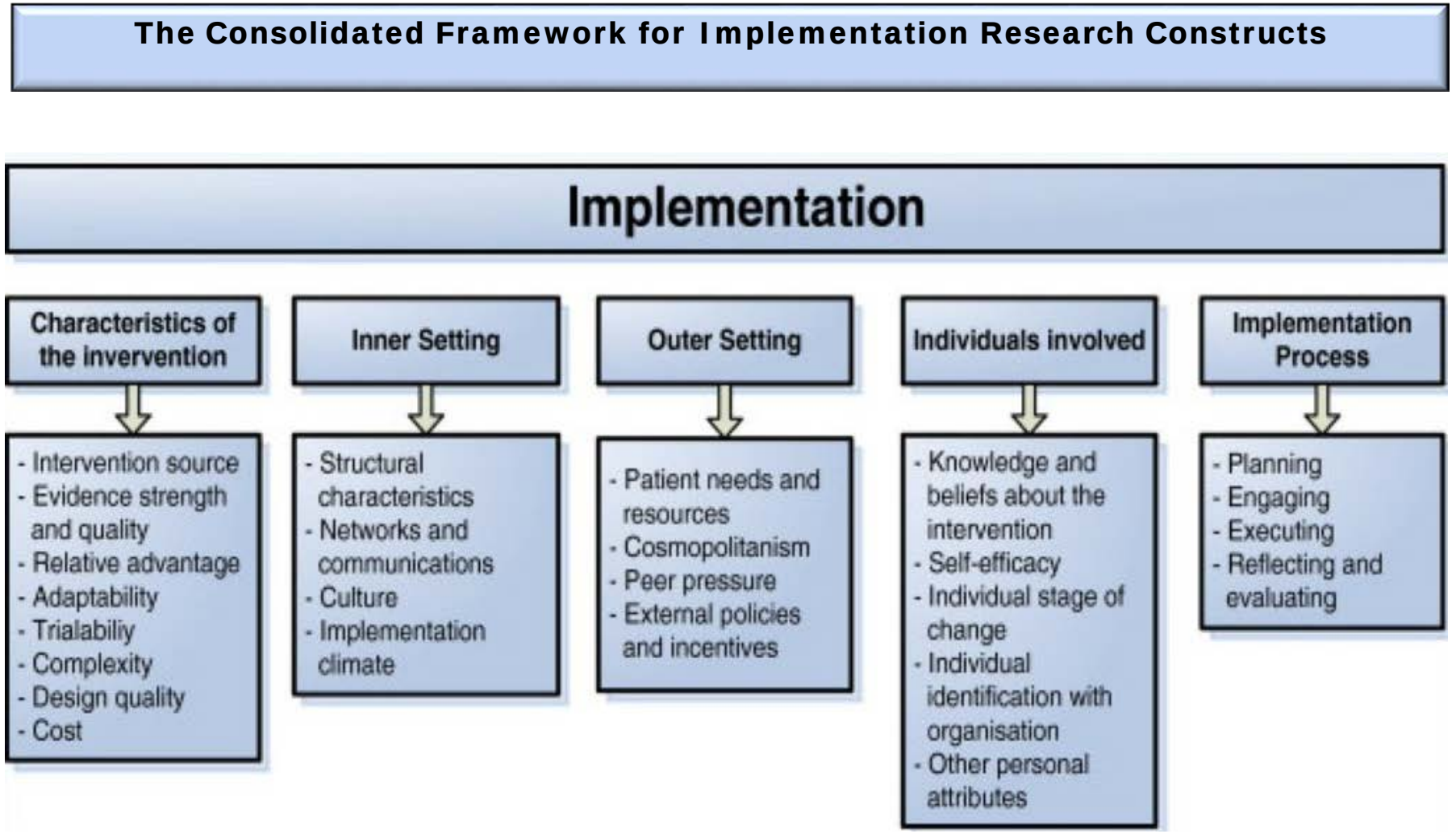


Figure 2.6: CFIR constructs (Damschroder et al. 2009)

2.6.5. Uses of the Consolidated Framework of Implementation Research

The CFIR has many uses according to Damschroder et al. (2009):

- To understand more what works where and why
- To be better able to predict implementation effectiveness across disparate context. Moreover, it can also be used prior to implementation
- To identify potential barriers and facilitators for the implementation of an intervention by exploring its capacity and needs from the perspective of the individuals and organisations involved
- To guide exploration of what factors influenced implementation and how implementation influenced performance of the intervention
- To organise and promote synthesis of research findings thus stimulating further theory development since it consists of clear definitions and terminologies

In the current doctoral research, the CFIR was used throughout Phases 3 and 4, including conceptualising the idea, formulating the research questions, developing the data generation and collection tools, and analysing and presenting data.

2.6.6. Consolidated Framework of Implementation Research in practice

Since development in 2009, CFIR has been used in over 350 implementation and evaluation studies. A comprehensive list can be found on the CFIR website (http://cfirguide.org/examp.html).

A systematic review published in 2016 investigated the extent to which CFIR had been used in implementation research (Kirk et al. 2016). Twenty-six published, peer-reviewed papers were included, 15 post-implementation, 8 during implementation and 2 pre-implementation. While it was applied for diverse study objectives, settings, methods (qualitative, quantitative and mixed methods) and units of analysis, most studies only referred to CFIR

during analysis. There is therefore scope to use CFIR more widely within a single research study to also advance implementation research.

2.7. Quality in research

2.7.1. Introduction

Regardless of the theory used, there are four main criteria to assess the quality of research studies; truth value, applicability, consistency and neutrality. These terms are applied differently in qualitative and quantitative approaches, as shown in Table 2.20.

Table 2.20: Quality assessment criteria in research (Noyes et al. 2011)

Criteria	Qualitative Term	Quantitative Term
Truth value	Credibility	Internal validity
Applicability	Transferability	External validity or generalisability
Consistency	Dependability	Reliability
Neutrality	Confirmability	Objectivity

The qualitative terms of credibility, transferability, dependability and confirmability are also captured under the umbrella term trustworthiness.

2.7.2. Quality in qualitative research

According to Noyes et al. (2011), credibility is concerned with whether or not the representation of data fits the views of the participants studied. Techniques used to assess the credibility of findings include external auditors, peer debriefing, attention to negative cases, independent analysis of data by more than one researcher, verbatim quotes, persistent observation.

Transferability focuses on whether results can be applied to other people or settings. Techniques involved in assessing transferability include providing details of the study participants to enable readers to evaluate for which target groups the study provides valuable information, providing contextual background information, demographics, the provision of thick description about both the sending and the receiving context.

Dependability is the extent to which the research process, especially the method, is logical and clearly documented. Thus, it is the degree to which

different researchers are able to produce the same data on a specific topic. To assess this, researchers might employ peer review, debriefing, audit trails, triangulation in the context of the use of different methodological approaches to look at the topic of research, reflexivity to keep a self-critical account of the research process, calculation of inter-rater agreements etc.

Confirmability considers the extent to which findings are qualitatively confirmable through the analysis being grounded in the data and through examination of the audit trail. Techniques include assessing the effects of the researcher during all steps of the research process, reflexivity, providing background information on the researchers such as their background, education, perspective, and school of thought.

2.7.3. Quality in quantitative research

Validity refers to the accuracy of instruments, data and findings in research (Bernard 2013). According to Tashakkori and Teddlie (1998), internal validity refers to the degree of confidence in the conclusions of the research (changes in an outcome can be attributed to a preceding variable rather than to other potential causal factors). External validity refers to the degree to which the results can be generalised to people who were not part of the study undertaken (Bernard 2013).

Reliability refers to internal consistency (whether the items' responses are consistent across constructs) and test-retest correlations (are scores stable over time when the instrument is administered a second time) as well as consistency in test administration and scoring (Creswell 2014). Reliability refers to whether or not the same answers are generated by using the same instrument more than once (Bernard 2013).

Payne and Payne (2004) define objectivity as ensuring that the researchers' personality, beliefs and values do not interfere with the study, when possible. Thus, the findings should only depend on the nature of what was studied.

2.7.4. Quality control measures for the doctoral research

To ensure the quality of this project, all data generation and collection tools used in Phase 3 and Phase 4 as part of this doctoral project were carefully

designed based on the literature searched as well as the theoretical framework (CFIR). Moreover, the expertise of the research team was also utilised since they have a vast experience and numerous publications in the areas of qualitative and quantitative research as well as in non-medical prescribing development, implementation and evaluation. In addition, all data collection tools were also validated and piloted to ensure that they are clear, appropriate and comprehensive.

In addition, careful considerations were made in the selection and recruitment of participants in Phase 3 and Phase 4 in order to ensure comprehensiveness and representation.

When conducting both the qualitative and quantitative studies, each model of pharmacist prescribing was defined in order to ensure that all stakeholders have a unified understanding of their differences. Additionally, analysis for all phases was mapped to the CFIR constructs and independently reviewed by at least one supervisor to ensure accuracy.

Furthermore, the final report included details on all the different aspects of the research such as when and how data were collected and analysed as well as any underpinning phenomena that might have influenced the results. Moreover, the researchers presented the differing views reported by participants on pharmacist prescribing by eliciting their knowledge and understandings. For example, in Phase 3, participants' insights were stated in their own words to ensure accuracy and transparency in reporting findings. Similarly, for the Delphi study, all feedback received was shared throughout the rounds with the different experts and subsequently included in the final report to avoid introducing bias into the results.

2.8. Summary of methods employed in the doctoral research

The research designs that were employed in this project are summarised in figure 2.7:

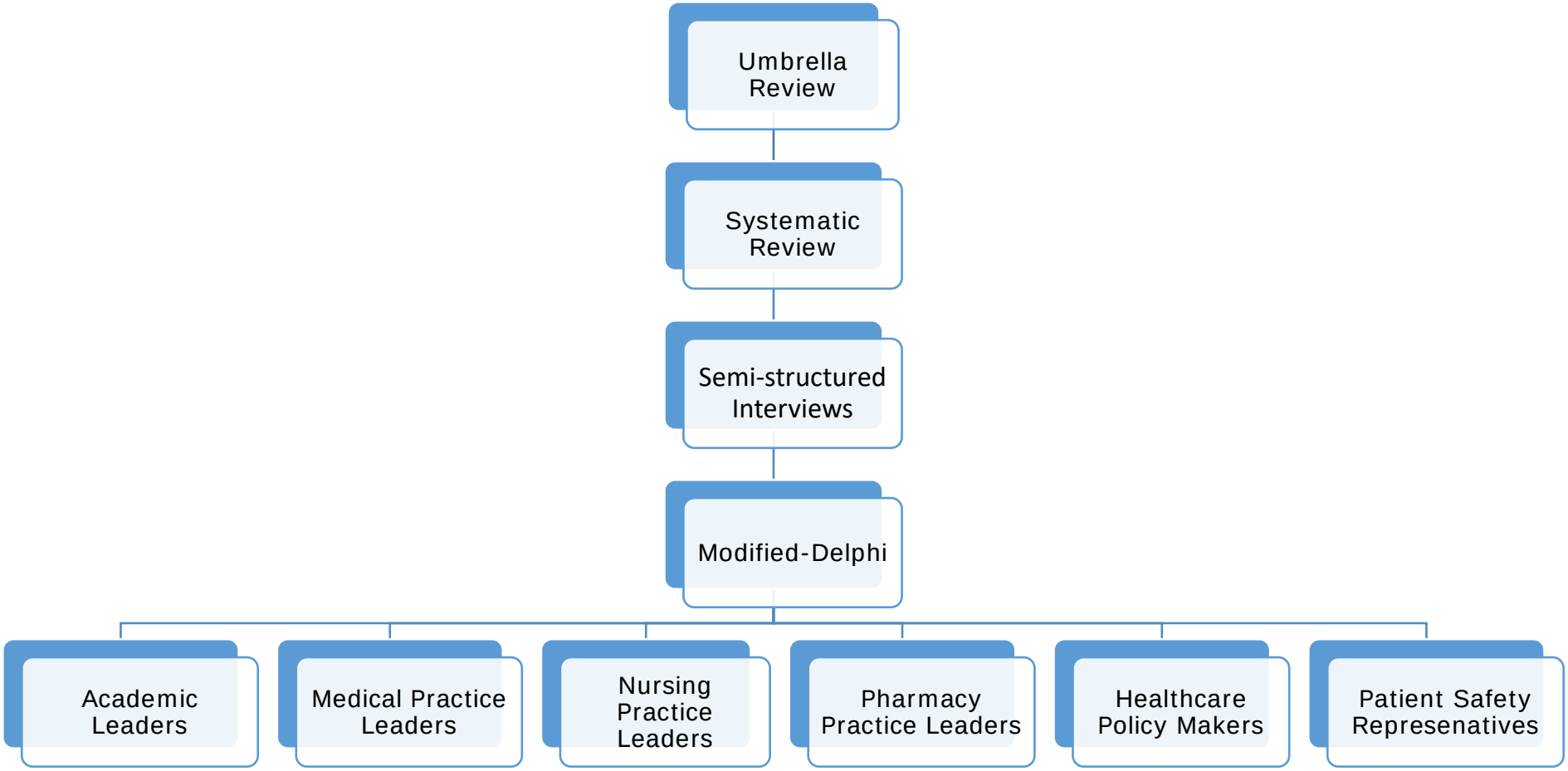


Figure 2.7: Summary of project's methods

Chapter 3:

An umbrella review of the published systematic reviews on aspects of non-medical prescribing

3. Introduction to the chapter

Many countries have implemented non-medical prescribing (NMP) and many others are scoping prescribing practices with a view to developing NMP. This chapter describes the findings of an umbrella review of aspects of NMP. As discussed in Chapter 2, umbrella reviews provide synthesis of the findings of systematic reviews (Aromataris et al. 2015). Conducting such a review involves examining the quality of the included systematic review but does not require repeating the searches, assessment of study eligibility or quality assessment of the included reviews. The focus is on providing an overall picture of findings around the umbrella review aim.

3.1. Aim

The aim of this umbrella review was to collate and summarise all the published systematic reviews on NMP in order to report aspects, including, but not limited to: models and definitions; legal frameworks; outcomes and benefits; perceptions and satisfaction of different stakeholders (e.g. general public, patients, health professionals and decision makers); and facilitators and barriers to implementing NMP. The search was conducted between March and November 2016.

3.2. Methods

3.2.1. Search strategy

Systematic reviews meeting the above criteria and published in English were included in the review. The following electronic bibliographic databases were searched: Medline, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Science Direct, International Pharmaceutical Abstracts and Google Scholar. The Cochrane Library, the Centre for Reviews and Dissemination (Prospero) and Joanna Briggs Institute databases were also searched to identify any registered systematic review protocols. The reference lists of the retrieved reviews were examined to locate any further reviews.

Table 3.1 describes the scope of the databases searched.

Table 3.1: Scope of selected databases

Database	Scope
Medline	MEDLINE is the U.S. National Library of Medicine (NLM) premier bibliographic database. It contains references to journal articles in life sciences with a concentration on biomedicine and health. This is broadly defined to encompass those areas of the life sciences, behavioral sciences, chemical sciences, and bioengineering (ProQuest 2016).
CINAHL	CINAHL Database provides indexing of the top nursing and allied health literature available including nursing journals and publications from the National League for Nursing and the American Nurses Association. Literature covers a wide range of topics including nursing, biomedicine, health sciences librarianship, alternative/complementary medicine, consumer health and 17 allied health disciplines. In addition, CINAHL Database provides access to healthcare books, nursing dissertations, selected conference proceedings, standards of practice, audiovisuals and book chapters. It includes full-text journals, legal cases, clinical innovations, critical paths, research instruments and clinical trials (EBSCO Health 2016).
ScienceDirect®	ScienceDirect hosts over 3,800 journals and more than 35,000 books—over 14 million peer-reviewed publications (and growing) from Elsevier. It is Elsevier's leading information solution for researchers, teachers, students, healthcare professionals and information professionals. It combines authoritative, full-text scientific, technical and health publications with smart, intuitive functionality (Elsevier 2016).
International Pharmaceutical Abstracts	The International Pharmaceutical Abstracts (IPA) database provides comprehensive coverage of worldwide pharmaceutical and related healthcare literature and is used by professionals in every area of healthcare by medical librarians and researchers in the pharmaceutical and cosmetic industries. Topics range from drug use, adverse reactions and drug interactions to pharmacy practice, drug research and technology. The scope of topics covered ranges from clinical, practical and theoretical to economic and scientific (ProQuest 2016).
Cochrane Library	The Cochrane Library is a collection of six databases that contain different types of high-quality, independent evidence to inform healthcare decision-making, and a seventh database that provides information about Cochrane groups (Cochrane Library 2016).
PROSPERO Database	PROSPERO is an international database of prospectively registered systematic reviews in health and social care. PROSPERO aims to provide a comprehensive listing of systematic reviews registered at inception to help avoid unplanned duplication and enable comparison of reported review methods with what was planned in the protocol (Centre for Reviews and Dissemination 2015).
Joanna Briggs Institute Database of Systematic Reviews	The JBI Database of Systematic Reviews and Implementation Reports is a refereed, online journal that publishes systematic review protocols and systematic reviews of healthcare research. The JBI Database of Systematic Reviews and Implementation Reports also publishes the Institute's implementation reports that present the findings of projects that seek to implement the best available evidence into practice (Wolters Kluwer 2016).
Google Scholar	Google Scholar provides a simple way to broadly search for scholarly literature across many disciplines and sources. It contains articles, theses, books, abstracts and court opinions, from academic publishers, professional societies, online repositories, universities and other web sites (Google 2016).

The search strategy included only terms relating to or describing NMP, with no limits placed on the search. Alerts were created to check for further reviews for inclusion while conducting the review. An example of the search for Medline is given in Box 3.1.

Box 3.1. Medline search string
("non-medical prescrib*" OR "non medical prescrib*" OR NMP OR "pharmac* prescrib*" OR "nurse* prescrib*" OR "midwi* prescrib*" OR "podiatrist* prescrib*" OR "chiropodist* prescrib*" OR "optometrist* prescrib*" OR "orthoptist* prescrib*" OR "optician* prescrib*" OR "physiotherapist* prescrib*" OR "physical therapist* prescrib*" OR "dieti* prescrib*" OR "occupational therapist* prescrib*" OR "paramedic* prescrib*" OR "radiographer* prescrib*" OR "respiratory therapist* prescrib*" OR "audiologist* prescrib*") AND (review)

Title, abstract and full text screening and assessment for inclusion was conducted by one of the reviewers (TJ), with another (DS) reviewing independently a 10% random sample to ensure sensitivity (comprehensiveness of search) and specificity (precision and relevance of reviews retrieved). Any disagreements were resolved through discussion without having to consult a third reviewer.

3.2.2. Assessment of methodological quality

The quality of systematic reviews that met the inclusion criteria was assessed using the Critical Appraisal Skills Programme (CASP) tool (CASP 2016) (Appendix 3A). Quality assessment was conducted independently by two reviewers (TJ and DS or KM or SC or AA or ARP) and disagreements resolved through discussion without having to consult a third reviewer.

3.2.3. Data extraction

The characteristics of the included reviews were extracted and summarised in tables. Data extracted were: authors; year of publication; country/countries of focus; type of review; objectives; NMP definition; databases searched; number of articles; and major findings. As with the quality assessment, data extraction was undertaken independently by two reviewers.

3.2.4. Data synthesis

Due to heterogeneity of reviews in terms of objectives and data, a narrative synthesis was most appropriate.

3.3. Results

Searching identified 528 studies, which was reduced to 453 after removing duplicates. Four hundred and five were excluded on review of titles and abstracts (no search strategy included or not related to NMP) leaving 48, with two more identified from reference lists making 50. Full-text screening excluded a further 26 (reasons as before). Of the remaining 24, there were 13 non-systematic reviews, 4 were protocols leaving 7 systematic reviews for quality assessment, data extraction and synthesis. The PRISMA flow chart is provided in Figure 3.1.

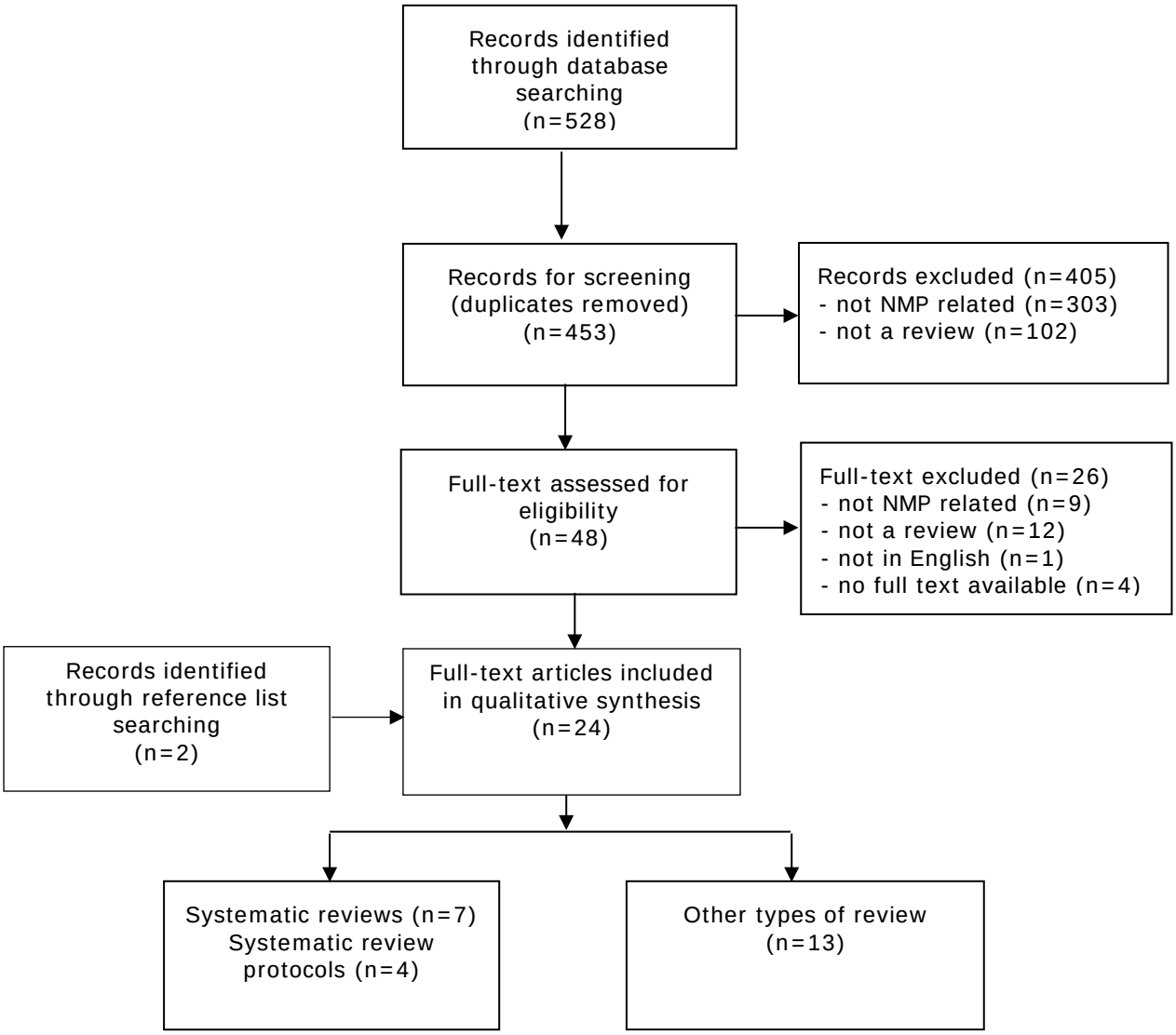


Figure 3.1: PRISMA flow chart detailing the inclusion process

3.3.1. Quality of included studies

The quality assessment of the seven systematic reviews is given in Table 3.2. Most were deemed of high quality, although one would have benefited from searching country specific databases and lacked quality assessment (Kroezen et al. 2011), and qualitative findings could have been subjected to meta-synthesis in another (Ness et al. 2016).

3.3.2. Characteristics and key findings of included studies

The data extraction is given in Table 3.3. Five focused solely on nurse prescribing (Van Ruth et al. 2007, Kroezen et al. 2011, Darvishpour et al. 2014, Gielen et al. 2014, Ness et al. 2016) with two discussing all non-medical prescribers (McIntosh et al. 2016, Weeks et al. 2016). While five included all studies irrespective of country or setting (Van Ruth et al. 2007, Darvishpour et al. 2014, Gielen et al. 2014, Ness et al. 2016, Weeks et al. 2016), one included only those conducted in Western European and Anglo-Saxon countries (Kroezen et al. 2011), and one was restricted to the UK (McIntosh et al. 2016). The number of studies reviewed ranged from three to 124. Two reviews focused on aspects of influences on prescribing decision-making generally (McIntosh et al. 2016) and prescribing behaviour related to antimicrobials (Ness et al. 2016). One reported the extent of implementation of nurse prescribing (Kroezen et al. 2011), one processes of prescribing and associated barriers and facilitators to implementation (Darvishpour et al. 2014), with three on various patient outcome measures (Van Ruth et al. 2007, Gielen et al. 2014, Weeks et al. 2016).

3.3.3. Synthesis of findings

Decision making and prescribing behaviours were reported as complex with many, and often conflicting, influences (McIntosh et al. 2016, Ness et al. 2016). Of the three studies reviewed by McIntosh et al. (2016) decision-making was not the primary aim for any. Acknowledging the paucity of studies and limited evidence base, key influences on decision-making included non-medical prescribers' experience, evidence based guidelines and treatment protocols, peer support and encouragement from medical practitioners, and patients. Ness et al. (2016) reported similar influences on

decision-making in relation to antibiotic prescribing in the seven studies reviewed. Patient and parent pressure was noted as a key influence in both the decision to prescribe and which antibiotic to prescribe. These two systematic reviews have highlighted the need for further research on the decision-making processes, decisions and prescribing behaviours of non-medical prescribers to inform NMP education, training and practice.

Facilitators of NMP included perceived improved patient care, professional autonomy and potential to apply expertise while barriers included lack of clearly defined roles of non-medical prescribers, time for prescribing activities and other resource pressures such as lack of funding to support prescribing roles, other competing tasks, lack of confidence of some NMPs, and the lack of acceptance of the role by other health professionals and patients. (Darvishpour et al. 2014). This review was a meta-synthesis of 11 qualitative studies. There would be merit in updating this review to incorporate qualitative, quantitative and mixed methodology studies but with focus on how facilitators are enabled and barriers overcome. Findings would assist greatly the development and implementation of NMP in new settings and countries.

Three systematic reviews have now been published reporting data on patient outcomes. (Van Ruth et al. 2007, Gielen et al. 2014, Weeks et al. 2016). Despite the largely positive findings on a variety of outcome measures, the review authors all highlighted the absence of well-designed RCTs and high levels of bias associated with many of the studies included in their reviews which often resulted in the outcomes findings being downgraded. In addition, the review authors noted the issue of often poor definition and description of ‘prescribing’ and the ‘prescribing process’ within many studies, and the difficulty in separating NMP effects from the contributions of other members of the healthcare team. Review findings should therefore be interpreted with great caution. In 2007, Van Ruth et al. reported their review of 23 studies of nurse prescribing. Of the nine studies reporting clinical outcomes, there were no differences between nurses and GPs in terms of resolution of symptoms, health status rating, and clinical improvement over two weeks. These studies included ‘various’ patients, those presenting acutely with sore throats, need for contraception and the chronic condition of diabetes mellitus hence limiting

the opportunity for data pooling. In 2014, Gielen et al. reported a systematic review of 35 studies of nurse prescribing. Of the 13 studies reporting clinical outcomes, there were no differences between nurse and physician prescribing in a variety of conditions including diabetes, hypertension, asthma, sore throat and contraception. The heterogeneity of patient populations and outcome measures limited the potential for any data pooling. Very recently, Weeks et al. (2016) reported a Cochrane review of 46 studies (26 nurse and 20 pharmacist prescribers) of clinical, patient-reported, and resource use outcomes of NMP for managing acute and chronic health conditions in primary and secondary care settings compared with medical prescribing. A meta-analysis of outcome measures of chronic disease showed positive intervention group effects. There was a moderate-certainty of evidence for studies of blood pressure at 12 months (12 studies, 4229 participants) and low-density lipoprotein (7 studies, 1469 participants). Patients were generally satisfied with non-medical prescriber care (14 studies, 7514 participants). A wide variety of resource use measures were reported across studies with little difference between groups for hospitalisations, emergency department visits, and outpatient visits. The authors concluded that there remains a need for well designed, conducted and reported randomised controlled trials of NMP compared to medical prescribing. However, as NMP is implemented increasingly into practice, there may be less desire from policy makers, healthcare leaders and funders to support such studies, preferring instead robust, rigorous evaluation of real life practice.

Table 3.2: Quality assessment of the seven systematic reviews (CASP 2016)

Authors (Year)	Are the results of the review valid?					What are the results?		Will the results help locally?	
	Review addressed a clearly focused issue	Search relevant	Important and relevant studies included	Rigorous assessment of quality of included studies	Reasonable to combine results of review	Overall results of review	Precision of results appropriate	Applicable to local population	All important outcomes considered
Van Ruth et al. (2007)	Yes	Yes	Yes	Yes	Yes, pooled if homogenous (for one review question) but noted high risk of bias in some studies	Very clear presentation of results according to aim	Yes (pooled data)	N/A	Yes
Kroezen et al. (2011)	Yes	Partially (peer reviewed literature less appropriate for some questions, e.g. extent of legal, educational conditions)	Partially	No explicit coverage of quality assessment	N/A as no meta-analysis or meta-synthesis	Very clear presentation of results according to aim	N/A as no pooling	N/A	Yes
Gielen et al. (2014)	Yes	Yes	Yes	Yes	Yes, pooled if homogenous but noted high risk of bias in some studies	Very clear presentation of results according to aim	Yes (pooled data)	N/A	Yes
Darvishpour et al. (2014)	Yes	Yes	Yes	Yes	Yes, qualitative meta-synthesis	Very clear presentation of results	N/A for meta-synthesis	N/A	Yes

						according to aim			
McIntosh et al. (2016)	Yes	Yes	Yes	Yes	Yes, qualitative meta-synthesis	Very clear presentation of results according to aim	N/A for meta-synthesis	N/A	Yes
Ness et al. (2016)	Yes	Yes	Yes	Yes	No meta-synthesis of qualitative studies given	Very clear presentation of results according to aim	N/A for meta-synthesis (although not conducted)	N/A	Yes
Weeks et al. (2016)	Yes	Yes	Yes	Yes	Yes, pooled if homogenous but noted high risk of bias in some studies	Very clear presentation of results according to aim	Yes (pooled data)	N/A	Yes

Table 3.3: Data extraction of seven systematic reviews

Authors (Year)	Aims/ Objective(s)	Country	NMP	Databases searched and search terms used	Number of articles	Findings
Van Ruth et al. (2007)	Aimed to review the effects of medication being prescribed by nurses. The following research questions were addressed: what are the effects of nurse prescribing compared to physician prescribing, on the quantity and types of medication being prescribed?; what are the effects of nurse prescribing on patient outcomes?; what are the effects of nurse prescribing on physician and nurse outcomes?; what are the effects of nurse prescribing on characteristics of the health care system?	Review of all studies, irrespective of country	Nurse prescribing	Pubmed, Embase, CINAHL, Cochrane Library, Picarta, SCI, Invert, Biomed central, Virginia Henderson Library, Current Control Trials, NIVEL catalog, UK Department of Health, World Health Organisation, Nurse Prescriber website, Google For Pubmed, the following search terms were used: ("Nurse prescribing") OR (Nurs* [tiab] AND Prescri* [tiab]) OR (Nurs* AND prescriptions, drug [MeSH])	23	Nurses sometimes differed from physicians in the number of patients they prescribe for and in the choice of type of medication. Clinical parameters were the same or better for treatment by nurses compared to physicians across a range of conditions (diabetes and 'various') Perceived quality of care by nurses was similar or better. The effects on professionals or on the health care system could not be described.
Kroezen et al. (2011)	Aimed to gain insight into the scientific and professional literature describing the extent to and the ways in which nurse prescribing has been realised or is being introduced in Western European and Anglo-Saxon countries.	Western European and Anglo-Saxon countries	Nurse prescribing	PubMed, Embase, CINAHL, Web of Science, EBSCO, NIVEL, Virginia Henderson International Nursing Library, WHO website, Health professionals' website, Google scholar.	124	Seven countries had implemented nurse prescribing of medicines. The Netherlands and Spain were in the process of introducing nurse prescribing.

	Secondly, to identify possible mechanisms underlying the introduction and organisation of nurse prescribing on the basis of Abbott's theory on the division of professional labour.			The following keywords were used: "nurse prescribing", "independent (nurse) prescribing", "autonomous prescribing", "supplementary (nurse) prescribing", "dependent (nurse) prescribing", "collaborative prescribing", "group protocols" "patient group directions", "time and dose prescribing", "nurse formulary"		A diversity of external and internal forces had led to the introduction of nurse prescribing internationally. The legal, educational and organisational conditions under which nurses prescribe medicines varied considerably between countries; from situations where nurses prescribed independently to situations in which prescribing by nurses was only allowed under strict conditions and supervision of physicians.
Darvishpour et al. (2014)	Aimed to obtain new insights on nurse prescribing drugs, and to present a schematic model of Nurse prescribing that could be a useful framework for its implementation. The following research questions were addressed: what is the overall view on nurse prescribing?; what are the positive and negative outcomes of nurse prescribing?; what are the barriers and facilitators for its implementation?	Review of all studies, irrespective of country	Nurse prescribing	Integrated Digital National Library of Medicine, CINAHL, Medline, Cochrane Library, Scopus, Web of science, Elsevier, Emelard, JAMA journals, Wiley, Oxford journals, Springer and Thieme journals, WHO website, - Nurse prescriber website, Google scholar, Cambridge journals website The following were used: review AND nurs* prescri*.	11	Studies revealed eight themes namely: leading countries in prescribing, views, features, infrastructures, benefits, disadvantages, facilitators and barriers of nursing prescribing. Despite the positive view on nurse prescribing, there were still issues such as legal, administrative, weak research and educational deficiencies in academic preparation of nurses.
Gielen et al. (2014)	Aimed to identify, appraise and synthesise the evidence presented in the literature on the effectiveness of nurse prescribing compared to physician prescribing.	Review of all studies, irrespective of country	Nurse prescribing	BioMed Central, CINAHL, Cochrane Database of Systematic Reviews, Current Controlled Trials, Embase, INVERT (Dutch nursing literature index), NIVEL catalogue, PiCarta (Dutch library system), PubMed,	35	Nurses prescribed in comparable ways to physicians. They prescribed for equal numbers of patients and prescribe comparable

	The following research questions were addressed: what are the effects of nurse prescribing on the quantity and types of medication being prescribed?; what are the effects of nurse prescribing on patient outcomes?			Science Citation Index and the Virginia Henderson International Nursing Library, and the website of the UK Department of Health, the website of the World Health Organisation, a website for health professionals and Google Scholar For Pubmed: ("Nurse prescribing") OR (Nurs* [tiab] AND Prescri* [tiab]) OR (Nurs* AND prescriptions, drug [MeSH])		types and doses of medicines. Studies comparing the total amount of medication prescribed by nurses and doctors show mixed results. There appeared to be few differences between nurses and physicians in patient health outcomes: clinical parameters were the same or better for treatment by nurses, perceived quality of care was similar or better and patients treated by nurses were just as satisfied or more satisfied.
McIntosh et al. (2016)	To critically appraise, synthesise and present evidence on the influences on prescribing decision-making among supplementary and independent non-medical prescribers in the UK.	UK	All non-medical prescribers	Medline, PsycARTICLES, CINAHL, International Pharmaceutical Abstracts, Education Resources Information Centre, Cochrane Library, Google Scholar, reference lists The following search terms were used: prescrib* and (pharmacist* or nurse* or physiotherapist* or podiatrist* or radiographer* or optometrist*) and (influenc* or decision* or decid* or judge* or factor*)	3	While all studies reported aspects of prescribing decision-making, this was not the primary research aim for any. Studies were carried out in primary care almost exclusively among nurse prescribers (n = 67). Complex influences were evident such as experience in the role, the use of evidence-based guidelines and peer support and encouragement from doctors; these helped participants to feel more knowledgeable and

						confident about their prescribing decisions. Opposing influences included prioritisation of experience and concern about complications over evidence base, and peer conflict.
Ness et al. (2016)	To present the findings of a systematic review which explored the influences on the antimicrobial prescribing behaviour of independent nurse prescribers.	Review of all studies, irrespective of country	Independent nurse prescribing	Medline, CINAHL, AMED, HealthSource Nursing/Academic Edition, Proquest Health, Internurse, Cochrane Database, Web of Knowledge, Index to Thesis, ETHOS, reference lists Search terms included: Prescri* AND Antibiotic OR antimicrobial OR antibacterial AND Nurs*	7	Three articles expected that an antimicrobial would be given and therefore influences discussed were on the choice of the antimicrobial. Guidelines/protocols, safety, tolerability and efficacy of the antimicrobial itself, patient/parent pressure and training/experience were mentioned as influencing factors within the reported studies. The other four studies explored influences on whether to prescribe an antimicrobial or not and also found that guidelines/protocols were an influencing factor, however, the influence occurring most frequently was diagnostic uncertainty.

Weeks et al. (2016)	To assess clinical, patient-reported, and resource use outcomes of non-medical prescribing for managing acute and chronic health conditions in primary and secondary care settings compared with medical prescribing (usual care).	Review of all studies, irrespective of country	Healthcare providers who were not medical doctors, undertaking prescribing including, nurses, optometrist, pharmacists, physician assistants, and other allied health professionals or categories not specifically mentioned whose roles met the definition of non-medical prescribing	Cochrane Database, DARE, HTA, Medline, Embase, PsycINFO, CINAHL. grey literature, trial registries	46	A meta-analysis of surrogate markers of chronic disease (systolic blood pressure, glycated haemoglobin, and low-density lipoprotein) showed positive intervention group effects. While there appeared little difference in medication adherence across studies, a meta-analysis of continuous outcome data from four studies showed an effect favouring patient adherence in the non-medical prescribing group. Patients were generally satisfied with non-medical prescriber care.

3.4. Discussion

3.4.1. Summary of key findings

The review identified seven systematic reviews of influences on prescribing decision-making, processes of prescribing, and barriers and facilitators to implementation. Decision making was reported as complex with many, and often conflicting, influences (McIntosh et al. 2016, Ness et al. 2016). Facilitators of NMP included perceived improved patient care and professional autonomy, while barriers included lack of defined roles and resource pressures (Darvishpour et al. 2014). Three systematic reviews explored patient outcomes that were noted to be equivalent or better to physician prescribing (Van Ruth et al. 2007, Gielen et al. 2014, Weeks et al. 2016). Despite positive findings, authors highlighted high bias, poor definition and description of 'prescribing' and the 'prescribing process' and difficulty in separating NMP effects from the contributions of other healthcare team members.

3.4.2. Strengths and weaknesses

This umbrella review is the first published review to collate all the published systematic reviews around NMP globally. It provides a comprehensive description of the different aspects of NMP hence assists in identifying gaps in the evidence base. Furthermore, the quality of included systematic reviews was deemed of high quality thus strengthening the validity of the conclusion derived from this umbrella review. The umbrella review is limited only by the number of published systematic reviews.

3.4.3. Systematic reviews published since November 2016

Since completion of this systematic review in November 2016, five additional systematic reviews have been published hence add to the evidence base around aspects of non-medical prescribing. Data extraction from these reviews is presented in the Table 3.4, illustrating the varied focus in terms of non-medical prescribers targeted, countries and specific review aims.

Table 3.4: Data extraction of five systematic reviews published after November 2016						
Authors (Year)	**Aims/ Objective(s)**	**Country**	**NMP**	**Databases searched and search terms used**	**Number of articles**	**Findings**
Abuzour, Lewis and Tully (2017)	To explore whether the theory of expertise development model is applicable to non-medical independent prescribing and to assess the factors underpinning expertise development reported in the literature.	UK	Pharmacist and nurse independent prescribing	EMBASE, Medline, AMED, CINAHL, IPA and PsychInfo were searched for articles published between 2006 and 2016. Search terms included nonmedical prescribe*/non medical prescribe*, independent prescrib*, nurs* independent prescrib*, pharmac* independent prescrib*, education, curriculum, courses, training, clinical competen*, competen*, diagnos*, assess*.	34	Knowledge, pre-registration education, experience, support and confidence were intrinsic and extrinsic influences. Difficulty in transferring theory to practice was attributed to lack of basic pharmacology and bioscience content in pre-registration nursing rather than the prescribing programme. Students considered interventions using virtual learning or learning in practice most useful. IPs were able to develop their expertise when integrating their competencies in a workplace context with support from colleagues.
Cleary et al. (2017)	To identify and summarise qualitative research that focused on mental health nurse prescribing, synthesise findings, and outline key themes discerned	UK	Nurse prescribing	PubMed, Excerpta Medica, (Embase), Cumulative Index to Nursing and Allied Health Literature, Scopus, PsycINFO and reference lists.	12	Three themes emerged from the review: (i) patient-centred care; (ii) professional role; and (iii) professional support. Nurse prescribers embraced a patient-centred approach, providing timely and

				Boolean operators and/or were used to combine search terms, including qualitative research, nursing, nurse*, psychiatric nursing, nurse prescrib*, and mental health.		effective medication management. Adequate education and continuing professional development inclusive of clinical supervision enable competency development in nurse prescribing, supportive professional relationships, and patient safety.
Noblet et al. (2017)	The review question was, what are the factors that affect the implementation or utilisation of independent non-medical prescribing (iNMP)?	Review of all studies, irrespective of country	Independent non-medical prescribing	Databases (CINAHL, EMBASE, MEDLINE, AMED, NICE, Medicines Complete, HMIC, ASSIA, Web of Science, Health and Safety Science Abstracts), Internet sites (PUBMED, Turning Research into Practice, Google Scholar, Royal College of Nursing, Royal Pharmaceutical Society, King's Fund, National Institute of Clinical Excellence, Department of Health, National Prescribing Centre, Chartered Society of Physiotherapy, Society of Chiropodists and Podiatrists, American Association of Nurse Practitioners, Australian College of Nurse Practitioners, Canadian Pharmacists Association, Optometry Australia, British Optometry Association), National Research Register, Hand searching of key journals, System for Information on Grey	43 qualitative and seven quantitative studies	Qualitative data were synthesised into four themes (and subthemes): systems (government and political, organisational, formulary); education and support (non-medical prescribing (NMP) courses/continuous professional development (CPD)); personal and professional (medical profession, NMP professions, service users); and financial factors. Quantitative data corroborated the qualitative themes.

				Literature, unpublished research, Expert opinion, Reference lists of all included papers The search terms developed in MEDLINE are presented in Appendix 1.		
Noblet et al. (2018)	To evaluate the clinical and cost-effectiveness of non-medical prescribing (NMP).	Review of all studies, irrespective of country	Non-medical prescribing	CINAHL, EMBASE, MEDLINE, AMED, NHS Economic Evaluation database, NICE, Medicines Complete Cochrane Central Register of Controlled Trials), Selected internet sites (PUBMED, Turning Research into Practice, Current Controlled Trials website (York), Google Scholar, the Royal college of Nursing, Royal Pharmaceutical Society, King's Fund, National Institute of Clinical Excellence, Department of Health, National prescribing Centre, Chartered Society of Physiotherapy, Society of Chiropodists and Podiatrists, American Association of Nurse Practitioners, Australian College of Nurse Practitioners, Canadian Pharmacists Association, Optometry Australia, British Optometry Association), National Research Register, Expert Opinion, Hand searches- key journals Full electronic search strategy for Medline OvidSP was presented in the paper.	3 RCTs	Participants demonstrated significant improvement in outcomes when receiving NMP compared to treatment as usual (TAU) in all RCTs. An associated cost analysis showed NMP to be more expensive than TAU (regression coefficient p = 0.0000), however experimental groups generated increased QALYs compared to TAU.

Tabesh et al. (2018)	To examine the effectiveness of nurse-led clinics, in which nurses were involved in prescribing, on haemoglobin A1c (HbA1c) among people with type 2 diabetes.	Review of all studies, irrespective of country	Nurse prescribing	Medline, the Cochrane Central Register of Controlled Trials (CENTRAL), EMBASE and Allied Health Literature database guide (CINAHL) and reference lists. The literature search strategy involved Medical Subject Heading (MESH) and text words that include “diabetes” and “nurse” or “nursing practitioners” and “trials”.	9 RCTs	In the five RCTs in which nurse prescribers supplemented a team, there was no significant difference in change of HbA1c compared to usual care (-0.34 percentage points; 95% CI: −0.71, 0.02). In the four RCTs in which nurses replaced doctors, the outcomes of nurse prescribers were comparable to those of doctors. No data on adverse events were available.

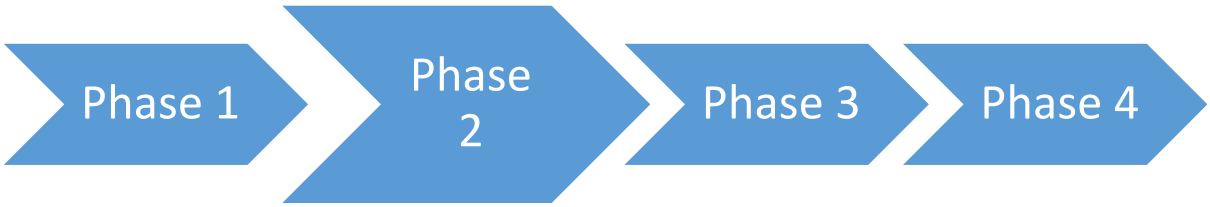
The findings of these systematic reviews augment those of the umbrella review, further expanding the evidence base particularly in relation to education, implementation and impact on specific outcomes. Given that the umbrella review identified only three systematic reviews reporting patient outcomes (Van Ruth et al. 2007, Gielen et al. 2014, Weeks et al. 2016), these additional outcomes based systematic reviews are worthy of further consideration. While Noblet et al. sought to review the clinical and cost-effectiveness of NMP, only three studies were identified (Noblet et al. 2018). Of these, one was rated as high bias and one unclear and one was of poor quality, hence the findings given in Table 3.4 should be interpreted with caution. Tabesh et al. (2018) aimed to review the impact of nurse prescribing on glycaemic outcomes in patients with Type 2 diabetes mellitus. All nine studies had a medium degree of bias. Of the five in which the nurse prescribers worked alongside physicians (prescribing models not clearly defined), there was no significant difference in outcomes. In the remaining four studies in which the nurse prescribers replaced the physicians (again model not clearly described), outcomes were comparable.

3.5. Conclusion

This umbrella review (together with the findings of systematic reviews since completion and publication of the umbrella review) has identified an accumulation of evidence of aspects of non-medical prescribing. While the studies included within the reviews are not all of the highest quality, there is evidence of successful implementation and merging evidence of outcomes. It is, however, important for future studies to clearly define ‘prescribing’, models of prescribing, associated training and scope of practice.

3.6. Implications for next phase

To date, no published systematic review has synthesised studies on stakeholders’ views and experiences of non-medical prescribing either pre- or post-implementation. Given that the primary doctoral research will focus on pharmacist prescribing in Qatar, such a systematic review on pharmacist prescribing would be beneficial.



Chapter 4:

Stakeholders' Views and Experiences of Pharmacist Prescribing: A Systematic Review

4. Introduction to the chapter

The findings of the umbrella review presented in Chapter 3 provided evidence of effectiveness and safety of non-medical prescribers, including pharmacists. There is, however, a gap in relation to synthesised evidence on the views and experiences of key stakeholders. Evidence may facilitate the development and implementation of pharmacist prescribing in those countries where prescribing is not yet within legal or practice frameworks. This chapter provides the aim, method, findings and conclusion of such a systematic review.

4.1. Aim

The aim of this systematic review was to critically appraise, synthesise, and present the available evidence on the views and experiences of stakeholders on pharmacist prescribing, including potential facilitators and barriers, regardless of implementation status.

4.2. Methods

A systematic review protocol was developed, in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocol (PRISMA-P) standards, and registered on International Prospective Register of Systematic Reviews (PROSPERO) at the Centre for Reviews and Dissemination in the UK (CRD42016048072) (Jebara et al. 2016) as shown in Appendices 4A and 4B respectively.

4.2.1. Inclusion criteria

Studies reporting views and/or experiences of any stakeholder group (e.g. patients, general public, physicians, nurses, pharmacists) pertaining to pharmacist prescribing, irrespective of the stage of implementation (pre or post), model of prescribing (e.g. supplementary, independent or collaborative), with no date or language limit up to November 2017, were included in this systematic review. All peer-reviewed, primary research studies were included, while literature reviews, narrative reports, and editorials were excluded. The inclusion process was performed by TJ and reviewed by DS.

4.2.2. Search strategy

The search string applied to Medline is given in Box 4.1; and adapted for Cumulative Index to Nursing and Allied Health Literature (CINAHL), International Pharmaceutical Abstracts (IPA), PsychArticles, and Google Scholar. The reference lists of all identified articles in the full text screening were searched manually for potentially eligible studies meeting the review criteria.

Box 4.1: Search string applied to Medline (title, abstract, keywords, subject heading)

((view* OR perspective* OR perception* OR opinion* OR attitude* OR belief* OR thought* OR feel* OR impress* OR stance* OR viewpoint* OR standpoint* OR position* OR support* OR concern* OR confiden* OR expect*)

OR

(experience* OR satisf* OR reflect* OR react* OR content* OR understand* OR encounter* OR evaluat* OR feedback))

AND

"pharmacist* prescrib*"

The scope of the databases searched (Medline, CINAHL, IPA and Google Scholar) was discussed previously in Chapter 3. Table 4.1 describes the scope of the additional database searched:

Table 4.1: Major area of focus of searched databases

Database	Major area of focus
PsychArticles	PsychArticles includes more than 180,000 full-text articles from more than 100 journals as well as the American Psychological Association, Canadian Psychological Association and Hogrefe Publishing Group scholarly journals. It covers the full spectrum of research in the area of psychology and behavior from preeminent scholars to the historical underpinnings of the behavioural and social sciences (American Psychological Association 2016).

4.2.3. Assessment of methodological quality

Quality assessment was conducted independently by two reviewers (TJ and one of either DS, KM, SC, AA, ARP) using the Mixed Methods Appraisal Tool (MMAT) (Pluye et al. 2011), which permits the appraisal of qualitative, quantitative, and mixed methods studies (Appendix 4C). Consensus was reached through discussion or by a consultation with a third reviewer. The MMAT was developed based on a theory, a literature review, workshops as well as consultations with experts, followed by testing for content validity, efficiency and reliability. The different criteria in the MMAT allow researchers aiming to conduct a mixed methods systematic review to critical appraise studies with diverse designs including qualitative, quantitative and mixed methods. Thus, it overcomes the difficulties associated with using different critical appraisal tools for the different designs (Pluye and Hong 2014). Since the current systematic review was likely to include different study designs, the latest version (2011) of the MMAT was chosen to assess methodological quality.

4.2.4. Data extraction

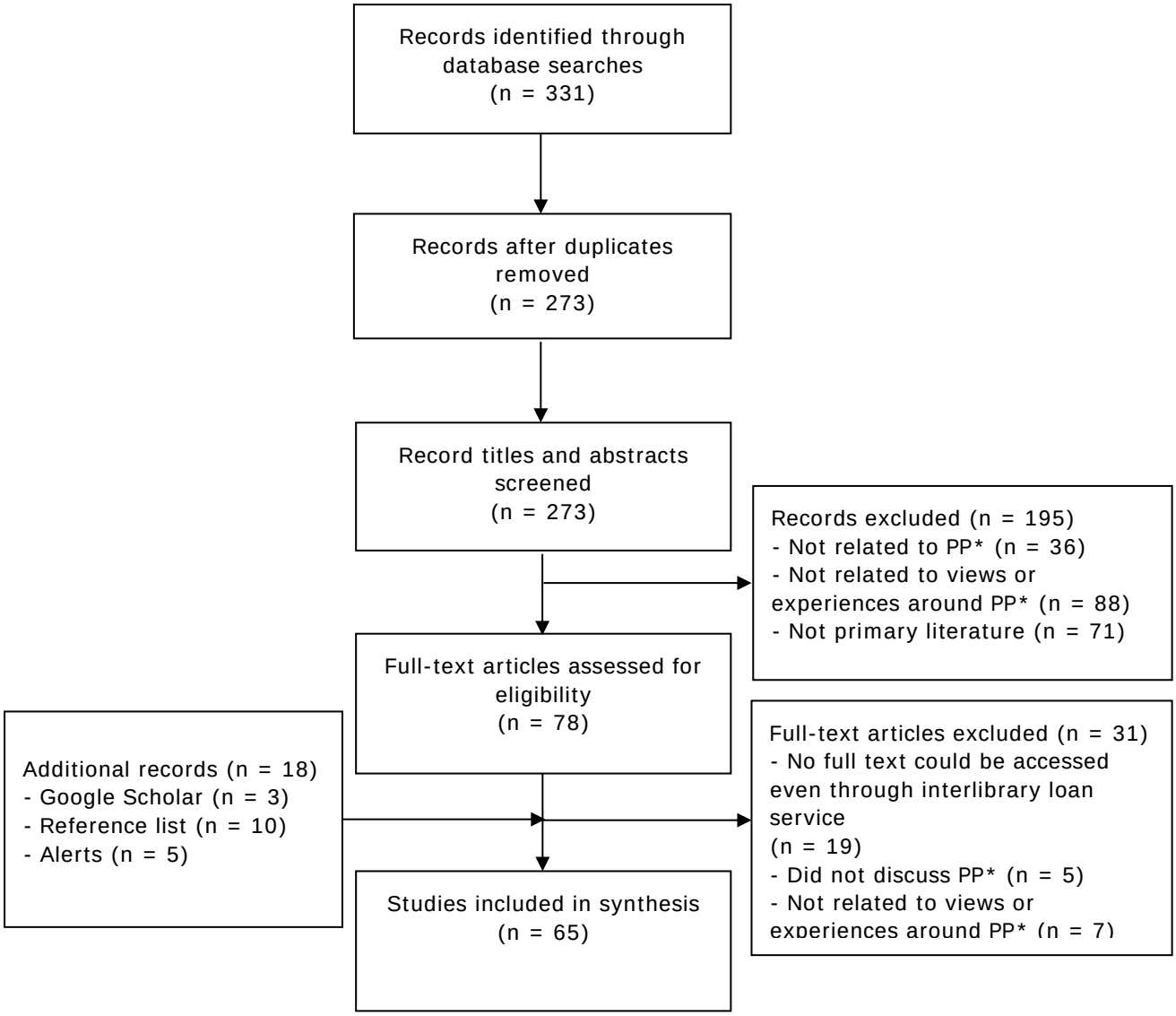
Data extraction was performed by two independent reviewers, with a third included if any disagreement occurs. Data items extracted were: stated aim/objective, phase of implementation (pre vs post), country of focus, model of prescribing, stakeholder group, study design, and key findings.

4.2.5. Data synthesis

Due to heterogeneity of phase of implementation, models of prescribing, study designs, and variability of data collection tools, a meta-analysis approach of quantitative findings was not possible. Hence, a narrative approach to data synthesis was applied. Pooling of qualitative research findings involved the aggregation or synthesis of findings to generate a set of statements that represented that aggregation, through assembling and categorising findings based on similarity in meaning.

4.3. Results

The electronic search yielded 331 studies. Removal of duplicates resulted in 273 articles, 226 of which were excluded based on title, abstract, or full-text review. An additional 18 studies were identified from other sources (e.g. reference lists) resulting in 65 eligible studies for quality assessment and data extraction. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart is provided in Figure 4.1.



*PP: Pharmacist Prescribing

Figure 4.1: PRISMA flow chart detailing the inclusion process

4.3.1. Quality of included studies

Most studies employed quantitative designs, largely questionnaire-based survey methodology (n=41) (Pennock et al. 1988, Segal and Grines 1988, Spencer and Edwards 1992, White-Means and Okunade 1992, Erwin, Britten and Jones 1996, Child, Hirsch and Berry 1998, Child and Cantrill 1999, Child 2001, George et al. 2006a, George et al. 2006b, Hobson and Sewell 2006a, Hobson and Sewell 2006b, Kay, Bajorek and Brien 2006, Smalley 2006, George et al. 2007, Nguyen and Bajorek 2008, Stewart et al. 2008, Weeks and Marriott 2008, Stewart et al. 2009a, Hoti et al. 2010, McCann et al. 2011, McIntosh et al. 2011, Perepelkin 2011, Stewart et al. 2011, Hutchison et al. 2012, Erhun, Osigbesan and Awogbemi 2013, Hoti, Hughes and Sunderland 2013, MacLure et al. 2013, Tinelli et al. 2013, Auta et al. 2014, Hill et al. 2014, Moore, Kennedy and McCarthy 2014, Mansell et al. 2015, Bourne et al. 2016, Hale et al. 2016, Ung et al. 2016, Khan et al. 2017, Auta et al. 2018, Isenor et al. 2018), with fewer qualitative designs (n=21) (Eng, McCormick and Kimberlin 1990, Lloyd and Hughes 2007, Tully et al. 2007, Blenkinsopp et al. 2008, Stewart et al. 2009b, Weiss and Sutton 2009, Hobson, Scott and Sutton 2010, Lloyd, Parsons and Hughes 2010, Tonna et al. 2010, Weeks, Marriott and George 2010, Dawoud et al. 2011, Hoti, Hughes and Sunderland 2011, McCann et al. 2012a, McCann et al. 2012b, Hatah et al. 2013, Makowsky et al. 2013, Pojskic et al. 2014, Bajorek et al. 2015, Deslandes, John and Deslandes 2015, Auta, Strickland-Hodge and Maz 2016, Feehan et al. 2016, McIntosh and Stewart 2016, Le, Braunack-Mayer and Laurence 2017). The remaining three studies were sequential explanatory mixed methods studies all with survey followed by either focus group discussions (Hanes and Bajorek 2005, Baqir 2010) or interviews (Vracar and Bajorek 2008). Quality assessments given in Figure 4.2 highlight the largely robust and rigorous nature of the studies reviewed.

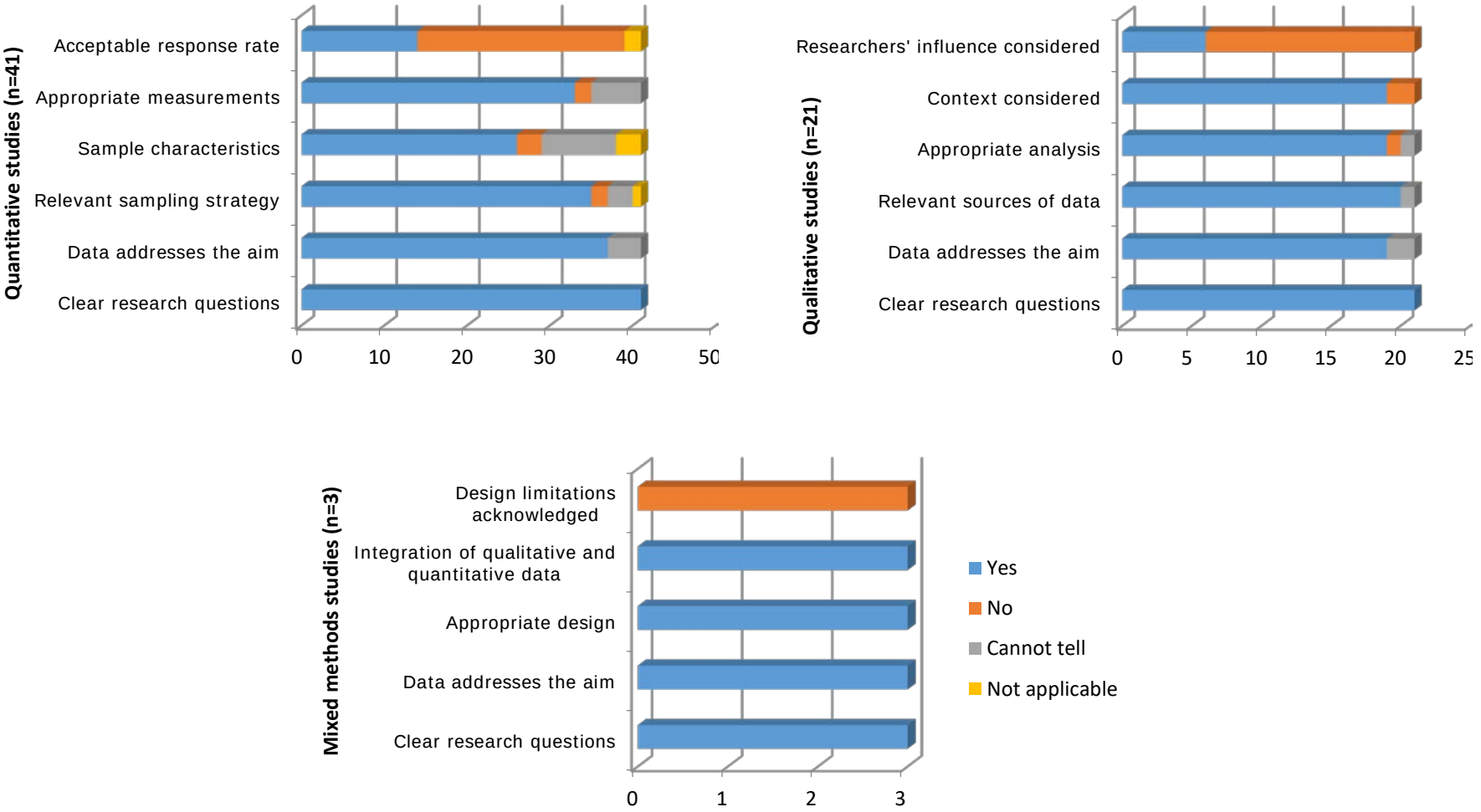


Figure 4.2: Cumulative quality assessment of the 65 studies, grouped according to study design

The key limitations of the survey studies were the lack of details around sampling strategies and the stages of questionnaire development, review, and piloting. Only 14 studies had achieved the MMAT target response rate of 60% (Segal and Grines 1988, Eng, McCormick and Kimberlin 1990, Spencer and Edwards 1992, George et al. 2006a, Hobson and Sewell 2006a, Hobson and Sewell 2006b, Smalley 2006, George et al. 2007, McCann et al. 2011, Hutchison et al. 2012, Auta et al. 2014, Mansell et al. 2015, Hale et al. 2016, Khan et al. 2017). Qualitative studies lacked details of approaches to ensuring data trustworthiness and the mixed methods studies provided limited information on integrating quantitative and qualitative data. Based on the MMAT assessments, all 65 studies were included in the stages of data extraction and synthesis.

4.3.2. Characteristics and key findings of included studies

The extracted data are summarised in Tables 4.2, 4.3 and 4.4 for the quantitative, qualitative, and mixed methods studies respectively.

Table 4.2: Characteristics and key findings of included quantitative studies (n=41)						
Author (Year of publication)	**Aim(s)/Objective(s)**	**Definition and model of PP discussed**	**Country of focus**	**Stakeholder population studied (sample size)**	**Study design and methods**	**Key findings**
Pre-implementation of pharmacist prescribing						
Pennock et al. (1988)	Explore to what extent will pharmacist prescribing be accepted by consumers	No standardised definition provided	USA	Consumers (n=400, response rate (RR) 53%)	Questionnaire	Consumers' relationships with pharmacists is important in determining acceptance of prescribing role.
Segal and Grines (1988)	Identify attitudes of organised pharmacy, organised medicine and pharmaceutical industry about prescribing authority for pharmacists	Models of PP in each US state presented	USA	Different pharmacy and medical associations and boards, Pharmaceutical Manufacturers Association (PMA), manufacturers and non-PMA-member generic manufacturers (n=307, RR 63%)	Questionnaire	Hospital pharmacy associations/boards to a lesser extent in support; non-PMA-member generic manufacturers/US state pharmacy associations relatively neutral. Medical associations/PMA-member companies in opposition.
Spencer and Edwards (1992)	Ascertain GPs' attitudes to an extended role for community pharmacists	No standardised definition provided	UK	Doctors (n=1087, RR 68.4%)	Questionnaire	Pharmacists are too influenced by commercial pressures, should stick to dispensing and not supervise repeat prescriptions. However, GPs supported pharmacists prescribing nicotine chewing gum.
Child, Hirsch and Berry (1998)	Identify the attitudes of hospital-based healthcare professionals involved in drug therapy towards prescription writing and initiation of drug treatment ("prescribing") by the pharmacist, explore the perceived barriers to PP, and to examine the potential future role of the pharmacist in drug therapy management	No standardised definition provided	UK	Doctors (n=195, RR 48.7%), nurses (n=200, RR 57.5%), pharmacists (n=87, 77%)	Questionnaire	Postgraduate education/training and attachment to clinical area are important requirements for PP. Barriers are pharmacists' willingness to accept this role, education/training and accountability.

Child and Cantrill (1999)	Examine the reasons behind hospital doctors' perceived barriers to PP in the UK	No standardised definition provided	UK	Hospital doctors (n=193, RR 49%)	Questionnaire	Awareness of clinical and patient details, communication, doctor writing initial prescription, clinical responsibility and review of treatment were reported.
Child (2001)	Examine hospital nurses' perceptions of PP in the UK	No standardised definition provided	UK	Nurses at five NHS teaching hospitals (n=200, RR 57.5%)	Questionnaire	Pharmacists' knowledge, review of treatment, pharmacists' workload, communication and accountability issues were discussed.
George et al. (2006b)	Investigate community pharmacists' awareness, views and attitudes relating to IP by community pharmacists and their perceptions of competence and training needs for the management of some common conditions	Provided definition of UK models	UK	Community pharmacists (n=500, RR 43.4%)	Questionnaire	Confidence in abilities to IP, training, consultation skills and communication were highlighted. Facilitators include practising more hours/week as a pharmacist, training, and involvement in Scottish Executive pharmaceutical care model schemes.
Kay, Bajorek and Brien (2006)	Identify Australian pharmacists' awareness of their international colleagues' prescribing practices and explore their views about the feasibility and utility of PP privileges within the scope of their current practice	Provided definition of dependent prescribing	Australia	Pharmacists (n=4158, RR 6.4%)	Questionnaire	74% and 52% supported dependent and independent prescribing respectively. 86% believed they could justify their prescribing while 73% believed they would benefit from prescribing authority.
Nguyen and Bajorek (2008)	Explore the clinical utility and capacity of pharmacists to undertake prescribing functions in anticoagulation management in the hospital setting (Pilot study)	No standardised definition provided	Australia	Pharmacists (n=16), graduates (n=2) and final year pharmacy students (n=6)	Questionnaire	Inpatient PP can be useful but outpatient and dependent models were more appropriate. 58% of prescribing was clinically inappropriate. Barriers include training, experience and doctors' opposition.
Weeks and Marriott (2008)	Explore the views of Society of Hospital Pharmacy Australia pharmacist members on collaborative prescribing and the extent of de facto prescribing at their institution	Provided definition for collaborative and de facto prescribing	Australia	Pharmacists (n=1367, RR 40%)	Questionnaire	95% thought collaborative prescribing could circumvent hospital delays with timely service delivery. If a framework existed, 75% would consider PP.

Hoti et al. (2010)	Evaluate the views of Australian pharmacists on expanded PP roles and identify important drivers and barriers to its implementation	Current practice of Australian pharmacists presented	Australia	Pharmacists (n=2592, RR 40.4%)	Questionnaire	83.9% supported PP and 97.1% needed training. Inadequate training in patient assessment, diagnosis and monitoring were barriers to PP.
Hoti, Hughes and Sunderland (2011)	Examine the views of regular pharmacy clients on PP and employ agency theory in considering the relationship between the stakeholders involved	Current practice of Australian pharmacists presented	Australia	Patients (n=1153, RR 34.7%)	Interview (Quantitative approach)	71% trusted PP, while 66% supported doctor diagnosing first. Pharmacist diagnosing and prescribing was limited to pain management and antibiotics. 64% highlighted improved access to prescription medicines with PP.
Perepelkin (2011)	Better understand public perceptions of pharmacists, and the acceptance of possible expanded roles for pharmacists, including prescribing authority	No standardised definition provided	Canada	General public (n=1283, RR 31.4%)	Questionnaire	Emergency situations, renewal of long-term medications and changing medications' frequency or strength were the most accepted scenarios for PP.
Erhun, Osigbesan and Awogbemi (2013)	Determine the views of pharmacists and physicians on PP, appropriateness and the possible contribution to the healthcare system if pharmacists prescribe	No standardised definition provided	Nigeria	Pharmacists (n=300, RR 61%) and physicians (n=400, RR 40%)	Questionnaire	77.5% of pharmacists supported while 74.4% of physicians opposed PP. However, if there was no doctor, some physicians supported PP. Reasons for opposition were legal provision and professional incompetence.
Hoti, Hughes and Sunderland (2013)	Compare the attitudes of hospital and community pharmacists regarding an expanded prescribing role	An overview of international models presented	Australia	Pharmacists (n=2592, RR 40.4%)	Questionnaire	Community pharmacists supported IP and emergency prescribing. Hospital pharmacists supported SP for heart failure and anticoagulant therapies; and IP for anticoagulant therapies.
Auta et al. (2014)	Explore the views of patients of community pharmacists on their consultation experiences, and the possible extension of prescribing rights to pharmacists in Nigeria	No standardised definition provided	Nigeria	Patients (n=432, RR 86.6%)	Questionnaire	92.5% supported PP. 79.7% favored restricted formulary prescribing, and 71.9% prefer to see a doctor if their conditions get worse.

Moore, Kennedy and McCarthy (2014)	Explore GP–pharmacist relationship, gain insight into communication between the professions and evaluate opinion on extension of the role of the community pharmacist	No standardised definition provided	Ireland	Doctors (n=500, RR 52%) and community pharmacists (n=335, RR 62%)	Questionnaire	Compared to doctors, pharmacists were more supportive of PP. 82% of GPs and 96% of pharmacists favored pharmacists dealing with minor ailments.
Hale et al. (2016)	Assess whether patient satisfaction with the pharmacist as a prescriber and patient experiences in two settings of collaborative doctor-pharmacist prescribing may be barriers to implementation of PP	No standardised definition provided	Australia	Patients in pre-admission (n=200, RR 91%) and sexual health (n=17, RR 85%) clinics	Questionnaire	Almost all patients (98% in pre-admission and 97% in sexual health clinic) were satisfied with the consultation.
Ung et al. (2016)	Explore how pharmacists can prescribe oral antibiotics to treat a limited range of infections whilst focusing on their confidence and appropriateness of prescribing	Current practice of Australian pharmacists presented	Australia	Pharmacists (n=240, RR 34.2%)	Questionnaire	High levels of appropriate antibiotic prescribing were shown for uncomplicated urinary tract infections (97.2%), cellulitis (98.2%) and adolescent acne (100%).
Khan et al. (2017)	Assess the attitudes of rural population towards PP and their interest in using expanded PP services	No standardised definition provided	India	General public (n=480, RR 85.4%)	Questionnaire	81.5% supported PP. Participants with low income and tertiary education showed more interest towards PP ($p<0.05$).
Auta et al. (2018)	Explore the views of pharmacists in Nigeria on the extension of prescribing authority to them, determine their willingness to be prescribers and identify the potential facilitators and barriers to introducing PP in Nigeria	Provided definition of UK models	Nigeria	Pharmacists (n=775, RR 40.6%)	Questionnaire	97.1% supported PP. Facilitators for PP were increasing patients' access to care and better utilisation of pharmacists' skills. Barriers were medical resistance and pharmacists' inadequate diagnosis skills.
Post-implementation of pharmacist prescribing						
Eng, McCormick and Kimberlin (1990)	Examine the attitudes and self-reported prescribing activities of a sample of Florida pharmacists interviewed 6 months and 12 months after enactment of the Florida Pharmacist Self-Care Consultant Law (SCCL)	No standardised definition provided	USA	Pharmacists (prescribers and non-prescribers) (n=200, RR 97% for Phase 1; n= 131, RR 66% for Phase 2)	Interview (Quantitative approach)	Prescribers perceive that the law positively affected their relationships with patients. Both prescribers and non-prescribers believed that the law has not affected their relationships with physicians.

White-Means and Okunade (1992)	Assess the current status of IP by Florida pharmacists two years after the law was enacted, examine correlates of the choice to prescribe, and discuss policy implications of the findings	Provided a description of the SCCL	USA	Pharmacists (prescribers and non-prescribers) (n=1800, RR 32.3%)	Questionnaire	Prescribers are more likely to perceive they have enough training to prescribe and to view their skills as comparable to those of physicians, but less likely to think a PharmD is needed.
Erwin, Britten and Jones (1996)	Explore GPs' views on various drugs being dispensed by community pharmacists without a prescription to determine whether these views have changed since 1990	No standardised definition provided	UK	Doctors (not exposed to PP) (n=250, RR 69% for fundholding, n= 600, RR 57% for non-fundholding practices)	Questionnaire	GPs overall level of approval for PP had increased. GPs from fundholding practices agreed to a slightly wider range of drugs being made available over-the-counter than those from non-fundholding practices.
George et al. (2006a)	Explore SP pharmacists' early experiences of prescribing and their perceptions of the prescribing course	Provided definition of UK models	Great Britain	SP pharmacist (n=518, RR 82.2%)	Questionnaire	Better patient management and funding issues were the main benefit and barrier respectively. Predictors of SP included time since SP registration; confidence and practicing in a setting other than community pharmacy.
Hobson and Sewell (2006a)	Study the implementation of SP by pharmacists within primary care trusts (PCTs) and secondary care trusts (SCTs) in England	Provided definition of UK models	UK	Pharmacists (not exposed to PP) (n=143, RR 68% for SCT; n= 271, RR 68% for PCT)	Questionnaire	Additional training required around the clinical area of practice for SCT and the completion of continuing professional development for PCT respondents.
Hobson and Sewell (2006b)	Provide data on the views of chief pharmacists and PCT pharmacists on the risks and concerns surrounding SP	An overview of global experiences presented	UK	Chief pharmacists and PCT pharmacists (not exposed to PP) (n=143, RR 68% for SCT; n= 271, RR 68% for PCT)	Questionnaire	There was a positive attitude about implementing SP but concerns rose over training and professional competency/responsibility.
Smalley (2006)	Evaluate patients' experience of our established pharmacist-led SP hypertension clinic	No standardised definition provided	UK	Patients who experienced SP (n=127, RR 87%)	Questionnaire	91% continued to attend. 57% found the care they received was better than previous care. 86% understood their condition

						more, were more involved in decision-making and could easily schedule appointment.
George et al. (2007)	Investigate the challenges experienced by pharmacists in delivering SP services, explore their perceptions of benefits of SP and obtain feedback on both SP training and implementation	Provided definition of UK SP model	Great Britain	SP pharmacists (n=488, RR 82.2%)	Questionnaire	Better patient management was the main benefit. Barriers include lack of organisational recognition of SP and funding. Greater emphasis on clinical skills development should be part of the SP course.
Stewart et al. (2008)	Explore patients' perspectives and experiences of pharmacist SP in Scotland	Provided definition of UK SP model	UK	Patients who experienced SP (sample size not clear, RR 57.2%)	Questionnaire	89.3% were satisfied with the consultation, 78.7% thought it was comprehensive and most would recommend PP to others. However, 65% would prefer to consult a doctor.
Stewart et al. (2009b)	Determine the awareness of, views on, and attitudes of members of the Scottish general public toward nonmedical prescribing, with an emphasis on PP	Provided definition of UK models	UK	General public (exposed and non-exposed to PP) (n=500, RR 37.1%)	Questionnaire	56.6% were aware of non-medical prescribing. More than half supported PP. Concerns rose about privacy despite acknowledging its enhanced convenience.
McCann et al. (2011)	Capture information on PP in Northern Ireland	Provided definition of UK models	UK	Pharmacists who were identified as qualified prescribers (n=105, RR 76%)	Questionnaire	Benefits for patient care and pharmacist were reported. IP was viewed as the way forward but concerns were raised about prescribing without a diagnosis or beyond the team setting.
McIntosh et al. (2011)	Investigate newly registered pharmacists' awareness of PP and views on potential future roles as prescribers	No standardised definition provided	Great Britain	Newly registered pharmacists (not exposed to PP) (n=1658, RR 25.2%)	Questionnaire	86.4% were interested in prescribing. Training is needed in clinical examination, patient monitoring and medico-legal aspects of prescribing. 66.3% thought the current requirement for SP was appropriate.
Stewart et al. (2011)	Evaluate the views of patients across primary care settings in Great Britain who had experienced PP	No standardised definition provided	Great Britain	Patients who experienced PP (n=1622, RR 29.7%)	Questionnaire	The vast majority were satisfied with their consultation, believed their pharmacist prescribed as safely as their GP

						and considered them approachable and thorough.
Hutchison et al. (2012)	Determine reasons for the slow adoption of prescribing authority by hospital pharmacists in the Canadian province of Alberta	An overview of PP in Canada presented	Canada	Pharmacists (not exposed to PP) (n=500, RR 62.8%)	Questionnaire	The value of PP motivates pharmacists to apply for PP. Barriers include the lengthy application process, increased liability and documentation requirements.
MacLure et al. (2013)	Explore the views of the Scottish general public on non-medical prescribing	Provided definition of UK models	UK	General community in Scotland (exposed and non-exposed to PP) (n=500, RR 37.1%)	Questionnaire	There was lack of awareness of NMP knowledge and training but support for a limited range of prescribing. Barriers included lack of access to medical records and issues with privacy and confidentiality.
Tinelli et al. (2013)	Obtain feedback from primary care patients on the impact of prescribing by nurse independent prescribers (NIPs) and pharmacist independent prescribers (PIPs) on experiences of the consultation, the patient–professional relationship, access to medicines, quality of care, choice, knowledge, patient-reported adherence and control of their condition	Provided definition of UK models	UK	Patients who experienced PP (n=975, RR 30%)	Questionnaire	Satisfaction and confidence with PIP were high. When comparing NMP to doctor prescribing, most reported no difference in their experience of care.
Hill et al. (2014)	Not explicitly stated: Explore the acceptability of PP in addiction services in NHS Lanarkshire amongst the stakeholders and service users	Provided definition of UK models	UK	Patients (n=110, RR 78.2%), PP (n=5, 100%), medical prescribers (n=12, RR 50%)	Questionnaire	PP is seen as effective and preferred by patients. Although doctors have more reservations, the majority believed it was beneficial. All thought IP would be more beneficial.
Mansell et al. (2015)	Determine whether patients prescribed treatment for minor ailments by a pharmacist symptomatically improve within a set time frame	No standardised definition provided	Canada	Patients who experienced PP (all population was included)	Questionnaire	Condition significantly/completely improved in 80.8% with only 4% experiencing bothersome side effects. Trust in pharmacists and convenience were the common reasons for

						choosing a pharmacist over a physician.
Bourne et al. (2016)	Determine the current and proposed future IP practice of UK clinical pharmacists working in adult critical care	No standardised IP definition provided	UK	UK Clinical Pharmacy Association members (prescribers and non-prescribers) (n=404, RR 33%)	Questionnaire	Over a third were IP, and 70% intended to be prescribers within the next 3 years. Experience and working in a team facilitated IP. Pharmacists reported significant positives in patient care and job satisfaction.
Isenor et al. (2018)	To identify the relationship between barriers and facilitators to pharmacist prescribing and self-reported prescribing activity using the Theoretical Domains Framework version 2 (TDF(v2))	An overview of PP in Nova Scotia (Canada) presented	Canada	Pharmacists (prescribers and non-prescribers) (n= 1100, RR 8%)	Questionnaire	The three domains most positively associated with prescribing were Knowledge (84 %), Reinforcement (81%) and Intentions (78 %). The largest effect on prescribing activity was the Skills domain.

Table 4.3: Characteristics and key findings of included qualitative studies (n=21)						
Author (Year of publication)	**Aim(s)/Objective(s)**	**Definition and model of PP discussed**	**Country of focus**	**Stakeholder population studied (number of participants)**	**Study design and methods**	**Key findings**
Pre-implementation of pharmacist prescribing						
Weeks, Marriott and George (2010)	Pilot a UK NMP course for Australian hospital pharmacists and elicit participants' views on NMP and experiences of the training	Provided definition of UK models	Australia	Hospital pharmacists (n=15)	Focus group	Confidence, competency, legislative constraints, acceptance by other health providers, assessment requirements and university documentation were highlighted.
Hatah et al. (2013)	Evaluate GPs' perceptions of pharmacists' contributions to services traditionally undertaken by GPs	Provided definition of IP	New Zealand	Doctors (n=18)	Interview	GPs were more accepting of pharmacists' medication reviews than of PP unless appropriate controls, close collaboration and co-location of services took place.
Pojskic et al. (2014)	Ascertain the initial perceptions of the Ontario government and health professional stakeholder groups regarding the prospect of prescriptive authority for pharmacists	An overview of the models present internationally and in Ontario presented	Canada	Key informants from the Ontario government and provincial pharmacy and medical regulatory colleges and professional associations (n=17)	Qualitative study using policy documents and semi-structured interviews	Pharmacy organisations and Ontario government representatives supported while medical organisations opposed PP.
Bajorek et al. (2015)	Explore the perspectives of GP super clinic staff on current and potential (future) pharmacist-led services provided in this setting	No standardised definition provided	Australia	Doctors (n=3), pharmacist (n=1), nurse (n=1), business manager (n=1) and reception staff (n=3)	Interview	Positive working relationships, satisfaction with pharmacist's current role and support for potential future roles were reported. Although GPs had differing views about PP, they saw several benefits for it.
Auta, Strickland-Hodge and Maz (2016)	Investigate stakeholders' views on granting prescribing authority to pharmacists in Nigeria	No standardised definition provided	Nigeria	Policymakers, pharmacists, doctors and patient group representative (n=43)	Interview	Non-medical stakeholders supported PP while doctors were reluctant to do so. Benefits (access to medicines) and

						barriers (pharmacists' diagnosis skills) were stated.
Le, Braunack-Mayer and Laurence (2017)	Explore the potential impact of a collaborative prescribing model for Opioid Substitution treatment (OST) on patients, pharmacists and health provider relationships from the perspective of pharmacists and patients	No standardised definition provided	Australia	OST patients (n=14) and community pharmacists (n=18)	Interviews with patients and focus groups with pharmacists	Benefits included improved continuity of care and convenience. Changes to healthcare relationships and ensuring adequate support of PP were highlighted.
Post-implementation of pharmacist prescribing						
Lloyd and Hughes (2007)	Explore the views and professional context of pharmacists and physicians (who acted as their training mentors), prior to the start of SP training	Provided definition of UK SP model	UK	Pharmacists prescribers (n=47) and their mentors (n=35)	Focus groups with pharmacists and face-to-face semi-structured interviews with the mentors	SP was anticipated to improve patient care and interprofessional relationships. Loss of diversity, deskilling of junior doctors, safety and professional encroachment were reported.
Tully et al. (2007)	Investigate the views and experiences of pharmacists in England before and after they registered as SP	Provided definition of UK SP model	UK	Pharmacists (before and after registering as SPs) (n=8)	Interview	Pharmacists thought training would legitimise their current informal prescribing. Pharmacists already involved with prescribing were more likely to work as prescribers.
Blenkinsopp et al. (2008)	Explore GPs perceptions of the advantages and disadvantages of pharmacist SP and the future introduction of IP	Provided definition of UK models	UK	Doctors who had experienced SP (n=13)	Focus group	Not all referred patients to the PP. Those GPs who referred patients described benefits with some ambivalence.
Stewart et al. (2009a)	Explore the perspectives of pharmacist SP, their linked independent prescribers and patients, across a range of settings, in Scotland, towards PP	Provided definition of UK models	UK	SP pharmacists (n=9), their mentors (n=8) and patients (n=18)	Interview	All were supportive of SP identifying benefits for patients and the wider healthcare. Pharmacists were keen on IP but not doctors citing inadequate examination skills.
Weiss and Sutton (2009)	Investigate the potential threat to medical dominance posed by the addition of pharmacists as prescribers in the UK and explore the role of prescribing as an indicator of professional power, the legitimacy and status of new PP and the forces	Provided definition of UK models	UK	SP pharmacists (n=23)	Interview	Facilitators include blurred definitions of prescribing, competence and a team approach to patient management.

	influencing professional jurisdictional claims over the task of prescribing					
Hobson, Scott and Sutton (2010)	Explore the opinions of patients on the development of NMP	Provided definition of UK models	UK	Patients (exposed and not exposed to PP) (n=18)	Interview	Concerns rose about clinical governance, privacy and space. Participants acknowledged pharmacists' knowledge and accessibility.
Lloyd, Parsons, and Hughes (2010)	Explore the context and experiences, in relation to the practice of SP, of pharmacists and physicians (who acted as their training mentors) at least 12 months after pharmacists had qualified as SP	Provided definition for UK IP model	UK	SP pharmacists (n=40) and their mentors (n=31)	Focus groups with pharmacists and face-to-face semi-structured interviews with the mentors	PP was perceived to reduce doctors' workload and improved continuity of care. IP was seen as contentious by mentors due to the diagnostic element.
Tonna et al. (2010)	Explore pharmacists' perceptions of the feasibility and value of PP of antimicrobials in secondary care in Scotland	Provided definition of UK models	UK	Senior hospital pharmacists (prescribers and non-prescribers) (n=37)	Focus group	Perceived benefits included quicker access to medicines, reduced risk of resistance and better application of evidence-based medicine.
Dawoud et al. (2011)	Investigate pharmacist prescribers' views and experiences of the early stages of SP implementation	Provided definition for independent, dependent and collaborative prescribing models	UK	SP pharmacists (n=16)	Interview	Benefits reported on patient care and pharmacists' job satisfaction. SP limited pharmacists' freedom in decision making. Hence, IP was supported.
McCann et al. (2012a)	Explore patients' perspectives of pharmacists as prescribers	Provided definition of UK models	UK	Patients who experienced PP (n=34)	Focus group	Patients supported PP especially in a team setting. However, there was a lack of awareness of PP role.
McCann et al. (2012b)	Provide an in-depth understanding of PP from the perspective of pharmacists, medical colleagues and other key stakeholders in Northern Ireland	Provided definition of UK SP model	UK	PP (n=11), medical colleagues (n=11) and other key stakeholders (n=13)	Interview	PP resulted in a more holistic approach to care. Challenges include working within areas of competency, complex conditions and resistance by older doctors.
Makowsky et al. (2013)	Understand what factors influence pharmacists' adoption of prescribing	An overview of prescribing authority in	Canada	Pharmacists (prescribers and	Interview	PP was dependent on the innovation itself, adopter, system readiness, practice

	using a model for the Diffusion of Innovations in healthcare services	Alberta presented		non-prescribers) (n=38)		setting, communication and influence.
Deslandes, John and Deslandes (2015)	Explore the views and experiences of patients with mental illness on being managed by a pharmacist SP in a secondary care outpatient setting	Provided definition of UK SP model	UK	Patients with mental illness who experienced SP (n=11)	Exploratory study using semi-structured interviews and self-completion diaries	Patients supported PP and felt they were involved in decisions concerning their healthcare.
Feehan et al. (2016)	Investigate the perceived demand for and barriers to PP in the community pharmacy setting	An overview of prescribing authority in USA presented	USA	Consumers (n=19), community pharmacists (n=20) and re-imbursement decision-makers (n=8) (not exposed to PP)	Interview	Consumers opposed. Pharmacists supported PP for limited conditions. Reimbursement decision-makers were most receptive. Barriers included awareness of PP, pharmacist training, conflicts of interest and liability issues.
McIntosh and Stewart (2016)	Explore the views and reflections on PP of UK pre-registration pharmacy graduates	No standardised definition provided	UK	Pre-registration pharmacy graduates (n=12)	Interview	Support was related to professional development. Barriers included lack of organisational strategy, confidence and workload.

Table 4.4: Characteristics and key findings of included mixed-methods studies (n=3)						
Author (Year of publication)	**Aim(s)/Objective(s)**	**Definition and model of pharmacist prescribing discussed**	**Country of focus**	**Stakeholder population studied (sample size)**	**Study design and methods**	**Key findings**
Pre-implementation of pharmacist prescribing						
Hanes, and Bajorek (2005)	Explore the views of a sample of Australian hospital pharmacists on prescribing privileges	Provided a definition for dependent prescribing	Australia	Hospital pharmacists (n=10) and teacher practitioners (n=5) (15 completed the questionnaire, 8 participated in the focus groups)	Questionnaire and focus group	Benefits include more efficient/improved pharmaceutical care and reduced healthcare costs. Physician opposition was a barrier. Training and accreditation beyond registration was deemed necessary.
Vracar and Bajorek (2008)	Explore Australian GPs' views on extending prescribing rights to pharmacists, the appropriateness of PP models, and the influence of GPs' characteristics on their preference for a particular PP model	An overview of international models presented	Australia	Doctors (150 approached, 22 filled the questionnaire and 10 participated in the interview)	Questionnaire and semi-structured interview	Repeat prescribing and prescribing by referral were the most favoured. Safety issues, lack of awareness of pharmacist training and capabilities, clinical responsibility, GP–patient relationship and remuneration were raised.

Post-implementation of pharmacist prescribing						
Baqir (2010)	Evaluate the extent of PP and identify some of the barriers to maintaining and developing such services	No standardised definition provided	UK	Pharmacists who undertook a prescribing course (179 were invited to participate, 98 filled the questionnaire but not clear how many were involved in the focus groups)	Multiple methods: Questionnaire, focus groups, documents review and interviews	In secondary care, easy access to medical records and prescription pads as well as close working relationships with doctors were facilitators. The major barrier was lack of a clear strategy at organisational level.

Of the 65 studies, 29 (44.6%) were conducted prior to the implementation of pharmacist prescribing in the country of study (Pennock et al. 1988, Segal and Grines 1988, Spencer and Edwards 1992, Child, Hirsch and Berry 1998, Child and Cantrill 1999, Child 2001, Hanes and Bajorek 2005, George et al. 2006b, Kay, Bajorek and Brien 2006, Nguyen and Bajorek 2008, Vracar and Bajorek 2008, Weeks and Marriott 2008, Hoti et al. 2010, Weeks, Marriott and George 2010, Hoti, Hughes and Sunderland 2011, Perepelkin 2011, Erhun, Osigbesan and Awogbemi 2013, Hatah et al. 2013, Hoti, Hughes and Sunderland 2013, Auta et al. 2014, Moore, Kennedy and McCarthy 2014, Pojskic et al. 2014, Bajorek et al. 2015, Auta, Strickland-Hodge and Maz 2016, Hale et al. 2016, Ung et al. 2016, Khan et al. 2017, Le, Braunack-Mayer and Laurence 2017, Auta et al. 2018), while 35 (53.8%) were conducted post-implementation (Eng, McCormick and Kimberlin 1990, White-Means and Okunade 1992, Erwin, Britten and Jones 1996, George et al. 2006a, Hobson and Sewell 2006a, Hobson and Sewell 2006b, Smalley 2006, George et al. 2007, Lloyd and Hughes 2007, Blenkinsopp et al. 2008, Stewart et al. 2008, Stewart et al. 2009a, Stewart et al. 2009b, Weiss and Sutton 2009, Baqir 2010, Hobson, Scott and Sutton 2010, Lloyd, Parsons and Hughes 2010, Tonna et al. 2010, Dawoud et al. 2011, McCann et al. 2011, McIntosh et al. 2011, Stewart et al. 2011, Hutchison et al. 2012, McCann et al. 2012a, McCann et al. 2012b, MacLure et al. 2013, Makowsky et al. 2013, Tinelli et al. 2013, Hill et al. 2014, Deslandes, John and Deslandes 2015, Mansell et al. 2015, Bourne et al. 2016, Feehan et al. 2016, McIntosh and Stewart 2016, Isenor et al. 2018). Only one study explored views and experiences pre- and post-registration (Tully et al. 2007).

Most of the included studies were conducted in the UK (n=34, 52%) (Spencer and Edwards 1992, Erwin, Britten and Jones 1996, Child, Hirsch and Berry 1998, Child and Cantrill 1999, Child 2001, George et al. 2006a, George et al. 2006b, Hobson and Sewell 2006a, Hobson and Sewell 2006b, Smalley 2006, George et al. 2007, Lloyd and Hughes 2007, Tully et al. 2007, Blenkinsopp et al. 2008, Stewart et al. 2008, Stewart et al. 2009a, Stewart et al. 2009b, Weiss and Sutton 2009, Baqir 2010, Hobson, Scott and Sutton 2010, Lloyd, Parsons and Hughes 2010, Tonna et al. 2010, Dawoud et al. 2011, McCann et al. 2011,

McIntosh et al. 2011, Stewart et al. 2011, McCann et al. 2012a, McCann et al. 2012b, MacLure et al. 2013, Tinelli et al. 2013, Hill et al. 2014, Deslandes, John and Deslandes 2015, Bourne et al. 2016, McIntosh and Stewart 2016), followed by Australia (n=13, 20%) (Hanes and Bajorek 2005, Kay, Bajorek and Brien 2006, Nguyen and Bajorek 2008, Vracar and Bajorek 2008, Weeks and Marriott 2008, Hoti et al. 2010, Weeks, Marriott and George 2010, Hoti, Hughes and Sunderland 2011, Hoti, Hughes and Sunderland 2013, Bajorek et al. 2015, Hale et al. 2016, Ung et al. 2016, Le, Braunack-Mayer and Laurence 2017), Canada (n=6, 9%) (Perepelkin 2011, Hutchison et al. 2012, Makowsky et al. 2013, Pojskic et al. 2014, Mansell et al. 2015, Isenor et al. 2018), US (n=5, 8%) (Pennock et al. 1988, Segal and Grines 1988, Eng, McCormick and Kimberlin 1990, White-Means and Okunade 1992, Feehan et al. 2016), Nigeria (n=4, 6%) (Erhun, Osigbesan and Awogbemi 2013, Auta et al. 2014, Auta, Strickland-Hodge and Maz 2016, Auta et al. 2018) and one for each of New Zealand (Hatah et al. 2013), Ireland (Moore, Kennedy and McCarthy 2014) and India (Khan et al. 2017).

The main stakeholder group studied was pharmacists (n=27, 41.5%), including those registered as prescribers (George et al. 2006a, George et al. 2007, McCann et al. 2011, Weiss and Sutton 2009, Baqir 2010, Dawoud et al. 2011), non-prescribers (Hobson and Sewell 2006a, Hobson and Sewell 2006b, McIntosh et al. 2011, Hutchison et al. 2012, George et al. 2006b, Kay, Bajorek and Brien 2006, Nguyen and Bajorek 2008, Weeks and Marriott 2008, Hoti et al. 2010, Weeks, Marriott and George 2010, Hoti, Hughes and Sunderland 2013, McIntosh and Stewart 2016, Ung et al. 2016, Auta et al. 2018) or mixed prescribers and non-prescribers (Eng, McCormick and Kimberlin 1990, White-Means and Okunade 1992, Tully et al. 2007, Tonna et al. 2010, Makowsky et al. 2013, Bourne et al. 2016, Isenor et al. 2018). In addition, different stakeholders were researched. The majority of papers investigated perceptions and views of pharmacists (Eng, McCormick and Kimberlin 1990, White-Means and Okunade 1992, George et al. 2006a, George et al. 2006b, Hobson and Sewell 2006a, Hobson and Sewell 2006b, Kay, Bajorek and Brien 2006, George et al. 2007, Tully et al. 2007, Nguyen and Bajorek 2008, Weeks and Marriott 2008, Weiss

and Sutton 2009, Baqir 2010, Hoti et al. 2010, Tonna et al. 2010, Weeks, Marriott and George 2010, Dawoud et al. 2011, McCann et al. 2011, McIntosh et al. 2011, Hutchison et al. 2012, Hoti, Hughes and Sunderland 2013, Makowsky et al. 2013, Bourne et al. 2016, McIntosh and Stewart 2016, Ung et al. 2016, Auta et al. 2018, Isenor et al. 2018). Fewer studies investigated the perceptions of patients (n=12, 18.5%) (Pennock et al. 1988, Smalley 2006, Stewart et al. 2008, Hobson, Scott and Sutton 2010, Hoti, Hughes and Sunderland 2011, Stewart et al. 2011, McCann et al. 2012a, Tinelli et al. 2013, Auta et al. 2014, Deslandes, John and Deslandes 2015, Mansell et al. 2015, Hale et al. 2016), doctors (n=6, 9.3%) (Spencer and Edwards 1992, Erwin, Britten and Jones 1996, Child and Cantrill 1999, Blenkinsopp et al. 2008, Vracar and Bajorek 2008, Hatah et al. 2013), the general public (n=4, 6.2%) (Stewart et al. 2009a, Perepelkin 2011, MacLure et al. 2013, Khan et al. 2017), nurses (n=1, 1.5%) (Child 2001), or policymakers (n=1, 1.5%) (Pojskic et al. 2014). Fourteen studies reported multiple stakeholder perspectives (Segal and Grines 1988, Child, Hirsch and Berry 1998, Hanes and Bajorek 2005, Lloyd and Hughes 2007, Stewart et al. 2009b, Lloyd, Parsons and Hughes 2010, McCann et al. 2012b, Erhun, Osigbesan and Awogbemi 2013, Hill et al. 2014, Moore, Kennedy and McCarthy 2014, Bajorek et al. 2015, Auta, Strickland-Hodge and Maz 2016, Feehan et al. 2016, Le, Braunack-Mayer and Laurence 2017).

While most studies (n=41, 63%) provided a standardised or legislative definition of pharmacist prescribing, 24 (37%) did not (Pennock et al. 1988, Eng, McCormick and Kimberlin 1990, Spencer and Edwards 1992, Erwin, Britten and Jones 1996, Child, Hirsch and Berry 1998, Child and Cantrill 1999, Child 2001, Smalley 2006, Nguyen and Bajorek 2008, Baqir 2010, McIntosh et al. 2011, Perepelkin 2011, Stewart et al. 2011, Erhun, Osigbesan and Awogbemi 2013, Auta et al. 2014, Moore, Kennedy and McCarthy 2014, Bajorek et al. 2015, Mansell et al. 2015, Auta, Strickland-Hodge and Maz 2016, Bourne et al. 2016, Hale et al. 2016, McIntosh and Stewart 2016, Khan et al. 2017, Le, Braunack-Mayer and Laurence 2017).

For quantitative studies, the sample size ranged from 105 to 4158, with response rates of 6.4% to 87%. On the other hand, qualitative studies included

between 8 and 82 participants. For mixed methods studies, the sample size in the quantitative element ranged from 15 to 179, with response rates of 15% to 100%, while the number of participants in the qualitative element ranged from 8 to 10.

4.3.3. Stakeholders' views and experiences of pharmacist prescribing

The majority of both pre- and post-implementation studies included reported support for prescribing pharmacists.

Pre-implementation studies

a. General public

Two studies investigated the public's perceptions of granting pharmacists the authority to prescribe in Canada and India. Respondents were generally supportive of prescribing by pharmacists who received training in specific situations, which included: the physician having made the diagnosis, prescribing from a limited range, in emergency situations, prescribing alternative medicines for the same medical condition, renewing prescriptions, or modifying the strength or frequency of medicines prescribed by a physician (Perepelkin 2011, Khan et al. 2017).

b. Patients

Studies of patients and patient group representatives reported support for pharmacist prescribing (Pennock et al. 1988, Hoti, Hughes and Sunderland 2011, Auta et al. 2014, Auta, Strickland-Hodge and Maz 2016, Hale et al. 2016, Le, Braunack-Mayer and Laurence 2017), which was perceived as likely to improve access to healthcare generally and consultation with a trained health professional making better use of pharmacists' skills (Hoti, Hughes and Sunderland 2011, Auta et al. 2014, Hale et al. 2016, Le, Braunack-Mayer and Laurence 2017). Respondents in several studies noted the need for the pharmacist prescribers to have undertaken additional training, after a

physician's diagnosis, and that prescribing should be from a restricted list of medicines (Hoti, Hughes and Sunderland 2011, Auta et al. 2014, Le, Braunack-Mayer and Laurence 2017).

c. Pharmacists

Pharmacists themselves were generally supportive of a prescribing role, which they perceived as a logical development given their expertise in medicines, their existing over-the-counter prescribing related activities, and their increasingly evolving clinical roles as part of the multidisciplinary team in secondary care. Moreover, they anticipated that outcomes would include quicker and easier patient access to medicines, promoting better utilisation of their skills with resultant enhanced status, as well as increased job satisfaction (Child, Hirsch and Berry 1998, Hanes and Bajorek 2005, Nguyen and Bajorek 2008, Weeks and Marriott 2008, Hoti et al. 2010, Weeks, Marriott and George 2010, Erhun, Osigbesan and Awogbemi 2013, Hoti, Hughes and Sunderland 2013, Moore, Kennedy and McCarthy 2014, Auta, Strickland-Hodge and Maz 2016, Le, Braunack-Mayer and Laurence 2017). There was agreement that they required additional training prior to assuming a prescribing role (Child, Hirsch and Berry 1998, Kay, Bajorek and Brien 2006, Nguyen and Bajorek 2008, Ung et al. 2016, Le, Braunack-Mayer and Laurence 2017, Auta et al. 2018).

There were diverse views on the models and scope of prescribing which ranged from prescribing within an agreed clinical management plan (CMP), repeat prescribing for stabilised chronic conditions, and modifying treatment based on the results of laboratory tests ordered by themselves (Hanes and Bajorek 2005, Weeks, Marriott and George 2010, Auta et al. 2018). Many respondents also viewed IP as appropriate for pharmacists, noting that it will be safe, effective, and improve patient access to medicines. They generally held the view that physicians would be in favour of pharmacist prescribing (Hoti, Hughes and Sunderland 2013, Ung et al. 2016).

d. Doctors

Studies conducted pre-implementation of pharmacist prescribing reported a range of views from doctors (n=9). In one study conducted in the UK, the majority of respondents were supportive, provided that additional postgraduate education/training was undertaken (Child, Hirsch and Berry 1998). In other studies, physicians were more cautious in their support, but acknowledged that a model of pharmacist prescribing for limited conditions, such as minor ailments, was a logical development (Spencer and Edwards 1992, Erhun, Osigbesan and Awogbemi 2013, Hatah et al. 2013, Moore, Kennedy and McCarthy 2014, Auta, Strickland-Hodge and Maz 2016).

Other studies reported physicians' concern over: pharmacists' lack of clinical assessment and diagnosis skills, lack of access to individual patient medical records, legal considerations such as division of clinical responsibility of care, a potential negative effect on the physician-patient relationship, and issues around communication between the pharmacist prescriber and other members of the multidisciplinary team (Child and Cantrill 1999, Vracar and Bajorek 2008, Moore, Kennedy and McCarthy 2014).

e. Nurses

Two UK studies reported the perspectives of nurses with respondents considering pharmacist prescribing for existing or new therapy very useful due to their knowledge in pharmacology and a belief that it will be clearer and safer (Child, Hirsch and Berry 1998, Child 2001).

f. Policymakers

Government and pharmacy policymakers from the US, Canada, and Nigeria anticipated benefit to pharmacist prescribing in terms of improved continuity of care, better patient outcomes, reduced prescribing costs, and reduced physician workload (Segal and Grines 1988, Pojskic et al. 2014, Auta, Strickland-Hodge and Maz 2016). Concerns were, however, expressed by medical policymakers in relation to the need for additional training and access to individual patient

medical records, without which there could be fragmented care (Pojskic et al. 2014).

Post-implementation studies

a. General public

Two studies reported the perspectives of samples of the public, both exposed to pharmacist prescribing and not exposed to it, in the UK. Findings highlighted general support, particularly for the management of minor ailments and issuing repeat prescriptions. There were some concerns around pharmacists' training in diagnosis, lack of access to patients' medical records, and potential lack of privacy and confidentiality within a community pharmacy setting (Stewart et al. 2009a, MacLure et al. 2013).

b. Patients

Nine studies assessed the experience of patients who were exposed to pharmacist prescribing, while Hobson, Scott and Sutton (2010) included exposed and unexposed patients in the UK and Feehan et al. (2016) had US patients who had never been exposed to pharmacist prescribing.

The majority of those patients who had consulted with a pharmacist prescriber were highly satisfied with the consultation overall, particularly the pharmacist's competence and capability, considering their prescribing to be as effective and safe as their physician. They also gave positive feedback relating to the pharmacist's personality, knowledge and communication skills as well as the consistency, accessibility, length and outcome of the care received (Smalley 2006, Stewart et al. 2008, Stewart et al. 2009b, Hobson, Scott and Sutton 2010, Stewart et al. 2011, McCann et al. 2012a, Tinelli et al. 2013, Hill et al. 2014, Deslandes, John and Deslandes 2015, Mansell et al. 2015).

In a recent study of prescribing by community pharmacists in the US, patients who had yet to experience pharmacist prescribing were of the view that pharmacists should only dispense and provide medicines information other than a possible role in prescribing for minor conditions (Feehan et al. 2016).

c. Pharmacists

Twenty-four studies researched the perspectives of pharmacists post-implementation of prescribing rights mainly in the UK (n=18), US (3), and Canada (3). The pharmacists sample in these studies included either prescribers (George et al. 2006a, George et al. 2007, Lloyd and Hughes 2007, Stewart et al. 2009a, Weiss and Sutton 2009, Baqir 2010, Lloyd, Parsons and Hughes 2010, Dawoud et al. 2011, McCann et al. 2011, McCann et al. 2012b, Hill et al. 2014), non-prescribers (Hobson and Sewell 2006a, Hobson and Sewell 2006b, McIntosh et al. 2011, Hutchison et al. 2012, Feehan et al. 2016, McIntosh and Stewart 2016), or both (Eng, McCormick and Kimberlin 1990, White-Means and Okunade 1992, Tully et al. 2007, Tonna et al. 2010, Makowsky et al. 2013, Bourne et al. 2016, Isenor et al. 2018). Pharmacists positively perceived this expanded professional role and reported that drivers to undertake pharmacist prescribing include developing a clinical role, better patient management, personal development, enhancing job and patient satisfaction, improving self-confidence as well as reducing cost of therapy (Eng, McCormick and Kimberlin 1990, White-Means and Okunade 1992, George et al. 2006a, George et al. 2007, Hobson and Sewell 2006a, Hobson and Sewell 2006b, Lloyd and Hughes 2007, Tully et al. 2007, Stewart et al. 2009a, Weiss and Sutton 2009, Baqir 2010, Lloyd, Parsons and Hughes 2010, Tonna et al. 2010, Dawoud et al. 2011, McCann et al. 2011, McIntosh et al. 2011, Hutchison et al. 2012, McCann et al. 2012b, Makowsky et al. 2013, Hill et al. 2014, Bourne et al. 2016, McIntosh and Stewart 2016, Isenor et al. 2018).

Studies also concluded that implementing pharmacist prescribing was easier in secondary care compared to primary or community care due to logistics related to access to medical records and networking environment (Lloyd and Hughes 2007, Baqir 2010, Lloyd, Parsons and Hughes 2010, McCann et al. 2011, Makowsky et al. 2013).

Negative attitudes towards prescribing pharmacists were mainly related to increased liability, lack of time to engage in prescribing, and lack of experience in diagnosis in addition to medical resistance and difficulties in developing a CMP

for every patient (Eng, McCormick and Kimberlin 1990, Lloyd and Hughes 2007, Tully et al. 2007, Lloyd, Parsons and Hughes 2010, Tonna et al. 2010, McCann et al. 2011, Makowsky et al. 2013, McIntosh and Stewart 2016).

Due to liability and diagnosis-related issues, pharmacists preferred SP or prescribing for minor and chronic conditions (Weiss and Sutton 2009, Tonna et al. 2010, Feehan et al. 2016). However, other studies reported that SP was not believed to significantly save physicians' time or improve patient care due to the limited list of drugs they can prescribe under the CMP. Thus, IP will have a better impact (Hobson and Sewell 2006b, Stewart et al. 2009a, Weiss and Sutton 2009, Lloyd, Parsons and Hughes 2010, Dawoud et al. 2011, McCann et al. 2011, Hill et al. 2014).

d. Doctors

Seven studies explored doctors' perceptions of this new role for pharmacists, all of which were conducted in the UK. Of those, six studies reported the perspectives of doctors who had worked alongside pharmacist prescribers. The majority supported pharmacist prescribing across the studies with some benefits highlighted including more holistic and continuous patient care, better utilisation of pharmacists' skills, effects of enhancing physicians' medicines knowledge, and drug cost saving (Lloyd and Hughes 2007, Blenkinsopp et al. 2008, Stewart et al. 2009a, Lloyd, Parsons and Hughes 2010, McCann et al. 2012b). While physicians reported reduced direct-patient workload, the need to develop individual patient CMPs for SP was burdensome hence the impending implementation of IP was welcomed (Hill et al. 2014).

The only study that investigated doctors who were not exposed to prescribing pharmacists reported that, with time, doctors are more likely to accept this new role (Erwin, Britten and Jones 1996).

e. Policymakers

Only one study from the US explored the perceptions of policymakers involved in medical services coverage or formulary policies after the realisation of

pharmacist prescribing. The main findings were that these decision-makers responded positively to pharmacist prescribing due to pharmacists' knowledge about drugs and their mechanisms of action (Feehan et al. 2016).

4.3.4. Facilitators of and barriers to pharmacist prescribing implementation

Many studies (n=27, 42%) reported facilitators and barriers to the implementation of pharmacist prescribers as perceived by the different stakeholder groups (Hanes and Bajorek 2005, George et al. 2006a, Hobson and Sewell 2006a, Hobson and Sewell 2006b, Kay, Bajorek and Brien 2006, George et al. 2007, Lloyd and Hughes 2007, Tully et al. 2007, Nguyen and Bajorek 2008, Stewart et al. 2009a, Baqir 2010, Hobson, Scott and Sutton 2010, Hoti et al. 2010, Lloyd, Parsons and Hughes 2010, Dawoud et al. 2011, McCann et al. 2011, McCann et al. 2012b, Erhun, Osigbesan and Awogbemi 2013, Hoti, Hughes and Sunderland 2013, Makowsky et al. 2013, Bajorek et al. 2015, Auta, Strickland-Hodge and Maz 2016, Bourne et al. 2016, Feehan et al. 2016, McIntosh and Stewart 2016, Auta et al. 2018, Isenor et al. 2018) which are summarised in Table 4.5.

Table 4.5: Facilitators and barriers to pharmacist prescribing

Facilitators	• Pharmacists' personal qualities (communication skills, training, experience, and enthusiasm) • Practice setting (secondary vs primary vs community) • Organisational, managerial, and medical colleagues' support • Resources (workforce, space, access to medical records)
Barriers	• Pharmacists' skills (clinical examination and diagnostic skills) • Resources (workforce, access to medical records, space, time) • Physicians and organisational support • Funding • Legal aspects (accountability, conflict of interest) • Pharmacy practice recognition

The major facilitators to this role include pharmacist personal qualities (enthusiasm, communication skills, experience and training), practice setting (working in an interprofessional team), organisational, managerial and medical colleagues' support as well as infrastructure and resources (number of

pharmacist available, space and access to medical records) (George et al. 2006a, Hobson and Sewell 2006a, Lloyd and Hughes 2007, Dawoud et al. 2011, McCann et al. 2012b, Makowsky et al. 2013, Isenor et al. 2018).

The main barriers reported are pharmacists' poor clinical skills if not prescribing collaboratively and issues relating to resources (access to medical records, shortage in pharmacy workforce, funding, time), support (doctors opposition), logistics (accountability, conflict of interest, referral process) and poor recognition of pharmacy profession (Hanes and Bajorek 2005, George et al. 2006a, Hobson and Sewell 2006b, Kay, Bajorek and Brien 2006, George et al. 2007, Lloyd and Hughes 2007, Tully et al. 2007, Nguyen and Bajorek 2008, Stewart et al. 2009b, Baqir 2010, Hobson, Scott and Sutton 2010, Hoti et al. 2010, Lloyd, Parsons and Hughes 2010, McCann et al. 2011, McCann et al. 2012b, Erhun, Osigbesan and Awogbemi 2013, Hoti, Hughes and Sunderland 2013, Bajorek et al. 2015, Auta, Strickland-Hodge and Maz 2016, Feehan et al. 2016, McIntosh and Stewart 2016, Auta et al. 2018, Isenor et al. 2018).

4.4. Discussion

4.4.1. Summary of key findings

This systematic review summarises the evidence around the views and experiences surrounding pharmacist prescribing from the perspectives of a diverse range of stakeholders in a range of countries and settings.

The majority of studies pre- and post-implementation reported positive views and experiences with main benefits described as: increased access to healthcare services, perceptions of enhanced patients' outcomes, better utilisation of pharmacists' skills and knowledge, improved job satisfaction, and reduced physicians' workload. However, concerns were noted around issues of: liability, limited pharmacists' diagnosis skills, access to medical records, and lack of organisational and financial support. While review findings are derived from many studies of generally high methodological quality, there is a lack of mixed-methods approaches. These are being used increasingly within healthcare and

allow both quantification of findings and in-depth exploration of key issues (Onwuegbuzie and Frels 2016).

4.4.2. Interpretation of findings

Healthcare policies in countries such as the UK are supporting the expansion of pharmacist prescribing and indeed there is a move to increase the number of pharmacists practicing within primary care practices (Royal College of General Practitioners in Scotland and Royal Pharmaceutical Society in Scotland 2016). The positive findings of this systematic review, together with previous reviews of effectiveness and safety (Kay and Brien 2004, Bhanbhro et al. 2011, Auta et al. 2015, Faruquee and Guirguis 2015, Weeks et al. 2016), provide evidence to support such developments. Furthermore, such review findings are important in those countries and settings starting to explore and develop models of pharmacist prescribing (Stewart et al. 2017). Interpretation and extrapolation of findings from studies conducted pre-implementation are limited in that participants may not be fully aware of the aim, nature, and scope of the intervention and may be influenced by experiences of similar or diverse interventions. This is apparent in terms of concerns around independent prescribing models in the UK and pharmacists' limited training in diagnosis. While this does allow assessment and prescribing of undiagnosed conditions, this must be within the prescribers' competence and indeed most pharmacist independent prescribers' practise with patients in whom diagnosis has already been established by the doctor (UK Department of Health 2006). Concerns such as liability and skills which were voiced pre-implementation were less common post-implementation as such studies allow participants to reflect on their real-life experiences. For example, doctors who had worked alongside pharmacist prescribers and patients managed by the pharmacists were very supportive of their professionalism and skills.

4.4.3. Gaps in literature

While lack of access to medical records is an issue, most notably within community pharmacy settings, this is being addressed within the UK with

pharmacists having access to specific limited sections of the electronic medical record (Goundrey-Smith 2016). Many of the barriers and indeed facilitators can be explained by theories of implementation. It is therefore notable that only three of the 65 studies incorporated any mention of theory within the study design, conduct, and reporting (Hoti, Hughes and Sunderland 2011, Makowsky et al. 2013, Isenor et al. 2018). There is a need for implementation studies to focus on theory to allow more systematic and comprehensive investigation of facilitators and barriers. Similarly, those planning implementation should include key theoretical elements at the outset in order to heighten the facilitators and lessen the barriers such as inadequate funding, access to resources, etc. As described in Chapter 2, the Consolidated Framework for Implementation Research (CFIR) is an integrative framework derived from many different theories. It is described in five domains of: intervention characteristics, outer setting, inner setting, characteristics of the individuals involved, and the process of implementation (Damschroder et al. 2009). All barriers identified post-implementation of pharmacist prescribing (e.g. funding, access issues, etc.) would be eliminated in advance by employing CFIR since it can serve as a guide for implementing an innovation. However, it is likely that these barriers reflected the stage of implementation and are likely to have been resolved over time.

4.4.4. Strengths and weaknesses

Previous reviews have been limited in nature and rigour (thematic and scoping reviews), focused on pre-implementation, lacked quality assessment of included studies, and focused on limited ranges of stakeholders in specific countries (UK and Canada) (Cooper et al. 2009, Faruqee and Guirguis 2015, Famiyeh and McCarthy 2017). This systematic review was conducted according to best practices and is reported in accordance with the PRISMA Statement standards (Moher et al. 2009). Furthermore, it was not limited to a specific country, setting, stakeholder group, or implementation stage. However, the generalisability or transferability of findings to other countries or cultures may be limited given that almost all studies were conducted post-implementation in the western world and mainly focused on pharmacists' perspectives. Moreover,

several of these studies were conducted several years ago hence may no longer accurately reflect the current situation in those countries. While many implementation studies have been reported, it is still necessary to conduct such investigations in any country or setting planning to establish pharmacist prescribing to learn from the evidence-base. Future developments and studies should pay attention to theories of implementation and adopt mixed methods approaches with an inclusive range of stakeholders.

4.5. Conclusion

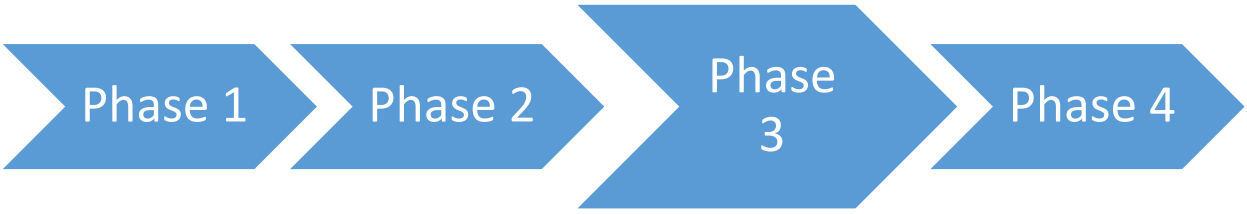
A large number of studies have reported stakeholders' views and experiences of pharmacist prescribing, pre- and post-implementation. While studies were from a limited number of countries, the overwhelming finding was positive, particularly in relation to increased access to healthcare services, perceptions of enhanced patients' outcomes, better utilisation of pharmacists' skills and knowledge, improved job satisfaction, and reduced physicians' workload. Concerns were largely identified pre-implementation and were around organisational issues and perceived lack of pharmacists' diagnosis skills.

4.6. Implications for next phase

It is evident from this systematic review that extensive research has been conducted on the views and experiences of pharmacist prescribing from the perspectives of diverse groups of stakeholders. However, fewer studies have been comprehensive and also included stakeholder groups such as the general public, nurses and policymakers. Notably, none of the studies included all relevant stakeholder groups and there was a lack of studies employing a qualitative approach. Furthermore, none included implementation theory in the stages of development of data collection and generation tools, analysis and interpretation.

Given that most of the studies were conducted in the UK, USA, Canada, New Zealand, Ireland and Australia, there is a need for primary research in the 'Arab World' where the ethnicity, culture and work practices may be considerably different.

The next phase of this research attempted to address these gaps through conducting primary research in Qatar, focusing on a diverse group of stakeholders and incorporating implementation theory throughout.



Chapter 5:

Qualitative interviews with key health stakeholders in Qatar around pharmacist prescribing

5. Introduction to the chapter

This chapter provides a detailed description of the field work conducted around key health stakeholders' perceptions and views on the potential of implementing pharmacist prescribing in Qatar. The aim and research questions are stated followed by the methods, key findings, conclusion and discussion.

5.1. Research aim and objectives

This study aimed to explore the views and perceptions of stakeholders in Qatar on the potential of developing and implementing pharmacist prescribing. The specific research objectives were to:

- Explore stakeholders' awareness, experiences and views of prescribing by non-medical health professionals
- Determine stakeholders' views and perceptions of clinical roles of pharmacists in Qatar
- Investigate stakeholders' views and perceptions of expanding the remit of pharmacists in Qatar to include prescribing
- Examine stakeholders' views and perceptions of facilitators, barriers and solutions to the development and implementation of pharmacist prescribing in Qatar

5.2. Methods

5.2.1. Study design

A phenomenological qualitative approach was employed using semi-structured interviews with key health stakeholders in Qatar. Justification for this approach is provided in Chapter 2.

5.2.2. Research governance

As shown in the appendices, prior to conducting the interviews, ethical approval was received from:

- Robert Gordon University School of Pharmacy & Life Sciences Research Ethics Committee (Approval reference S64)
- Ministry of Public Health Ethics Committee
- HMC Medical Research Committee (Approval reference MRC0449/2017)
- Qatar University Institutional Review Board (Approval reference QU-IRB 772-E/17)

5.2.3. Settings

Data generation took place in Qatar, across several settings as follows:

- Ministry of Public Health (MoPH) in Qatar. MoPH is the health regulatory body in Qatar, responsible for overseeing the medical marketplace as well as ensuring the highest quality of care. Currently, the Ministry evaluates and monitors both public as well as private health sectors (Qatar Ministry of Public Health 2016)
- Hamad Medical Corporation (HMC). The largest hospital group in the State, managed by the government of Qatar and includes eight hospitals differing in their level and range of care to address the public's healthcare needs (Qatar Supreme Council of Health 2014)
- Aspetar Orthopaedic and Sports Medicine Hospital which is the first hospital to provide this specialised care in the Gulf region.
- Primary Health Care Corporation (PHCC). PHCC is the largest governmental group providing primary healthcare services in the State of Qatar (Primary Health Care Corporation 2018a)
- Weil Cornell Medical School. The first and main medical college in Qatar
- College of Medicine at Qatar University. The first and only public medical college in the country

- College of Pharmacy at Qatar University. The first and only college of pharmacy in the State
- Faculty of Nursing at University of Calgary. The first and only college of nursing in Qatar
- Qatar Petroleum Medical Centres. The largest private primary care setting in the country
- Wellcare and Khulud Groups. The largest chain of community pharmacies in Qatar

These settings represented all major institutions relating to the education, practice, regulation and governance of pharmacists. Figure 5.1 shows each of the settings for data generation

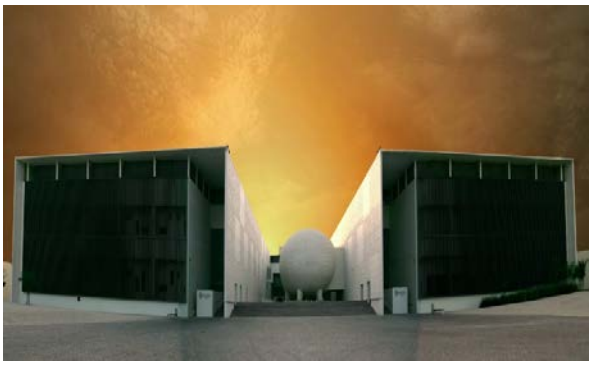
Ministry of Public Health

Hamad Medical Corporation

Aspetar Orthopaedic and Sports Medicine Hospital

Primary Health Care Corporation

Qatar Petroleum Medical Centres



Weil Cornell Medical School

College of medicine at Qatar University

College of Pharmacy at Qatar University

University of Calgary's Faculty of Nursing

Wellcare Group

Khulud Group

Figure 5.1: Settings in Qatar for all data generation

5.2.4. Participant inclusion and exclusion criteria

The intention was to generate data representing all key stakeholder groups and stakeholders in Qatar. This would ensure that data were generated from key experts in their respective fields and who would have policy influence to enact the research findings. The key groups targeted represented health professionals at Director level (or equivalent) involved in prescribing (medicine, pharmacy and nursing), policy makers, leading administrators, senior educators and regulators, and managers of patient safety and quality assurance. Members of the research team based in Qatar were excluded from the study.

5.2.5. Sampling frame and sampling approach

The sampling frame included all individuals meeting the inclusion and exclusion criteria. The names and contact details of all were collated by the local members of the research team using their professional networks.

Purposive sampling was employed (as described in Chapter 2) to capture those individuals most likely to contribute to the achievement of the research objectives. Snowball sampling was also used to ensure that no key individuals had been omitted. This was conducted by asking each interviewee to recommend others that they thought were important to include.

5.2.6. Sample size determination

The approach to sample size determination of Francis et al. (2010) was employed to identify the point of data saturation for each stakeholder group (i.e. the point at which no new themes emerged). The initial sample size for each group was set at five, representing diversity of years of experience and country of training. The stopping criterion was one, at which point recruitment ceased when no additional themes were identified. However, medical and nursing practice leaders proved more difficult to recruit hence only five of each were recruited.

5.2.7. Development of data generation tools

The semi-structured interview schedule was drawn from a comprehensive literature review and the recent umbrella and systematic reviews conducted as part of the doctoral research (Stewart et al. 2017, Jebara et al. 2018). As discussed in Chapter 2, the Consolidated Framework for Implementation Research (CFIR) provided the underpinning of the schedule (Damschorder et al. 2009). Employing a theoretical framework would ensure that individual facts had a meaningful context and contribute towards building an integrated body of knowledge. The schedule was reviewed for credibility by members of the research team prior to piloting with five academic and practice-based stakeholders. The doctoral student received training in qualitative interviewing. In addition, the pilot interviews were shared with the principal supervisor and feedback given to ensure both credibility and dependability. All pilot interviews were not included in the dataset. The interview schedule questions and alignment to the research questions and CFIR are presented in Table 5.1.

Table 5.1: Semi-structured interview questions (Consolidated Framework for Implementation Research 2016)			
Research questions	**Related theory constructs**	**Interview questions**	**Probes**
What are stakeholders' awareness, experiences and views of prescribing by non-medical health professionals with a focus on pharmacists?	Intervention Characteristics (Evidence Strength and Quality)	Are you aware of the possibility of prescribing by health professionals other than physicians?	-[If Yes] What do you know about it? -How did you find out about it? -Have you ever experienced this? Where, when, extent of prescribing and by whom? etc -What do you think of it? -[If No] What do you think of it?
What are stakeholders' views and perceptions of clinical roles of pharmacists in Qatar?	Inner Setting (Tension for Change)	How do you feel about current programmes/practices/process that are available related to current clinical pharmacist roles in Qatar?	-Are clinical pharmacists currently allowed to prescribe? -Does the current practice meet the needs of the community in Qatar? -To what extent?
What are stakeholders' views and perceptions of expanding the remit of pharmacists in Qatar to include prescribing?	Intervention Characteristics (Relative Advantage) Inner Setting (Tension for Change) Outer Setting (Patient Needs and Resources)	What do you think about implementing pharmacist prescribing in Qatar?	-What do you think are possible advantages/disadvantages of implementing this in Qatar on: - Patients - Health professionals - Your organisation - Qatar's society
		Do you think implementing pharmacist prescribing will meet the health needs of the Qatari community?	-In what way? Improved access, reduced waiting time, reduce travel time and cost

What are the stakeholders' views and perceptions of facilitators, barriers and solutions to the development and implementation of pharmacist prescribing in Qatar?	Inner Setting (Structural Characteristics) Process (Planning)	What kind of changes or alterations do you think will need to be made to successfully implement pharmacist prescribing in Qatar?	-Changes in scope of practice? Changes in formal policies? Changes in information systems or electronic records systems? Other? -What kind of approvals will be needed? Who will need to be involved? -Can you describe the process that will be needed to make these changes such as: - Training needed - Accreditation requirements - Need for monitoring and review
	Outer Setting (Patient Needs and Resources)	How do you think patients will respond to pharmacist prescribing?	What barriers might they face?
	Characteristics of Individuals (Self-efficacy)	How confident do you think your colleagues feel about implementing the intervention?	What gives you that level of confidence (or lack of confidence)?
	Inner Setting (Relative Priority)	To what extent might the implementation take a backseat to other high-priority initiatives going on now?	-How important do you think it is to implement the intervention compared to the other priorities?
	Inner Setting (Available Resources)	Do you expect to have sufficient resources to implement and administer the intervention?	-[If Yes] What resources are you counting on? Are there any other resources that you received, or would have liked to receive? -What resources will be easy to procure? -[If no] What resources will not be available? -What challenges do you expect to encounter?

5.2.8. Data generation

All potential participants were emailed the participant information leaflet and asked to partake in this project by the HMC Executive Director of Pharmacy (Appendix 5B and 5H). If no response was received within two weeks, a reminder email was sent. If agreeing to participate, a convenient location, date and time of the interviews were sought via email. Prior to commencing the interview, the doctoral student articulated the information leaflet and obtained signed, informed consent (Appendix 5C).

Interviews of approximately 45-60 minutes were digitally audio-recorded and transcribed *verbatim* by the doctoral student, indicating mannerisms and physical characteristics in order to capture more accurately the interaction between the participant and the researcher. All interviewees were offered to review the transcripts to promote credibility and dependability. A summary of the data generation process is given in Figure 5.2.

5.2.9. Data analysis

Thematic analysis was conducted according to the steps outlines by Howitt (2016), as described in Chapter 2. In summary, once the transcribing was complete, all interviews were inputted into NVivo®. The responses were initially coded then examined in order to cluster similar trends together into themes based on the initial coding and the different CFIR constructs. Afterwards, the emerging themes were reviewed against the original data then indexed and defined. The analysis was conducted by TJ and independently reviewed by at least one team member and disagreements resolved through discussion. Data are presented in the form of quotes made by interviewees in the results section. Mannerisms were found not to add any value hence were not reported as part of the verbatim quotes.

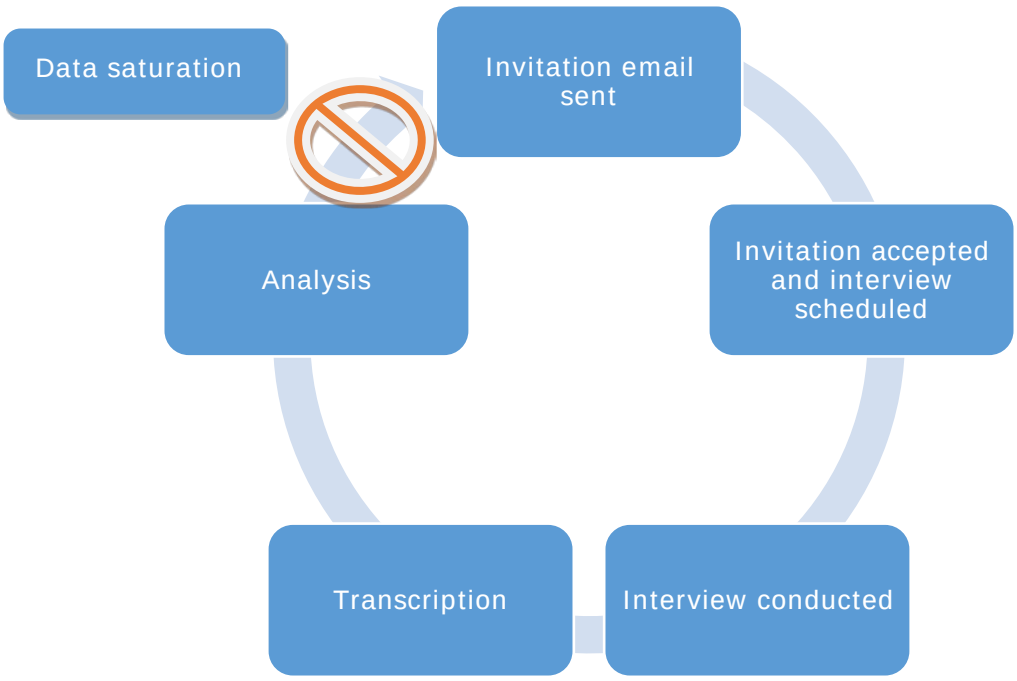


Figure 5.2: Summary of interview process

5.2.10. Data storage

Measures were taken to protect the anonymity of participants. All information recorded and transcribed was stored in secure laptops with restricted access. All research materials were handled in accordance with School of Pharmacy and Life Sciences standard operating procedures.

5.3. Results

5.3.1. Stakeholder recruitment

Seventy-five stakeholders were invited; 11 from academia, 9 medical directors, 10 pharmacy directors, 12 nursing directors, 22 healthcare policy developers and 11 patient safety advocates. Thirty-seven interviews were conducted to reach data saturation in each stakeholder group. The recruitment process is described in Figure 5.3.

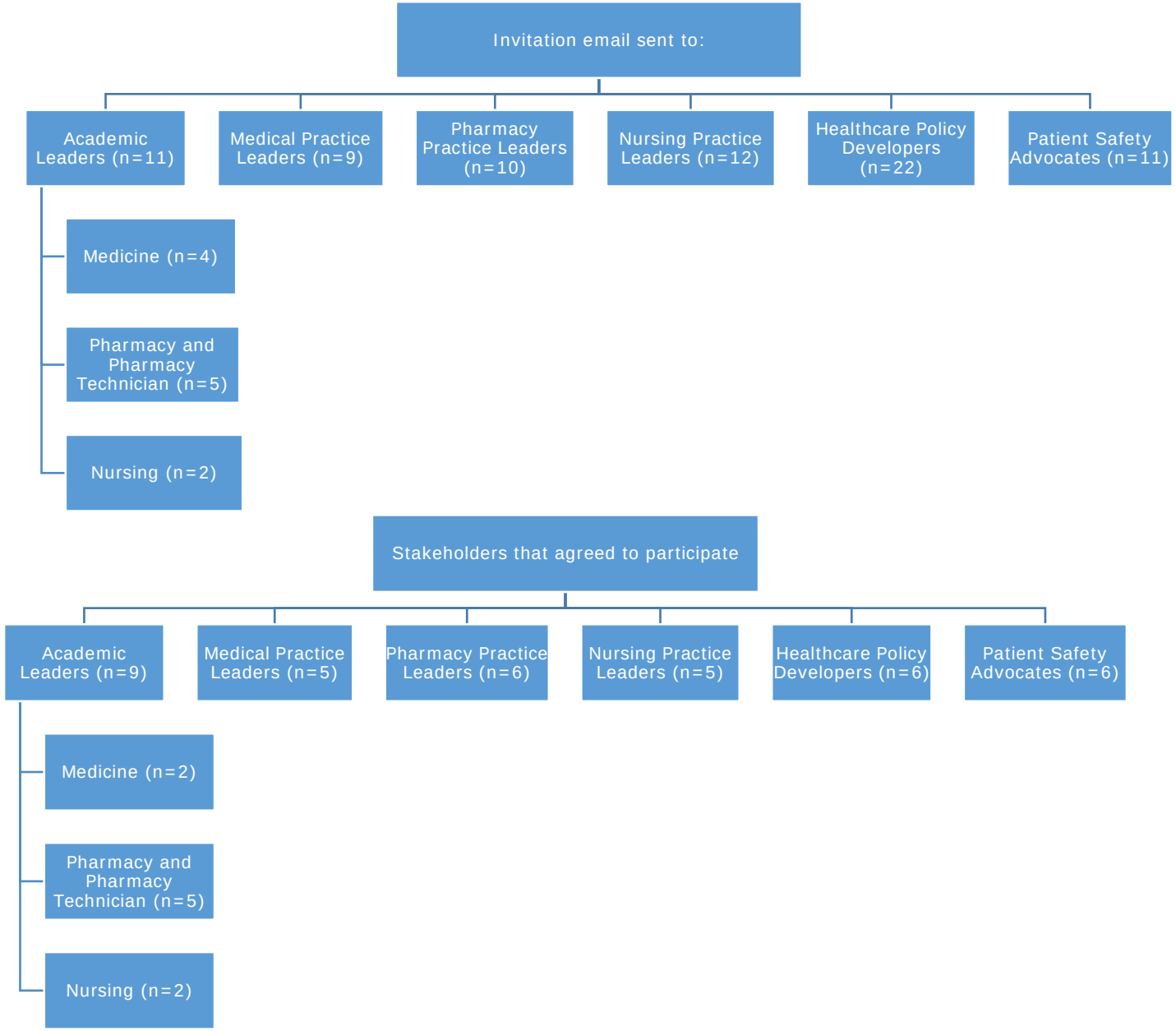


Figure 5.3: Process followed in recruiting stakeholders

The practice settings of stakeholders were diverse, as described in Table 5.2

Table 5.2: Characteristics of included stakeholders according to practice setting

Stakeholders' category	Setting: Number of participants
Academic Leaders	• Medicine: 2 • Pharmacy and Pharmacy technician: 5 • Nursing: 2
Healthcare Policy Developers	• Primary care/Community: 1 • Secondary care: 1 • Tertiary care: 2 • Corporate/Ministry: 2
Medical Practice Leaders	• Secondary care: 2 • Tertiary care: 3
Pharmacy Practice Leaders	• Primary care/Community: 2 • Secondary care: 1 • Tertiary care: 2 • Corporate/Ministry: 1
Nursing Practice Leaders	• Secondary care: 1 • Tertiary care: 2 • Corporate/Ministry: 2
Patient Safety Advocates	• Primary care/Community: 1 • Secondary care: 1 • Tertiary care: 4

Note that further demographic details of the participants are not given to protect their identities thus maintaining anonymity.

5.3.2. Key themes

The results are presented as two main sections. The first relates to the views and perceptions of patient-facing roles of pharmacists in Qatar. This is followed by the results relating to aspects of pharmacist prescribing generally, and specifically in terms of the potential for developing and implementing in Qatar. For ease of reading, both sections are presented according to the domains and constructs of CFIR.

a. Results: Pharmacy Practice in Qatar

At the outset of the interviews, all were asked their views and perceptions of the pharmacist's clinical activities irrespective of sector.

Innovation characteristics

In terms of the innovation of clinical pharmacy practice, there was recognition that this role was developing at pace, particularly within the secondary care setting of HMC. There was description of the clinical pharmacy service in general and exemplified through specialist activities such as the pharmacist led anticoagulation clinic.

1. Innovation source

There was recognition that the anticoagulant service had significantly developed in recent years. This was expressed by participants from all groups of stakeholders.

> "The clinical pharmacists' role has developed quite significantly in the recent years like for example in Al Wakrah Hospital there is the anticoagulation clinic that is run by pharmacists." *Academic Leader 1*

The clinical service had extended to allow dose adjustment.

> "We call it the anticoagulation clinic where the clinical pharmacists are on the front line, meeting the patients usually not new initiation of medication but rather continuation of warfarin, checking the INR and then adjusting the dose so they make the decision." *Medical Practice Leader 5*

There was also recognition of other examples of clinical services.

> "Also in clozapine clinic in mental health, there is a direct contact with the patient for monitoring the side effect and recording if require changing the dose or any side effects…" *Pharmacy Practice Leader 4*

2. Evidence strength and quality

The expansion of the numbers of clinical pharmacist within HMC was considered to be an indication of effectiveness, efficiency and acceptability.

> "I don't really have the statistics but the number of clinical pharmacists now in Hamad [Hamad General Hospital] is really big. We started only with 10. Today maybe we are talking about 60-70 pharmacists. So why did we have this expansion if the role is not really important?"
>
> *Academic Leader 3*

3. Relative advantage

Clinical practice was perceived to bring many advantages including professional autonomy which was considered a springboard to further developments.

> "… It will give you more confidence in what you are doing, your clinical skills, would help increase the trust that is given to the pharmacists and maybe help them gain more roles in the future in doing more collaborative practice agreement. We were thinking about implementing that to include other specialties like heart failure." *Academic Leader 6*

> "…because they have all the qualifications and they feel that their skills are underutilised…things that they have studied they are really [applying]."
>
> *Patient Safety Advocate 4*

There were also examples of positive feedback from patients.

> "Generally our feedback with like warfarin clinics and such that we have is very positive… patients don't wait for months to get an appointment. I don't think they feel any different from what the physician is doing. I actually believe that pharmacists maybe give more time to explain about medications and potential side effects and interactions than what physicians do."
>
> *Healthcare Policy Leader 2*

This clinical service was also reported to reduce pressure on physicians.

> "The most important advantage I see from the side of physicians is that it will free their time to do more skilled work definitely…."
>
> *Academic Leader 6*

There was also the view that patient health outcomes were improving.

> "Being able to be seen on time would improve definitely the outcomes as far as efficacy and safety. We have already a study looking into patients seen by a physician versus a pharmacist and we can see definitely that the anticoagulation outcomes have been better with those monitored by pharmacists."
>
> *Academic Leader 6*

4. Design quality and packaging

Mandatory continuing professional development for pharmacists was considered a positive development contributing to the quality of services.

> "I think they are efficient. They keep continuous educations so they have weekly sessions so they are updating themselves."
>
> *Healthcare Policy Leader 1*

Furthermore, those involved in the delivery of new and specialised services had to undertake further education and training.

> "It is a condensed course that focuses on anticoagulation, how to dose, what are the guidelines available and the pathophysiology."
>
> *Pharmacy Practice Leader 3*

While these developments were in HMC settings, it was highlighted that they could also be in primary healthcare centres.

> "Now it is in Heart Hospital, now it is in Wakrah Hospital. They don't have it in primary healthcare the warfarin clinic. But if the volume of the patients increase, it can be in primary healthcare, why not?"
>
> *Medical Practice Leader 5*

Outer setting

1. Needs and resources of those served by the organisation

There was a feeling that the general public was not aware of the skillset of pharmacists and that this could act as a barrier to expanding scope of practice.

> "Patients are barriers because they don't really value the role of the pharmacist… Unfortunately, at the moment, pharmacist role is still under-utilised in terms of public perception. Anytime you speak about pharmacist, shop keeper image pops to their mind. Pharmacists need to try to promote their profession not just to the public and the patients but also to the other healthcare professionals." *Academic Leader 1*

> "The role of the pharmacists and nurses as well is extremely poor. It is not well known, it is not well advertised… Patients don't understand and if we start implementing pharmacist prescribing, they will be ups and downs."
>
> *Patient Safety Advocate 3*

Inner setting

1. Structural characteristics

Many participants highlighted that while the public sector was highly regulated with focus on quality of care, the private sector was profit oriented.

> "The public sector I think it is more structured because they are accredited, they know about the rules, they have some policies, they have some guidelines to follow and they have a reporting system...but in private, nothing. They don't have the policies, they don't have guidelines, they are more or less looking for money." *Healthcare Policy Leader 3*

There were contradictory views around the influence and power of the medical profession around these developments in clinical pharmacy practice.

> "It is still completely physician driven. There is still a hierarchy."
>
> *Academic Leader 8*

> "In the cancer centre they have a very intimate collaboration with them and communication and they really are valued [as an] equivalent member of the team. There is no hierarchy." *Medical Practice Leader 1*

One overwhelming theme was that clinical pharmacy practice varied greatly with setting. There was recognition that HMC was much further advanced than other settings.

> "Initially [in HMC], we didn't have clinical pharmacists and everything we were doing we did it by ourselves. It is like brainstorming even for us physicians to know the doses adjustment based on the level, based on the creatinine clearance, based on the body weight… But when the pharmacists joined us, it made my life easy because I will depend on someone else, he will do everything for me." *Medical Practice Leader 2*

"As for practice, hospitals are better than community since community is not well developed because it lacks assessment and clinical practice."

Pharmacy Practice Leader 6

"In primary healthcare centres, they are developing now, they are in a better position if you compare them to the community pharmacists. But I have to say that still they need to work more on themselves. Comparing the community pharmacists to primary healthcare corporation pharmacists, profits in the community pharmacy come as a priority which is not the case in the primary healthcare corporation."

Academic Leader 3

"In secondary care, it is much more developed and so you have established clinical pharmacy programmes in place where you have pharmacists trained and working in wards." *Patient Safety Advocate 3*

2. <u>Networks and communication</u>

There were mixed views on the degree of integration of the pharmacist within the multidisciplinary team and therefore the communication networks in operation.

"I have really good relationship here with my pharmacist as well. We have dialogue with regard to if there is any issue with nurses and administration for instances as well." *Nursing Practice Leader 3*

"In the psychiatric hospital, the pharmacist was always in a little back room. And not on the floor at all… I just think that you need to open up the interprofessionalism, the collaboration."

Academic Leader 8

Trust, relationships and communication were thought key to the anticoagulation clinic.

> "For the collaborative agreement, from the beginning we had very strong and very positive relationship with the medical directors…They are trusting me a lot. When I shared with them something, an idea, and when I explain it to them, approach them, they trust me "go ahead". Building the trust and having good relationships with the team it will facilitate everything."
>
> *Pharmacy Practice Leader 6*

3. Culture

Despite the positive developments in clinical practice in HMC, there was still the view that pharmacists were generally undervalued. This view was shared across all practice settings.

> "I think pharmacists feel they are not appreciated by other members of the healthcare team. I think for example physicians they feel threatened by the advancement in the role of the pharmacists."
>
> *Academic Leader 1*

> "I suspect that there is a traditional view about the dispensing type pharmacist rather than that understanding of them having the kind of clinical background knowledge as well." *Nursing Practice Leader 1*

One factor thought contributing to this lack of awareness and lack of value was the large number of expatriated health professionals.

> "We have physicians from very different backgrounds and parts of the world and all the different cultural heritages and there are sometimes adjustments needed to understand that other professional groups are just as valuable as their professional group is." *Medical Practice Leader 1*

4. Implementation climate

a. Tension for change

Almost all acknowledged that while clinical practice had developed, there was potential for further developments. Reasons cited including meeting the needs of the population and reducing physician workload.

> "Definitely there is a lot of room for improvement. There has been quite a lot of changes to the pharmacist role but there is a lot of space for further improvement." *Academic Leader 1*

> "The pharmacist should be going back-and-forth between each [ward] and reviewing all of their charts and their medications and their usage and they should also be part of the multidisciplinary team."

Academic Leader 8

b. Compatibility

There was some appreciation that the clinical pharmacy practice service in HMC could be benchmarked to practice in western countries.

> "I left the UK thinking that I had a very good pharmacy service. I have come to Qatar and there is a better pharmacy service here in my view. I think the level of clinical pharmacy, the level of liaison with the physicians, the work that has been done on medicine reconciliation and medicine safety and the data that can be produced is second to none in my view."

Healthcare Policy Leader 5

The level of technology and automation available within HMC was considered a positive facilitator of clinical pharmacy development

> "The level of automation that goes into packages like Cerner is clearly already demonstrating that pharmacists can take on a more assertive role on behalf of the patients to protect their safety…"

Healthcare Policy Leader 4

While the clinical anticoagulation clinic was well-established, it was noted that this took time, with the development accelerated once physicians had evidence of positive outcomes.

> "At the beginning, when they don't have much experience with it, they may be a little bit suspicious about the abilities of the pharmacists to do that appropriately. But then after a while, after they saw our abilities and how really the patients have been stable and monitored appropriately, I think they got more and more confident about our abilities to do it and they started to refer more patients even." *Academic Leader 6*

c. Relative priority

Developments in clinical practice were felt to align to the Qatar National Vision hence were considered beneficial.

> "…It will relieve the physician time a little bit… I think this is a very important part to be considered in the priorities of the national health over here."
>
> *Academic Leader 6*

5. Readiness for implementation

a. Leadership engagement

The support of the pharmacy leaders was considered a main influential factor in clinical development.

> "I think the Director of Pharmacy, she is really a pioneer in introducing this programme into Women's Hospital. This started I think seven years ago and now we have very good clinical pharmacists who are eager to work and to do further responsibilities." *Medical Practice Leader 3*

> "This is the role of [the pharmacy] directors, their immediate supervisors, to speak to the stakeholders, to the top level managers, that this is the role and they do… it is not obvious." *Patient Safety Advocate 1*

b. Available resources

There was a perception that the number of skilled clinical pharmacists was a barrier to further service development.

> "You may have enough [pharmacists] but you need specific skills, you need people with clinical practice, competencies and clinical background not traditional type of education. Qatar lacks the number of clinically qualified and skilled professionals." *Pharmacy Practice Leader 6*

This was noted to be a particular issues during times of staff absences.

> "If you have only one pharmacist covering the service, it gets difficult sometimes when they need to be on leave for conference or vacation.
>
> *Academic Leader 6*

Characteristics of individuals

1. Knowledge and beliefs about the innovation

There was general agreement that, given their education and training, pharmacists should be maximising their input to patient care.

> "When I look at the education of pharmacists, I think they should be working to full scope… I think by maximising their scope, it is better for the system and it is better for the patients." *Academic Leader 9*

2. Self-efficacy

There was recognition that while some pharmacists were motivate to develop their clinical practice, there were many likely to be less motivated.

> "Pharmacy like any other profession, you will find the group of people who are really motivated to do more work, motivated to do, love the profession, would like to serve more and other…and other pharmacists who are still [not]." *Academic Leader 3*

Notably those involved in establishing the anticoagulation clinic were highly committed despite their existing workload.

> "The people I had on the team were very committed and enthusiastic to the project despite being already overwhelmed with their original work. They were working very hard and they were very proud."
>
> *Pharmacy Practice Leader 6*

3. Other personal attributes

The personal development of the pharmacists in Qatar was appreciated and thought related to their extensive training, and rigid recruitment and licensing standards.

> "I think they improved a lot from maybe 17-18 years ago. There is a lot of improvements in pharmacy practice and we appreciate that there is this change and improvement." *Healthcare Policy Leader 6*

> "We have a very tight process for recruiting pharmacists so we are looking for quality first. So we have very good quality pharmacists with us."
>
> *Pharmacy Practice Leader 2*

There was, however, recognition that practice in community pharmacy centred on dispensing.

> "Unfortunately, I have to say that community pharmacy is one of the major gaps that we do really have here in Qatar… The role that is played by the community pharmacists in Qatar is still the traditional role in which they just sell medications and maybe provide some recommendations or counselling from time to time." *Academic Leader 3*

Process

1. Planning

When developing and implementing clinical pharmacy services, there were several key factors for successful implementation. The need for involvement and communication with other health professionals was vital.

> "From the beginning before we started anything, we communicated in a very nice way with the physicians. So we started to talk to them in friendly ways, unofficially, from time to time… So none of the physicians felt threatened… We brought everything in a very professional way, with the proper communication and they were very supportive. We were very scientific, very friendly with them… I was appreciating them all the time by emails or verbally…" *Pharmacy Practice Leader 6*

The development of clear guidelines and policies was cited as being important.

> "We have developed and approved the policies, we developed the guidelines for all of the anticoagulants and antiplatelets and we decided on and approved the workflow as well… We decided that pharmacists have to go through certain competency certification… So they have been through that course and we sponsored them. And then we started and we continued monitoring the work, take feedback from physicians and from patients to

improve the process. We prepared the collaborative agreement itself and it was reviewed and approved by the medical director."

Pharmacy Practice Leader 6

2. Engaging

a. Key stakeholders

The need for effective communication with all key stakeholders as part of implementation was highlighted.

"And the consultant here was very happy about this idea and he supported it especially since he came from Canada and he knew how the system was running and he supported this. Otherwise it wouldn't have worked."

Patient Safety Advocate 4

b. Results: Pharmacist prescribing

The remainder of the interview results are those relating specifically to views and perspectives on pharmacist prescribing. As before, the themes are provided under each of the CFIR constructs.

Innovation characteristics

1. Innovation source

Many of the interviewees across all stakeholder groups were aware of the concept of non-medical, and specifically pharmacist, prescribing either from their experiences or through the published literature.

> "I think with being trained in the UK and I did my MSc in Prescribing Sciences I am very familiar with pharmacist or other healthcare professionals prescribing… I think under some kind of agreement, pharmacists are able to prescribe certain kind of medications or sometimes repeat prescriptions."
>
> *Academic Leader 1*

> "I know in some countries like in Canada, there were efforts to let the pharmacists to start prescribing. And I know in the States, in some states, the nurse practitioners and physician assistants can also prescribe some medications." *Academic Leader 2*

> "From previous experience being in the anticoagulation clinic in the States. We have been in a collaborative practice agreement where we do prescribe but after the patient has been referred with an initial diagnosis. We had the opportunity to alter the dose of warfarin, sometimes switch from warfarin to one of the new oral anticoagulants at that time, prescribe vitamin K, enoxaparin. So anything related to anticoagulation, I actually experienced it myself." *Academic Leader 6*

> "Worldwide, there are different and many models of prescribing. So there is the North American model which is usually in most cases more of a collaborative framework where physicians agree with pharmacists or nurses

to prescribe within a limited scope… However, in the UK they started a decade or two ago to have independent prescribing models for both nurses and pharmacists where they can, with certain certifications and courses with some diagnosis skills, they can have full authority to prescribe different kinds of medications… But even many other countries have started to do that."

Healthcare Policy Leader 2

"I did my fellowship in USA… I noticed that even the pharmacists are coming sometimes to change the management or to change the treatment or to change the doses… That means that they are allowing them to prescribe or even to increase the dose or frequency based on their judgement."

Medical Practice Leader 2

"Yes, being British obviously [I am aware] and in fact I was involved in setting up both supplementary and basically open prescribing at the University of Bedford when I worked there… So yes I am familiar with both systems, supplementary and independent prescribing."

Nursing Practice Leader 2

Several were, however, less aware of non-medical prescribing practice.

"Honestly, my knowledge is very low because in Denmark where I come from it is not used. There are very few cases where nurses have been able to prescribe like statins but that is the only thing I know about it."

Academic Leader 5

"I am not sure actually. Where I come from in Germany or Switzerland that is not the case. In the United States, I think it is the case but I don't know to what extent." *Medical Practice Leader 1*

In general, interviewees highlighted prescribing by pharmacists was not currently within scope of practice in Qatar.

> "No [pharmacists in Qatar cannot prescribe] to the best of my knowledge and I am talking about Hamad Medical Corporation… They help us a lot in designing the medication [regimen] and how to monitor and follow up the levels but they don't really dictate any further actions."
>
> *Medical Practice Leader 3*

> "They will advise the doctor that this is right or you need to modify… But not a direct dealing with prescribing." *Patient Safety Advocate 2*

> "They see the patient, evaluate, monitor, document side effects and monitoring the whole safety issues then after that there is no prescribing but they refer the patient to the original prescriber."
>
> *Pharmacy Practice Leader 4*

As described in the previous section, there was also recognition of the role development within anticoagulation which required physicians' co-signatures.

> "I only know at Heart Hospital, they have anticoagulation clinic where the pharmacists are involved although I don't think that they are actually prescribing. I think they are recommending the doses and the doctors will agree." *Academic Leader 4*

> "They could also write the prescription but there is always the supervision by a doctor who is observing all the clinics."
>
> *Medical Practice Leader 5*

There was also recognition that the potential for developing and implementing pharmacists prescribing was being discussed at many levels within Qatar. As described by one interviewee, the scope of practice had been recently extended to include prescribing, a role which was likely to require additional certification.

> "[In Qatar], they added prescribing to the scope but they requested that the person who will be allowed to prescribe has to have additional certification… [However], it is not implemented yet."
>
> *Healthcare Policy Leader 6*

2. Evidence strength and quality

Most considered that the evidence base of safety and effectiveness of pharmacist prescribing was of sufficient quantity, robustness and rigour to support developments in other countries. There was awareness of the published peer-reviewed literature on specific models (e.g. UK and Canada).

> "Pharmacist prescribing privileges in the UK… has been established since long time and there is also enough data to show the effectiveness and the efficiency of such initiative… this is supported by data and supported by strong research and supported by other experiences."
>
> *Academic Leader 3*

> "Prescribing for example.. in any model I think we should be doing this because first of all there are many, many positive examples from all over the world. But I don't think our pharmacists are less than these countries where these models occurred." *Healthcare Policy Leader 2*

3. Relative advantage

The implementation of pharmacist prescribing in Qatar was considered by most to bring many advantages. For example, there were particular advantages to the pharmacists themselves, with likely increased in professional satisfaction and confidence.

> "I think it is important for pharmacists. It is good use of their skills… I think it fits nicely with the training that they get during their undergraduate or their postgraduate training… It will increase their self-confidence, they will feel that they are able to contribute more to society, they will feel that they are really a valued member of the healthcare team."
>
> *Academic Leader 1*

> "Empowering the pharmacists or the staff working in the pharmacy, I think it will be good for them, they will feel they are empowered… and having them connected with certain organisation which is accredited, certified or known at least, it will give them some kind of pride."
>
> *Patient Safety Advocate 1*

> "You are motivating pharmacists to give them something more to aim for… We need to create a structure within pharmacy that gives pharmacists who are ambitious a career structure."
>
> *Patient Safety Advocate 3*

There were benefits for physicians, with reduced time spent on prescribing allowing them to focus on other aspects of patient care.

> "This will definitely have an impact on the level of care that is provided to the patients. This will also reduce the pressure that we put on the physicians… especially since physicians are always complaining from the time given per patient." *Academic Leader 3*

> “I think we need to assist some of our doctors to have more time to formulate the plan, to think about the treatment and so on. If we can bring additional capacity and expertise to build in then it is going to be better for patients. So it becomes more of a team effort than just one person.”
>
> *Healthcare Policy Leader 5*

Notably, there was the view that pharmacist prescribing could lead to more timely access to care as well as that care being more holistic. Overall that could lead to improved patient satisfaction.

> “That would also enhance the patient experience itself in terms of waiting time, quick access to healthcare professionals as well as, especially for more chronic patients, many studies show that pharmacists can be as good as, if not better than, physicians.” *Healthcare Policy Leader 2*

> “They are the easiest healthcare professional to access. [Patients] don't have to pay the fees, they don't have to be in a big queue, anytime they can enter the pharmacy they will find the pharmacist and if the pharmacist have a bigger role especially in prescribing and counselling and all those things, definitely that will help a lot.” *Pharmacy Practice Leader 2*

> “I think it might make healthcare a lot more accessible particularly for example this [HMC] overpopulation.” *Nursing Practice Leader 5*

There was also general agreement that pharmacist prescribers could be more effective and safer than physicians given their extensive and focused education and training on medication.

> “When I look at the data we currently have, there is definitely room for improvement in terms of optimal prescribing and I think having people who are specifically trained and experienced in that area has got to be better.”
>
> *Healthcare Policy Leader 5*

> “Sometimes physicians are not aware of the advancement around new drugs. The pharmacists will know because this is their area of expertise. So this will advance the practice.” *Healthcare Policy Leader 6*

> “It will be safer, better and more economical. With pharmacists on site and pharmacists contributing, we will have less unwanted drug interactions and less toxicities therefore more efficiency and maybe also efficacy.”

Medical Practice Leader 1

There was also the potential for reducing the cost of healthcare, an outcome associated with many reasons including redistributed workload, reduced drug costs and reduced rates of hospital admissions.

> “This may have an impact on the cost because when you make the physicians’ time available for more complicated cases, this may be associated with cost reduction.” *Academic Leader 3*

> “Is it going to be more expensive for pharmacists to prescribe? I don’t think so. Would you actually be able to cut cost or economise? I think pharmacists might be very instrumental and say “you don’t need this” or “you can take an alternative”.” *Academic Leader 7*

> “A transformed pharmacy will save money, it will prevent readmissions which frees beds.” *Healthcare Policy Leader 4*

Implementing pharmacist prescribing was also considered to align with the aspirations of the Qatar National Vision 2030 of a healthier society by better utilising the skills of healthcare professionals.

> "To policy makers, I think having a skill-mixed profession is very important. It is in-line with Qatar National Vision where they want to have a healthier society, they want to make sure that they are graduating skilled healthcare professionals… So, I think it fits quite nicely to achieve its vision."
>
> *Academic Leader 1*

Pharmacists assuming responsibility for prescribing could also impact the roles and responsibilities of pharmacy technicians.

> "I know pharmacy technicians will obviously have more responsibilities because the pharmacists will have to spend time with the patients."
>
> *Academic Leader 4*

One further benefit was that if pharmacists were to prescribe the image of the profession may improve resulting in increased applications to study pharmacy at the College of Pharmacy in Qatar.

> "Having privileges for pharmacists to prescribe medications will really help in improving the pharmacy picture in the community… It will help in recruiting more national pharmacists which is a major issue to the college and the country as a whole." *Academic Leader 3*

4. Adaptability

Many commented on the potential to adapt models of pharmacist prescribing developed in other countries to meet the needs in Qatar, particularly around chronic conditions prevalent in Qatar.

> "[It is] definitely important especially in diabetes, in heart failure as well as the antithrombotic overall… Those are all areas that could… have collaborative practice agreement and… being pharmacist-run."
>
> *Academic Leader 4*

One interviewee voiced the opinion that pharmacists should prescribe in defined areas where there was a clear need.

> "One of the best ways of doing this is to take a service that might be very under pressure and develop the role of the pharmacist within that service… It has to be more about the service and the need of the service not the need of the individual." *Nursing Practice Leader 1*

5. Trialability

One theme which emerged particularly strongly was the need to start slowly by piloting pharmacist prescribing in defined areas and collecting data on aspects of effectiveness prior to implementing on a wider scale.

> "Cost-effectiveness has to be calculated, do some sort of pilot economic studies to see to what extent this is going to help patients, what are the risks of it." *Academic Leader 6*

> "I would strongly advocate that we start small and build and demonstrate the benefits, so not a big launch… If it demonstrates and achieves benefits, then that is the reason to try a bit more probably. " *Healthcare Policy Leader 5*

"… do piloting in one unit to see or like one specialty or one hospital… and you will see the system, it is [beneficial] on not."

Medical Practice Leader 2

The need for robust piloting was also emphasised.

"I think you would have to pilot it within some very strict sort of piloting rules and see what the results [are]." *Nursing Practice Leader 4*

"You have to pilot it many times, not only one time. You have to pilot it in different situations, and different timing with different personnel, with a different facility and different clinic. Then after piloting, you have to adjust your action plan." *Healthcare Policy Leader 3*

6. Complexity

There were some comments on issues around the potential complexity of pharmacist prescribing, dependent on the model to be implemented. This was particularly noted in relation to diagnostic skills.

"So, you can play through scenarios where if it is left to the pharmacist to make a clinical diagnosis and write a prescription, that to me, is beyond the scope, I think." *Patient Safety Advocate 5*

Embedding sufficient quality assurance within any prescribing model was considered to add to the complexity.

"The challenge is just to secure the quality that is needed to make this a reality." *Medical Practice Leader 1*

There was also a concern that pharmacist prescribing could potentially lead to conflict with physicians, particularly associated with an independent prescribing model.

> “The disadvantage would be the conflict... because if you create some kind of independency among clinical pharmacist, he might work away from the physicians’ direction.” *Medical Practice Leader 3*

There was potential for conflict with other key stakeholder groups including nurses and the Ministry of Health.

> “Changing the workload for the doctors, nurses, and pharmacists… the doctors [will say] "I will not prescribe?" it is a big thing for the doctor. And the nurse "I assist doctor before. Now I am assisting pharmacist. Why I have to do [that]?" *Patient Safety Advocate 4*

> “First of all [you will face challenges] from the other professional provider. Physician of course they will strike for this… and some of the population, the people at the same time. I don't think the Ministry of Health, they will not… [pose a] challenge unless if they need to change the rules, the regulation.”
>
> *Pharmacy Practice Leader 1*

One concern highlighted was that implementing prescribing by another group of health professionals could result in very complex networks of communication which could be problematic.

> “If the pharmacist somewhere in HMC was changing the medication orders or the prescription for the patient in the absence of a conversation with the doctors, I think, from the nurses’ perspective, if we're administering the medications, we would want to understand what's going on here.”
>
> *Nursing Practice Leader 4*

This issue could also be complex at the level of the individual patient.

> "The doctors, in a hospital setting, have the relationship with the patient which is about managing their healthcare. The pharmacists don't have that level of relationship with the patient."
>
> *Nursing Practice Leader 4*

Some interviewees highlighted that the current legislative framework could be a barrier to be overcome.

> "You have to change the law which is not easy… How you are going to handle this legal framework? How are you going to make it legal for the pharmacists?" *Healthcare Policy Leader 3*

Another concern was raised over possibility of overburdening pharmacists who would need to juggle their clinical and prescribing roles.

> "The other disadvantage is if we don't get the workload balance correct and the workforce balance correct, in other words overburdening the pharmacists with prescribing duties as well as clinical duties on the ward."
>
> *Patient Safety Advocate 3*

7. <u>Design quality and packaging</u>

In relation to the actual model of pharmacist prescribing and how it could be implemented, there was the overwhelming view that it would be best to be more conservative, particularly in the initial stages, prior to proceeding to a more autonomous model. This was highlighted by all stakeholder groups.

> "I think at the beginning it has got to be collaborative… But as the pharmacists get more experienced, they can go to independent."
>
> *Academic Leader 4*

> “Collaboration is the whole concept in this. If we were to go on the independent route, there may be limited cases where we talk to each other… Even in the medical team, we always generate a consensus according to the level of experience. So if it then comes to ordering medications and the treatment, I think that it is more needed that we communicate.”
>
> *Medical Practice Leader 1*

> “[Independent prescribing] is a fairly big step up from what I've seen… with the collaborative/supplementary one… I think that can be a good step because it would then require an interdisciplinary sort of activity where the doctor actually establishes a clear plan of care and then the pharmacist works within it… The collaborative model is safer at this stage.”
>
> *Nursing Practice Leader 4*

> “At the time being, I believe that [collaborative prescribing] will be the foundation for things that we have then after that we will focus on independent… Independent, I don’t believe that we are in this stage… I believe that first let us start with this, wait 5 years to see the impact for that then we can ask for independent prescribing.”
>
> *Pharmacy Practice Leader 3*

A further key theme relating to model design was that there had to be a clear need for pharmacist prescribing and to potentially target key therapeutic areas of patient groups. Targeting should also consider the skills and competencies of the pharmacists.

> “I think it is also important to see that there is a need for it. Not just do it in all the areas, no.” *Academic Leader 1*

> “I am internist and specialist, I cannot write chemotherapy, I cannot write anti-diabetologists and endocrine or certain limited restricted medications. So it should be the same… So he cannot prescribe something different beyond his specialty… They have to have their own sub-specialities.”
>
> *Medical Practice Leader 2*

> “I do believe having it for certain diseases would be better then you can start to expand… Then within one disease, within one category, you can start to add. So, the pharmacist will be more competent and more confident.”
>
> *Patient Safety Advocate 1*

However, several other interviewees held the opposite view that by limiting pharmacist prescribing to specific conditions or medicines could reduce the potential for holistic care and review of all medicines.

> “If you restrict the medications, you will mess with the experience of the pharmacist on how to handle a different disease or a different situation.”
>
> *Healthcare Policy Leader 3*

> “I think it is very hard to limit yourself to one section of the formulary because again just going back to diabetes the likelihood is that people have multiple co-morbidities and again we don't want to get into a situation where we see the patients and we will say" I can only prescribe this bit”.”
>
> *Nursing Practice Leader 1*

In addition to themes relating to the prescribing model and patients to target, there was wide-ranging discussion on the appropriate settings for implementing pharmacist prescribing. While it appeared that there was more support for implementation in the hospital sector, there was also potential for later implementation in all settings including community pharmacy. This centred on

better communication within hospital and greater clinical skills and experiences of hospital pharmacists.

> "At the time being, I believe that the hospitals should be the first people to implement it just to establish the fundamental things then after than we can expand it to PHCC and the community pharmacies because, to be honest, it is well known that there is a difference in competencies between community and hospital pharmacists." *Pharmacy Practice Leader 3*

> "It is a very good idea if there is a collaboration between the pharmacist and the physician anywhere, any place, this would be perfect… I would love to see in the hospital set up, health centre set up, but not in the community pharmacies." *Medical Practice Leader 3*

While possessing a postgraduate qualification in clinical pharmacy or related area was important, this was not essential provided that sufficient training was provided.

> "I wouldn't prefer to have necessarily like a masters or a PhD. Of course, that is a bonus but I don't think it is essential as far as that the course you will implement, certification or competency course, is certified by QCHP and it gets really developed by people who are experts in this."
>
> *Healthcare Policy Leader 2*

There was, however, overwhelming agreement that pharmacist prescribers should undertake specific education and training prior to prescribing, irrespective of any prior qualifications.

> "Train the pharmacists. It is not only training once. You have to have a certification done. It has to be on several episodes; we train them, we assess, we train, we assess. So, it has to be over a long period so that you ensure the sustainability of the skills and the knowledge they have obtained…

> You don’t want the pharmacists prescribing wrong medication or a wrong dose if they are not competent enough.” *Academic Leader 2*

> “There should be a training programme for all the pharmacists on how to start prescribing, when they should stop, they should know their limit…”

Healthcare Policy Leader 1

> “…so, no-one will work until he passed this training and he have to be privileged by QCHP.” *Healthcare Policy Leader 3*

Supervision was considered to be a key element of the programme to allow assessment of prescribing in practice.

> “You should have the proctoring system… Somebody have to, in the beginning, proctor them and say that this individual is expert now, they can continue, and they don't need to be under supervision.”

Healthcare Policy Leader 6

> “I think a period of supervised practice would be helpful. So I think finding a medical colleague who is really supportive that can kind of support the pharmacist through the process.” *Nursing Practice Leader 1*

The need for continuing professional development evidence through accumulation of credit was highlighted, emphasising that this development should be within the field of prescribing practice.

> “People who have prescribing authority should have so many credits and keeping current with that particular specialty which they are going to be authorised in.” *Academic Leader 4*

Outer setting

1. Needs and resources of those served by the organisation

Many interviewees across all stakeholder groups highlighted that public perceptions of pharmacists, their training and abilities may hinder implementation of pharmacist prescribing.

> "Is the patient ready for this as well? Not only the pharmacist… Many patients, especially in the Arab region, will tell you "Ah, pharmacist? He just dispense medication. I would trust the physician more" because still the physician is at the top of the hierarchy."
>
> *Academic Leader 2*

> "For outpatient setting, I think patients will totally resist the change. You have to think how you are going to overcome this resistance."
>
> *Healthcare Policy Leader 3*

2. Cosmopolitan

The fact that pharmacist prescribing had been successfully implemented in other countries, and particularly developed Western countries, was perceived as a positive influence on implementation in Qatar.

> "You have to connect them with other experience or to be affiliated with another organisation whom they have the same programme for example prescribing in Canada, USA, UK wherever which is well developed… Having them connected with certain organisation which is accredited, certified or known at least… They are doing it in this way. We can do it. Let us try it."
>
> *Patient Safety Advocate 1*

Inner setting

1. Networks and communication

Interviewees highlighted that those health professionals working alongside pharmacists in the hospital setting were fully aware of the pharmacists' clinical roles. This, however, was not the case for those in community settings.

> "Talking about physicians and nurses because they are in a daily contact with the pharmacists, they are aware of the pharmacist's role especially when we say in the hospitals… So, I have to say that because of the communications or because of the contact between them and the pharmacists, they more or less know the role that the pharmacists play. But talking about maybe community, I think no. Still the role is not clear to them."
>
> *Academic Leader 3*

2. Culture

There were mixed views relating to organisational culture within Qatar in that while some may embrace change, others would be more resistant.

> "I have been through the process of implementing a brand-new role. And you will always get people who embrace the change very, very quickly and you always get people who are really kind of slow to adopt the change."
>
> *Nursing Practice Leader 1*

3. Implementation climate

   a. Tension for change

Interviewees perceived several factors which could act as positive drivers for change. One key factor was the lack of physicians.

> "I think in Qatar particularly there is a great need because you need to

distribute a lot of the tasks away from the doctors because they are too overwhelmed and have too many patients."

Academic Leader 5

"With the increased costs of healthcare and shortage of healthcare providers including physicians of course, there is a need to widen the scope of prescribing for other healthcare professionals…"

Healthcare Policy Leader 2

b. Compatibility

The presence of the College of Pharmacy in Qatar and the quality of the programme was felt to align very strongly with implementing pharmacist prescribing.

"I think you have probably got more chances of getting pharmacists prescribing than nurses. There is a very strong academic programme for pharmacists in Qatar…" *Nursing Practice Leader 1*

Pharmacist prescribing was perceived as being compatible with the hospital setting where prescribing was considered a natural extension to pharmacists' existing clinical roles. Within that setting there were existing channels of communication and training programmes.

"Within Hamad hospitals, there are clinical pharmacists that have direct patient roles…" *Academic Leader 1*

"In Hamad, they started the PGY1 and this PGY1 programme got the accreditation only last week. So, if we are able to establish a residency programme and get it accredited from an international accreditation agency, we will be able to achieve a pharmacist prescribing project easily with the motivated people that we have." *Academic Leader 3*

In contrast, community and primary healthcare pharmacy practice was considered to be much less compatible with pharmacist prescribing due to the nature and volume of work.

> "…but if I talk about primary healthcare, when I have 500 prescriptions to dispense per day, what kind of counselling or cognitive service do you expect from these pharmacists if they cannot even go for their lunch break? Do you want to bombard them with prescribing in addition to dispensing?"
>
> *Academic Leader 2*

c. Relative priority

Developing and implementing pharmacist prescribing was perceived as a priority which was in keeping with the aims and ambitions of Qatar National Vision 2030 and the National Health Strategy.

> "I haven't seen any national priority that did not mention health as part of it. Now talking about pharmacist prescribing, it comes under the umbrella of health… So I think pharmacist prescribing project comes in the core of an important pillar of all these." *Academic Leader 3*

> "The triple aims that are set out in the National Health Strategy I think almost require us to think about pharmacist prescribing more because a major part of it is about safe care and if pharmacist prescribing can improve the safety of our care then it is a key plank over National Strategy and certainly a major priority within Hamad."
>
> *Healthcare Policy Leader 6*

Other noted that while pharmacist prescribing was important, other initiatives were more important. There were several reasons for this, one of which was that there were existing models of physician prescribing.

> "In the context of multidisciplinary and structured approach, I think it is in

the upper half of the priorities. I mean the bigger ones are things like beds and recruitments." *Healthcare Policy Leader 4*

"I cannot say it is priority one because physicians are prescribing, and physicians have been prescribing for many years."

Healthcare Policy Leader 6

Several noted that these other competing priorities could limit the resources available for the development and implementation of pharmacist prescribing in Qatar.

"It depends on what other things they are trying to implement in terms with the healthcare strategy… They need to look at this and see do we have enough resources to do this all in the same time or do we have to do this phased." *Academic Leader 4*

"So, frankly speaking, it might not compete with [other priorities] to be on the front line as a priority… We need to cover all the oncology patients with the best technology available for example. We need for example to provide best home healthcare services rather than to occupy the beds in the hospitals." *Pharmacy Practice Leader 5*

4. Readiness for implementation

a. Leadership engagement

Within the hospital setting, there was clear support for pharmacist prescribing, with discussions on extending pharmacist clinical activities currently taking place.

"For my end, I have no objection to it and I am already pushing it ahead now with a fairly senior consultant… he is very keen on pharmaceutical-led practice and we have been trying to almost beat up our pharmacists to understand that their job is to prevent death… Their role is to make doctors

accountable for the safety of our patients and that is what we have been telling them in the meetings and telling them how we want to reorganise our pharmacies." *Healthcare Policy Leader 4*

b. Available resources

Positive comments were received in relation to key resources which would be required for implementing pharmacist prescribing. These resources included human resources, access to clinical records and space. While these seemed to be available in all settings, most comments were received in relation to the hospital setting.

"Resources in Qatar are always available…Human resources are also available. So I cannot see resources as a challenge…Access to medical records now is granted to the majority of healthcare providers even researchers." *Academic Leader 3*

"In [my organisation], we have consultation rooms for pharmacists only. So space is available." *Healthcare Policy Leader 1*

"In Hamad Medical Corporation, they are really having a vast and huge range of resources that we are so proud of. And Cerner is very helpful, this is a major resource. And we have a huge medical library."

Medical Practice Leader 3

"Within HMC, I think that the pharmacists probably do have good access [to medical records]…We have a good number of pharmacists and that the support staff is often the issue." *Nursing Practice Leader 1*

"I can only talk about it from a hospital perspective but I have never worked in such well resourced environment from a pharmacy perspective. So I think it may just be about reengineering and looking at different ways of practice."

Nursing Practice Leader 5

There were particularly favourable comments in relation to the electronic health record system [Cerner] which was utilised throughout Qatar permitting shared access to patient information. While this did not currently extend to community pharmacies, this was not considered to be a major barrier.

> "We have got a great opportunity here in Qatar because of Cerner that is currently linked with family doctors and hospitals. If that was linked with chemists as well then it could be really extraordinary what pharmacists could do in primary healthcare in terms of all sorts of medication reconciliation."
>
> *Nursing Practice Leader 2*

Some interviewees held contrary views, expressing views that additional resources would be required to implement pharmacist prescribing. These resources included human resources, space, access to clinical records and funding for related research.

> "Right now, I think if I just look at HMC, there is not enough resources to just deliver care. So, I think, with this, it will be a resource intense effort because again you will be talking about putting structures which means faculty, curriculum, monitoring, measuring, governing, regulating… so do you have the capacity now to put something like that together?"
>
> *Patient Safety Advocate 5*

> "We don't have enough number of clinical [pharmacists] to shift those with proper qualification to be independent or supplementary prescribers."
>
> *Pharmacy Practice Leader 4*

> "It needs space and we have space issue in HMC."
>
> *Healthcare Policy Leader 2*

> "I think definitely one of the things that you have to have is access to medical records… otherwise you are doing it blindly…I think if the Ministry and others don't have the money, there are going to be difficult to procure

[resources needed]." *Academic Leader 9*

Characteristics of individuals

1. Knowledge and beliefs about the innovation

Many commented with regard to the existing knowledge base of the pharmacists and how this would facilitate pharmacist prescribing.

> "It should be a good thing especially for us pharmacists as we know all about medications and even we are usually teaching and consulting doctors about medication use." *Healthcare Policy Leader 2*

> "I think pharmacists certainly from my contacts have a tremendous amount of knowledge. They need to be supported in expanding their scope of practice." *Academic Leader 9*

There was also acknowledgment of the knowledge base of students graduating from the College of Pharmacy at Qatar University.

> "We teach our students. We give them the skills, we give them the knowledge to make the right recommendation. So, from an education perspective, we will be happy because we already train our students to do this." *Academic Leader 2*

2. Self-efficacy

There were many comments in relation to pharmacists' self-efficacy (perceived competence) to undertake pharmacist prescribing.

> "Pharmacists perceptions about their own roles and responsibility, maybe about their own self-confidence, maybe they don't feel ready that they can do." *Academic Leader 1*

"Sometimes [pharmacists] themselves, they don't have the confidence that they can do it I think. *Healthcare Policy Leader 6*

3. Other personal attributes

While interviewees felt that pharmacists may not be confident in their competence, others were much more convinced.

"I don't think our pharmacists are less than these countries where these models occurred especially that you always have these tests or requirements to get competence so that wouldn't be a problem."

Healthcare Policy Leader 2

"I would be expecting them to be as up to date as any clinician in our multidisciplinary team about the latest guidelines, the latest drug innovations, the latest generic etc." *Healthcare Policy Leader 5*

"I think pharmacists would probably have a greater body of expertise in medical stuff and I think it is something they should be able to do."

Nursing Practice Leader 5

It was however noted that due to curriculum changes not all pharmacists would be considered to have the up-to-date knowledge required for prescribing.

"The curriculum changes within years. So, maybe they are not prepared into the level that, it gives them the confidence that they can prescribe or they have the knowledge as a practitioner to make decisions."

Healthcare Policy Leader 6

Interviewees across all professional groups highlighted the need to have gained experience in clinical practice prior to undertaking prescribing practice. There were comments that it was not an appropriate role for new graduates irrespective of their clinical training and exposure.

> "I would be hesitant on the fresh graduates. I would say that they should definitely have at least five years of experience because I think those also build your confidence and your skills and you can begin to see patterns in patients." *Academic Leader 9*

> "We have to focus our recruitment far more on pharmacists who have worked in multidisciplinary environments in hospitals of X size and with X amount of experience… I think they need to have minimum years. So, if we are asking for minimum three years in hospital care for someone to be a pharmacist so he can start." *Healthcare Policy Leader 4*

> "I think you have got to have some experience but that is my personal priority. I think you need to know your primary role first before getting into something a bit more different." *Nursing Practice Leader 3*

Some also expressed concern over setting an arbitrary number of years of clinical experience prior to prescribing and that the nature and depth of the experience had also to be taken into account.

> "If we put a number of years on things, it is generally arbitrary. I think it is more about how active you are within the role that you are in now."
>
> *Nursing Practice Leader 1*

> "It depends on the field that he has experience with; maybe two years' experience in critical care unit equal 20 years in a private clinic setting. So it is not really about the years of experience."
>
> *Patient Safety Advocate 4*

Some also considered that new graduates should be eligible for pharmacist prescribing training, depending on the institution and programme studied as an undergraduate and that this would be like graduates of medicine.

> "There is no reason why fresh graduates shouldn't take part if they are coming from a qualified programme." *Academic Leader 4*

> "That is like asking for a freshly graduated physician needing to have additional and continuing training in order to qualify him/her as safe… I mean there is no label on someone it is always an evolution."

> *Medical Practice Leader 1*

> "I do believe in the fresh graduates a lot because they have the enthusiasm to do more. If they find a good coach, good mentor, I think they would exceed their mentors." *Patient Safety Advocate 1*

Process

1. Planning

In relation to planning for the implementation of pharmacists prescribing, multiple factors were highlighted as being key. One theme which emerged very strongly was the need to engage with other stakeholder groups, to identify their awareness, support and reluctance to overcome these barriers well in advance of implementation. This was likely to take time, patience and providing reassurance.

> "The problem with doing new things is you always need to be very patient in the beginning and very careful that the nurses are supporting, the doctors are supporting, the pharmacists who have not been trained are supporting it. So really make a lot of political work and continue meeting groups and get joined support." *Academic Leader 5*

> "First, the pharmacy division needs to sell the concept based on international practice and evidence that it can work and what the benefits are and win

some medical champions… Then they should choose few areas where you can get the maximum benefit for using a pharmacist… It is probably the best way forward to win over people." *Healthcare Policy Leader 4*

"I would then be looking at a stakeholder consultation to say this is what we believe from all the review work that we have done, what are the issues for the various stakeholders." *Nursing Practice Leader 4*

Effort should also be dedicated to having clear role definition, particularly in relation to collaborative working and assuming a role which had previously involved only physicians. The need to avoid conflict was discussed by many interviewees.

"Collaborative practice is very important, and it is not a competitive practice… You have to see the physicians' acceptability, maybe you need to give them some ideas about the pharmacists role, maybe you need to educate the physicians that this is what the pharmacist is going to do so that everybody is on the same page. Role clarification is very important."

Academic Leader 2

In addition to role definition, other aspects of governance were considered key to successful implementation. Clearly describing the prescribing framework, model and limits of prescribing were important.

"You need to have a framework or you need to have guidelines also in place even if you were going to go ahead with this programme, pharmacists should know their boundaries; when I should refer, when I can still treat."

Academic Leader 2

"Then I would set up some sort of clear governance framework for it and so it is very clear at which point decisions are made and who is responsible and accountable for them… and there would probably be some work that would

need to be done around the development of the models that you are proposing and a consultation around preferred models."

Nursing Practice Leader 4

The need to ensure that pharmacist prescribing was in adherence with legislative frameworks was also emphasised.

"First of all, you have to allow pharmacists to do it. So that is form a regulatory point of view, they need to be allowed to do it."

Healthcare Policy Leader 2

"You would have to change all policies or the Emiri decree here. I think in Hamad, we would have to have a massive revolution in our policies."

Nursing Practice Leader 2

As part of planning for implementation, many discussed the requirement for setting out a business case, highlighting the weaknesses of the current system and the likely benefits to be gained.

"You have to submit a good proposal showing the strengths and weaknesses, the SWOT analysis and you should show them of course that this would be good; for patients quicker access, it is cheaper care with the same quality I believe because pharmacists salaries are less than physicians and also probably more patient satisfaction I assume with having more time to patients, quicker access to healthcare professionals and medications."

Healthcare Policy Leader 2

"I have no doubt that it could be very safe and could be very cost-effective and could be a very good thing to be doing. However, we need to understand what is making it safe and why it is safe… So, I would try and build a very

strong case for doing this and I would use whatever literature there is that talks about cost-effectiveness or about safety of care."

Nursing Practice Leader 4

"We need to look at what the benefits are and we need to prove that it works and we need to prove it is successful then we can share those results with others." *Patient Safety Advocate 3*

Interviewees also recommended a detailed planning process which would involve all relevant stakeholder groups. At all stages, the need to protect patients and maintain safety in prescribing was emphasised.

"I think implementation is always an issue in that you have to carefully look at really planning it out well and do you have all the stakeholders… and really being definite in knowing the roles about who is going to implement, how you are going to implement it, designing the implementation and then looking at if there are any issues." *Academic Leader 9*

"If it is done quickly or it was not planned enough, or the certification processes were not adequate enough, of course there are risks to patient care and also this will impact negatively on the pharmacy image."

Healthcare Policy Leader 2

2. Engaging

    a. Champions

Interviewees highlighted that successful implementation would require support from senior physicians who could act as champions for pharmacist prescribing.

"What I'll be looking for would be a medical colleague who would want to support something similar." *Healthcare Policy Leader 5*

b. External change agents

There was also a role for external experts who could act as change agents as a key part of the implementation process. Ideally, these individuals should also have specific expertise in the development and implementation of pharmacist prescribing.

> "Look at the best centre in the world having a good [pharmacist prescribing experience] and invite them to help us set this project."
>
> *Medical Practice Leader 3*

c. Key stakeholders

The need to consult and engage with a wide-range group of key stakeholders as part of the implementation process was evident across all interviews.

> "It is much easier to achieve change if you have everybody engaged and they will be more agreeable to a change because it is not being a change applied to them, it is applied with them." *Patient Safety Advocate 3*

> "A lot of the criticism and perhaps worry is about when things are done without everybody being involved, when people feel that they are on the outside of decision making." *Patient Safety Advocate 6*

Given that patients were at the centre of healthcare and the prescribing process, it was essential that their views were taken into account hence the need to engage as part of the development, planning and implementation of pharmacist prescribing. Many interviewees highlighted that this would be a great change for patients and many would need much convincing.

> "Patients are big stakeholders. I think it will take a while to convince them around the skills and the knowledge [of pharmacists] …I think it would be important to actually interview patients to find out what is important to them as a stakeholder group." *Academic leader 9*

"My advice is to involve the patients as early as possible in the process of planning so even if they didn't accept it, you will know why they are not going to accept it. You will know that in advance."

Pharmacy Practice Leader 5

Policy makers across many health institutions in Qatar were also considered vital to the implementation process hence their views needed to be captured.

"I am quite positive that healthcare policy makers need to be on board. You need to get their buy-in to be able to promote it. I think leaders within either the healthcare institutions or within the Ministry of Public Health need to believe and realise the importance of this."

Academic Leader 1

"You need the support of the ministry, the Primary Health Care Corporation, Hamad Medical Corporation, all these entities."

Academic Leader 2

"I think you are going to have to have several people. You have to have the Ministry of Public Heath in terms of the views of public health and certainly when you look at stakeholders certainly Qatar Foundation is going to be a key one when you begin to look at Sidra and other hospitals, Primary Health Care Corporation." *Academic Leader 9*

"We have Pharmacy and Drug Control they have to be involved. Quality Improvement, Patient Safety they have to be involved. Licensing and Accreditation department I think it is better to be involved… QHCP; Qatar Health Care Practitioners you have to discuss this model with them. How they can adapt to the new changes of pharmacists privileges."

Healthcare Policy Leader 3

"I think first, Qatar Council for Healthcare Professionals. There should be a policy written about it and everything clear; what type of

qualification/certification this individual needs and from what school is accepted. And then the healthcare organisation follows this direction because the healthcare organisations have to develop the policy and develop the process of proctoring or supervision to the individual."

Healthcare Policy Leader 6

"If there are any regulatory entities/bodies basically involve them. And then if there is an equivalent of pharmacy board to say you have met the qualifications to be able to do this." *Patient Safety Advocate 5*

Support from pharmacy leaders was also considered crucial, with interviewees discussing the need for appropriate remuneration for a prescribing role and to ensure appropriate workload and balance.

"We need to get the pharmacy managers on board so that basically pharmacists are reimbursed for doing this extra job."

Academic Leader 2

"Say you have the staff already committed to do their own work, you need to give them protected time [to be able to prescribe] and here you need the leaders to be involved so they can help you with this."

Pharmacy Practice Leader 5

Academics were highlighted as being key to the implementation of pharmacist prescribing. This was particularly important in relation to education and training, and to ensuring appropriate standards of practice.

"When we talk about educational side, I think we should involve of course even the basic education like the undergraduate education. Of course we have here only one college [of pharmacy] which is Qatar University and they should be involved in starting this from the beginning."

Healthcare Policy Leader 2

> "I think for developing the competency or developing the guidelines maybe we will need the academic people." *Pharmacy Practice Leader 3*

All interviewees highlighted the importance of early engagement with all other health professional groups in all states of development and implementation. Full engagement at the outset was considered essential to identify any likely issues and resolve these at a very early stage.

> "You need to consider other healthcare professionals what do they think. You don't want a clash with them at the end of the day so we want them to be supporting that…You have to look at the pharmacists themselves. You need to explain to them that and to get their support because they are your population of healthcare professionals who actually are applying for this."
>
> *Healthcare Policy Leader 2*

> "We have to work with the physicians, we have to work with the healthcare organisation management team to tell them that these individuals can practice on that level… We should get support of our team; the physicians, the department itself, pharmacy…etc they have to accept this."
>
> *Healthcare Policy Leader 6*

> "I think you are going to have to get medical staff engagement and buy-in because otherwise you are just going to get obstacles and resistance."
>
> *Nursing Practice Leader 5*

> "So we need nursing involved, we need allied healthcare professionals involved, we need doctors, probably attract some leading doctors, to be involved in saying that this is the right way forward."
>
> *Patient Safety Advocate 6*

On discussing engaging with the drug industry, many interviewees highlighted their concerns over involving industry in the development and implementation of pharmacist prescribing.

> "You might want to have a representative as an observer, that is fine. But I don't think they can actually have any input because they would be biased."
>
> *Academic Leader 7*

3. Reflecting and evaluating

A major theme which emerged was that pharmacist prescribing should be monitored very carefully, to identify standards of practice, allowing the early identification thus resolution of any issues. Terms used included 'complaints', 'fall short', 'expected standards', 'audit and feedback' etc. The monitoring should be continuous rather than just a one-off exercise.

> "They need to be monitoring patients' complaints. So, if there is ever complaints against pharmacists that do advanced prescribing then that pharmacist needs to be reviewed…" *Academic Leader 4*

> "The privilege is not given only written, somebody has to criticise their level of knowledge and it needs continuous monitoring..."
>
> *Pharmacy Practice Leader 4*

> "I think that it has to be carefully monitored and so it really is looking at who are your pharmacists, what is their comfort level around prescribing… because audit and feedback is really useful to look at people's practices… to see how they are, how they are doing. I think that is going to be really important and to make sure if you want to improve, how do you improve."
>
> *Academic Leader 9*

Several interviewees also highlighted that measures should be put in place to measure the success, or otherwise, of pharmacist prescribing and to determine whether this had added value to the healthcare system.

> "We will do it, test it, then we will see the results… Then we will analyse the data, what are the pros, the cons, values and [do] we get added value or it is a waste." *Patient Safety Advocate 1*

The key themes, described as facilitators and barriers, relating to each of the CFIR domains are given in Table 5.3.

Table 5.3: Themes of facilitators and barriers to the implementation of pharmacist prescribing in Qatar mapped to CFIR domains and constructs			
CFIR Domain	**CFIR construct**	**Corresponding factors**	**Classification (Facilitator/Barrier)**
Innovation characteristics	Innovation source	Awareness of NMP and especially pharmacist prescribing practice globally	Facilitator
		Prescribing not currently within the scope of pharmacy practice in Qatar	Barrier
		Establishing the pharmacist-led anticoagulation clinic	Facilitator
	Evidence strength and quality	Robust and rigorous evidence of effectiveness and safety reported globally	Facilitator
	Relative advantage	Potential to: -Increase pharmacists' job satisfaction and confidence -Reduce doctors' workload -Provide timely and holistic care, increasing patients' experience and satisfaction -Reduce cost of healthcare -Improve image of the profession -Expand role of pharmacy technicians	Facilitator
	Adaptability	Potential to adapt models of pharmacist prescribing developed and implemented in other countries	Facilitator
	Trialability	Potential to pilot on a small scale to determine effectiveness	Facilitator
	Complexity	Lack of pharmacists' diagnostic skills	Barrier
		Need to ensure sufficient quality when prescribing	Facilitator/ Barrier
		Potential for conflict with physicians and others, most notably if an independently prescribing developed and implemented	Barrier
		Pharmacist prescribing could result in complex network of communication	Barrier
		Current legislative framework in Qatar	Barrier
	Design quality and packaging	Implementing collaborative prescribing before proceeding to a more autonomous model	Facilitator
		Need to prescribe in defined areas of clear need	Facilitator
		Scope of prescribing must align with pharmacists' competencies	Facilitator
		Preference to initially implement in secondary care prior to extending to other settings	Facilitator
		Requirement to provide additional education and supervised training	Facilitator

			Requirement to provide continuing professional development within field of prescribing practice	Facilitator
Outer setting	Needs and resources of those served by the organisation		Public and healthcare professionals' perceptions of pharmacists' education, training and practice	Barrier
	Cosmopolitan		Ability to collaborate with other countries experienced in pharmacist prescribing implementation	Facilitator
Inner setting	Networks and communication		Existing communication channels in secondary care	Facilitator
	Implementation climate	Tension for change	Shortage in the number of medical prescribers	Facilitator
		Compatibility	Quality of academic programme at the College of Pharmacy	Facilitator
			Current clinical pharmacist roles in secondary care	Facilitator
			Nature and volume of workload in primary care and community	Barrier
		Relative priority	Goals and ambitions of the National Health Strategy and Qatar National Vison 2030	Facilitator
			Competing priorities	Barrier
	Readiness for implementation	Leadership engagement	Current discussions to extend pharmacists' clinical activities	Facilitator
		Available resources	Availability of human resources, access to clinical records and space, most notably in secondary and primary care settings	Facilitator
			Lack of access to clinical records in community pharmacies	Barrier
Characteristics of individuals	Knowledge and beliefs about the innovation		Current knowledge base of practicing pharmacists	Facilitator
	Self-efficacy		Pharmacists' lack of confidence to undertake a prescribing role	Barrier
	Other personal attributes		Pharmacy practice in Qatar considered as advanced as in Qatar as those countries which have implemented pharmacist prescribing	Facilitator
			Differences in pharmacy curricula studied by pharmacists in Qatar	Barrier
			Requirement for pharmacist prescribers to have experience in clinical area	Facilitator
Process	Planning		Engagement of other stakeholder groups to identify potential barriers	Facilitator
			Requirement to develop robust governance mechanisms (role definition, prescribing framework, model, etc.)	Facilitator

	Engaging	Champions	Need for support from doctors	Facilitator
		External change agents	Engagement of experts in developing and implementing pharmacist prescribing	Facilitator
		Key stakeholders	Early engagement of a wide range of stakeholders (pharmacy leaders, policy makers, patients, other providers, academics etc.)	Facilitator
	Reflecting and evaluating		Requirement to plan to monitor prescribing practice regularly	Facilitator

5.4. Discussion

5.4.1. Summary of key findings

The aim of this phase of the research was to explore the views and perceptions of stakeholders regarding the development and implementation of pharmacist prescribing in Qatar. Interviews based on CFIR were conducted with key stakeholders in positions of power and influence in Qatar, with data saturation achieved on completion of 37 interviews. The interviewees were generally aware of models of pharmacist prescribing in other countries and the clinical activities of pharmacists in Qatar, most notably in Hamad Medical Corporation. These activities included working as a member of the multidisciplinary team, conducting medication reconciliation, and providing recommendations for individual patients. There was awareness and appreciation of and the recently established pharmacist-run anticoagulation clinic. There was also support for the development and implementation of pharmacist prescribing in Qatar, with many potential benefits highlighted. CFIR identified key themes of facilitators and barriers to implementation aligned to each of the five CFIR domains. While there are many more facilitators than barrier, particularly in the hospital setting within HMC, it was clear that there was a requirement to systematically plan the development and implementation of pharmacist prescribing with reference to all five domains.

5.4.2. Interpretation of findings

This is the first study on pharmacist prescribing which used a theoretical framework of implementation throughout the research processes of developing the research aim and objectives, interview schedule development, data generation, and analysis hence represents an original contribution to knowledge. The findings aligned well to the domains and constructs of CFIR.

The themes derived in relation to the first two research objectives (awareness of non-medical prescribing models and clinical activities of pharmacists in Qatar) demonstrated the very positive perception of these models and clinical pharmacy practice, particularly within Hamad Medical Corporation. Together with the specific themes of CFIR-related facilitators,

these findings are very positive in relation to the implementation of pharmacist prescribing in Qatar. Furthermore, data saturation was observed across all stakeholder groups, as well as the population of interviewees, hence the rigour of the findings and likelihood of implementation increased.

As noted earlier, the analysis of data generated from stakeholders across all participant groups identified facilitators and barriers to pharmacist prescribing implementation, with many more facilitators than barriers. These were reported around the five CFIR domains:

- The innovation, highlighting the preference for a collaborative prescribing model rather than an independent prescribing model. While the model has been developed elsewhere, and supported by evidence, there was need to adapt, refine, trial, define the education and training and governance processes

- The outer setting in terms of the need to articulate clearly the education, training and practice of pharmacists and to collaborate with those countries experienced in implementation

- The inner setting with secondary care the preferred setting initially due to the maturity, culture, communication channels, readiness and clinical pharmacy practice

- The individuals, highlighting that while clinical pharmacy practice in secondary care was perceived as well-advanced, effort is required in ensuring that pharmacists have the confidence and belief in their competence to undertake a prescribing role

- The process in relation to discussion and engagement with wide-ranging groups of stakeholders, to appoint product champions to plan and execute implementation, with robust governance policies and processes, and robust and rigorous evaluation to determine whether anticipated outcomes are realised

While the systematic review of stakeholders' views and experiences of pharmacist prescribing presented in Chapter 4 identified more than 60

studies, none of these were conducted in the Middle East. Furthermore, only 29 were conducted pre-implementation and only six of these were of a qualitative methodology.

There are, however, some similarities between the findings of this interview study and the systematic review. Several studies in the systematic review highlighted that major facilitators identified pre-implementation included pharmacists' personal qualities (e.g. their clinical experience, and education and training) and the perceived benefits of pharmacist prescribing (e.g. improved patient access to care and better utilisation of pharmacists' skills) (Hanes and Bajorek 2005, Auta, Strickland-Hodge and Maz 2016, Auta et al. 2018). Studies conducted to identify facilitators in post-implementation also reported the importance of pharmacists' training and experience, resources (easy access to medical records and prescription pads), having close working relationships with medical prescribers, working in an interprofessional team and perceptions of patient management (George et al. 2006a, Hobson and Sewell 2006b, George et al. 2007, Baqir 2010, Bourne et al. 2016).

The systematic review also identified similar barriers in pre-implementation studies including concerns over pharmacists' poor clinical skills in assessment and diagnosing, which were key issues in relation to independent models of prescribing practice (Hanes and Bajorek 2005, Nguyen and Bajorek 2008, Hoti et al. 2010, Erhun, Osigbesan and Awogbemi 2013, Auta, Strickland-Hodge and Maz 2016, Auta et al. 2018). These concerns were reiterated in post-implementation studies and may indicate a misunderstanding of the UK independent prescribing model which does not actually require the diagnosis to be made by the pharmacist independent prescriber. In fact, the UK Department of Health definition of independent prescribing is "prescribing by a practitioner (e.g. doctor, dentist, nurse, pharmacist) responsible and accountable for the assessment of patients with undiagnosed or diagnosed conditions and for decisions about the clinical management required, including prescribing" (UK Department of Health 2006).

Other similar barriers identified post-implementation were lack of funding to sustain services, potential liability issues, resources (space, privacy) and the lack of a clear organisational strategy to support pharmacist prescribers

(George et al. 2006a, Hobson and Sewell 2006b, George et al. 2007, Baqir 2010, Hobson, Scott and Sutton 2010, McCann et al. 2011, McCann et al. 2012b, Feehan et al. 2016, McIntosh and Stewart 2016).

It is notable that these facilitators and barriers have been identified with groups of non-medical prescribers other than pharmacists, as highlighted in the umbrella review described in Chapter 3. Facilitators were non-prescribers' experience as health professionals, the application of evidence-based guidelines and treatment protocols, peer support, and encouragement from medical practitioners and patients. Barriers included the lack of clearly defined roles for non-medical prescribers, no dedicated time allocated to prescribing activities, other competing tasks, lack of confidence of some NMPs, and the lack of acceptance of the role by other health professionals and patients.

Given that none of these studies had adopted CFIR or a similar framework, it is not surprising that they did not comprehensively report the facilitators and barriers. Using CFIR in the interviews identified additional facilitators and barriers of:

- The innovation in relation to awareness of pharmacist prescribing
- The outer setting highlighting the need to educate the public and other healthcare providers on pharmacists' education and training; and the potential to collaborative with other countries that have implemented pharmacist prescribing
- The inner setting in terms of the goals and ambitions of the health setting in Qatar; the quality of pharmacy education and practice; and the readiness for implementation in Qatar
- The individuals, highlighting the need to improve pharmacists' confidence to undertake a prescribing role
- The process in relation to need for robust governance; involving a diverse group of stakeholders in the design, implementation and evaluation of innovation

These additional facilitators and barriers highlight the benefit of adopting a theoretical framework in research. Identifying these pre-implementation can

allow for a more tailored implementation which emphasises the facilitators and with action to overcome as many barriers as possible. This is likely to result in more successful and sustained implementation with better outcomes for patients, professionals and the organisation. Theoretical frameworks used in preparation for implementation, such as CFIR, can also help in guiding translation of research into practice, identifying influences on implementation outcomes, and evaluating implementation (Damschroder et al. 2009, Nilsen 2015, Consolidated Framework for Implementation Research 2016). There is therefore merit in adopting CFIR in all subsequent stages of development and implementation of pharmacist prescribing in Qatar.

In the UK where implementation of pharmacist prescribing is most advanced, many factors have contributed to sustained action. Healthcare structures and processes, particularly those relating to clinical pharmacy practice, had evolved over several decades, with accumulated evidence of benefit. These aspects relate to all five CFIR domains and were facilitators for implementation of prescribing. Furthermore, government initiated key reports such as the Cumberlege and Crown reports advocated extending prescribing privileges to other groups of healthcare professionals (Crown 1999, Auta et al. 2015, Cope, Abuzour and Tully 2016). Pharmacist prescribers must complete a GPhC accredited prescribing course, aligning to the CFIR innovation characteristics domain (General Pharmaceutical Council 2018). Along with a legislative framework, national guidance documents also facilitated prescribing. These included ‘Principles of Good Prescribing’ (British Pharmacological Society 2010), ‘A Guidance for Good Prescribing Practice for Prescribing Pharmacists in NHS Scotland’ (NHS Education for Scotland 2012) and ‘A Competency Framework for all Prescribers’ (Royal Pharmaceutical Society 2016). Publishing these documents aligns with two CFIR domains (innovation characteristics and process).

Qatar is currently in the process of revolutionising its healthcare structure as outlined in its National Vision 2030 (Qatar General Secretariat for Development Planning and Statistics 2008) and the National Health Strategy 2018-2022 (Qatar Ministry of Public Health 2018). These aim to establish a world-class healthcare by better utilisation of the knowledge and skills of

health professionals such as pharmacists. These can also facilitate the development and implementation of pharmacist prescribing (aligning to CFIR inner setting domain)

5.4.3. Strengths and weaknesses

There are many strengths to this study:

1. A qualitative methodology was selected to generate in-depth, rich data allowing detailed description and understanding of perspectives that would facilitate the next phase of this doctoral research (Jensen and Laurie, 2016). Furthermore, this chapter is reported according to the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidance (Tong, Sainsbury and Craig 2007).
2. Key stakeholders in positions of power and influence were recruited. Gathering data on their perspectives would enable actual implementation of pharmacist prescribing later. Every effort was taken to ensure that all key stakeholder groups were identified and included.
3. The interview schedule was based on comprehensive reviews of the literature (Chapters 3 and 4). Furthermore, the use of CFIR as a theoretical framework allowed a much more detailed exploration of all facilitators and barriers to implementation (Damschroder et al. 2009), also allowing the data and findings to be considered within a wider and more meaningful context (Nilsen 2015).
4. An evidence-based approach to determining the point of data saturation in the stakeholder group as a whole as well as the individual groups was adopted (Francis et al. 2010).
5. Many steps were taken to enhance the trustworthiness of the research data and findings as follows:
    a. Research team included experienced researchers, some of which were not from a pharmacy background (dependability, Confirmability)
    b. The methodological approach was logical, clearly documented and the data generation tool piloted prior to use (dependability)
    c. Careful consideration in the selection and recruitment of participants (credibility)

d. Independent analysis of data by more than one researcher (credibility)
e. Analysis was mapped to the CFIR constructs (confirmability)
f. Use of *verbatim* quotes to support all themes reported (credibility)

The main limitation of this research is that the data were generated in Qatar hence the findings may lack transferability to other countries in the Middle East and beyond. Attention has been paid to describing the research setting, methods and participants to allow readers to consider likely transferability to their own settings and individuals. The findings may also have been limited through the following biases

1. Recruitment bias with those more interested in the topic more likely to participate
2. Interviewer bias as the doctoral student is a graduate of the College of Pharmacy, Qatar University
3. Social desirability bias, with participants expressing views potentially expected by the researchers

5.5. Conclusion

The majority of stakeholders interviewed held positive views of the current pharmacy practice in Qatar, were aware of non-medical prescribing globally, and supported such a role for pharmacists in Qatar. Key facilitators highlighted include adopting a more conservative model and providing additional training to pharmacists prior to commencing prescribing. Main barriers were around the current legislative framework and potential initial opposition by doctors and the public.

5.6. Implications for next phase

Together with the findings of the umbrella and systematic review, the interview findings highlight the potential to develop and implement a framework for pharmacist prescribing in Qatar. These findings were used in the next and final phase of the doctoral research which focused on

determining the levels of agreement amongst key stakeholders in Qatar around the development of pharmacist prescribing frameworks.

Chapter 6:

A Delphi study to determine the level of agreement relating to the development of pharmacist prescribing frameworks in Qatar

6. Introduction to the chapter

The following chapter outlines the aim and objectives, methods, results, and discussion of the final phase of the doctoral research relating to the development of framework(s) for pharmacist prescribing in Qatar.

6.1. Research aim and objectives

The aim of this phase of the doctoral research was to determine the levels of agreement amongst key stakeholders in Qatar around the development of pharmacist prescribing frameworks. The scope of the framework developed included: definitions and scope of prescribing; education and training; competence; accreditation; prescribing models; and governance.

The specific research objectives were to:

- Develop and validate a series of statements in relation to the framework of pharmacist prescribing, as described above
- Determine the levels of agreement of key stakeholders around these statements
- Determine any additional statements derived from the expert panel members' feedback
- Determine any reasons for not achieving consensus

6.2. Methods

6.2.1. Study design

As described in Chapter 2, data were collected using a descriptive observational survey-based modified Delphi technique with key health stakeholders in Qatar.

6.2.2. Research governance

Prior to conducting the research, ethical approvals were obtained from:

- Robert Gordon University School of Pharmacy and Life Sciences Research Ethics Committee (S104)

- Hamad Medical Corporation Medical Research Committee (MRC-01-17-115)
- Qatar University Institutional Review Board (QU-IRB 865-E/17)

6.2.3. Setting

Similar to the previous phase of this doctoral project, data collection took place in Qatar, across several settings as follows:

- Ministry of Public Health (MoPH) in Qatar. MoPH is the health regulatory body in Qatar, responsible for overseeing the medical marketplace as well as ensuring the highest quality of care. Currently, the Ministry evaluates and monitors both public as well as private health sectors (Qatar Ministry of Public Health 2016)
- Hamad Medical Corporation (HMC). The largest hospital group in the State, managed by the government of Qatar and includes eight hospitals differing in their level and range of care to address the public's healthcare needs (Qatar Supreme Council of Health 2014)
- Aspetar Orthopaedic and Sports Medicine Hospital which is the first hospital to provide this specialised care in the Gulf region.
- Primary Health Care Corporation (PHCC). PHCC is the largest governmental group providing primary health care services in the State of Qatar (Primary Health Care Corporation 2018a)
- Weil Cornell Medical School. The first and main medical college in Qatar
- College of Medicine at Qatar University. The first and only public medical college in the country
- College of Pharmacy at Qatar University. The first and only college of pharmacy in the State
- Faculty of Nursing at University of Calgary. The first and only college of nursing in Qatar
- Qatar Petroleum Medical Centres. The largest private primary care setting in the country
- Wellcare and Khulud Groups. The largest chain of community pharmacies in Qatar

6.2.4. Expert Panel

The expert panel consisted of key health stakeholders in Qatar with knowledge and significant influence on the healthcare system, holding positions of responsibility that could impact the implementation of pharmacist prescribing.

6.2.5. Sampling frame and sampling approach

The sampling frame for each stakeholder group from the qualitative study (Chapter 5) was utilised for this phase. The sampling categories were:

- Academic leaders
- Healthcare policy makers
- Medical leaders
- Nursing leaders
- Pharmacy and pharmacy technician leaders
- Safety, quality and patient group representatives

6.2.6. Sample size determination

As discussed in Chapter 2, there is no consensus on the ideal sample size of the Delphi panel. Thus, the aim was to recruit at least five stakeholders from each of these categories giving an estimated panel size of 35. This sample size was chosen after discussion with the research team and based on the recommendation of Delbecq, Van de Ven, and Gustafson (1975) to recruit the minimal number of participants to address the research needs.

6.2.7. Development of data collection tools

The Delphi statements were developed based on the umbrella review (Chapter 3), the systematic review (Chapter 4), and the qualitative interviews (Chapter 5). The Consolidated Framework for Implementation Research (see Chapter 2) provided the theoretical grounding for the statements (Damschorder et al. 2009). Furthermore, pharmacist prescribing frameworks of other countries described in Chapter 1 were also consulted which include Canada (National Association of Pharmacy Regulatory Authorities 2009), the US (Centers for Disease Control and Prevention 2013),

New Zealand (Pharmacy Council of New Zealand 2013) and the UK (Pharmaceutical Society of Northern Ireland 2013, Royal Pharmaceutical Society 2016). The expertise of the research team in pharmacist prescribing education and research also contributed to statements development.

Following the development of the draft statements, these were sent via email to eight experts in Scotland and Qatar (identified from professional networks) in relation to pharmacist prescribing and use of the Delphi technique (other than the ones included for the actual study) for comments relating to face and content validity. Responses were received from all eight, as presented in Table 6.1.

Table 6.1: Details of comments on draft Delphi statements, and actions taken									
Statements	**Experts Comments**								**Actions Taken**
	Senior Research Fellow & Lecturer	Academic Strategic Lead – Clinical Practice	Associate Professor of Pharmacy Practice (Qatar)	Assistant Director of Pharmacy Department, Co-Head of Pharmacy Continuing Professional Development & Hospital Research Officer (Qatar)	Pharmacist Independent Prescribing Module Leader	Senior Pharmacy Practice Lecturer	Independent Pharmacist Prescriber & Lecturer	Lead for pharmacist prescribing, NHS Education for Scotland	
Definitions, Models, and Scope									
1.1 Pharmacist Collaborative Prescribing									
1.1.1 A collaborative model of pharmacist prescribing is appropriate for Qatar.	"Collaborative Pharmacist Prescribing" appears in some form for every statement so move to the blue bar and have the reduced text listed	-Do not like the numbers format – Just exclude and have statements -May be appropriate but most appropriate? What are the other options – difficult to determine unless considered in relation to something else				No Comments		No Comments	

1.1.2 The protocol for collaborative pharmacist prescribing should have a defined format approved by Qatar Council for Healthcare Professionals (QCHP).		Is this generally or for specific patients – not clear and ambiguous				No Comments		No Comments	Changed to 'defined **generic** format'
1.1.3 The protocol for collaborative pharmacist prescribing must state the targeted medical condition(s).	Is it only medical?	Must or should? better for Likert Scale use – less strict and directive				No Comments		No Comments	
1.1.4 The protocol for collaborative pharmacist prescribing must state the scope of prescribing for the pharmacists (e.g. what, when, and how to initiate/continue/discontinue/ change drugs, dose, duration…).					No mention here of patient groups	No Comments		No Comments	

1.1.5 The protocol for collaborative pharmacist prescribing must be approved and signed by the pharmacist prescriber(s), physician(s), and the pharmacy leader within the organisation.	Do not think these need to be plural and will look neater without			Medical leadership, pharmacy leadership and committees responsible such as pharmacy and therapeutics (both facility and corporate), pharmacists and physicians will have a say but need not sign to approve	Lead pharmacist? Is this clear or should you give a couple of examples?	No Comments		No Comments	Change 'pharmacy leader' to 'pharmacy director' + Remove 'and signed by'
1.1.6 Only the pharmacist prescribers that have signed the protocol can prescribe collaboratively for that patient group.		Or could …. Not in place and you are asking them opinions?	I doubt if that is the norm. Protocol is usually approved by leadership sometimes including Pharmacy and Therapeutics Committee. The statement sounds as if all pharmacist prescribers have to sign the protocol. The	Our setting is different, all privileges need to be agreed and approved by the leaders and, pharmacists need to follow. Because the protocol is not applied for individual pharmacists, it should apply for all the pharmacists with prescribing privileges in specialised areas	-Only pharmacist prescribers who have signed the protocol may prescribe collaboratively for the specified patient group. -watch the difference between can' and 'may'. I won't comment again	No Comments		No Comments	Deleted

			protocol is the agreement.						
1.1.7 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe any licensed over-the-counter drug stated in the protocol.	Suggest not using underline as it denotes a hyperlink and can be difficult to read		Please make sure you check the "Qatar Pharmacy Law". This is very CRITICAL, because if it is WRONG, then many things below will not be in good shape	There are no over the counter drugs in HMC, all needs to be prescribed. Over the counter is only in the community pharmacy	Included in the protocol? I won't comment on this again.	No Comments		No Comments	Removed 'licensed'
1.1.8 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe any licensed prescription-only drug stated in the protocol						No Comments		No Comments	Removed 'licensed'
1.1.9 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe any licensed controlled drug						No Comments		No Comments	Removed 'licensed'

stated in the protocol									
1.1.10 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe any off-label over-the-counter drug stated in the protocol.					Will your participants all know what this means? Should you give an example?	No Comments		No Comments	Deleted
1.1.11 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe any off-label prescription-only drug stated in the protocol.						No Comments		No Comments	Deleted
1.1.12 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe any off-label controlled drug stated in the protocol.						No Comments		No Comments	Deleted

1.1.13 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe any unlicensed drug stated in the protocol.				Research purpose?		No Comments		No Comments	Deleted
1.2 Pharmacist Independent Prescribing for medical conditions previously diagnosed by a physician									
1.2.1 An independent model of pharmacist prescribing for diagnosed medical conditions is appropriate for Qatar.	Comments as above				-In the definition, I think the wording is 'previously diagnosed conditions' – do you need to make clear that again that these have been diagnosed by a doctor, if that's what you mean? This is likely to be a sticking point with doctors and possibly others. -Confusing – I suggest something like 'Pharmacist independent prescribing for previously diagnosed conditions is an	No Comments	Applies to all subsequent rows: "it is "pharmacist independent prescribing – PIP" not IPP	No Comments	Reworded + Changed 'Independent Pharmacist Prescribing' to 'Pharmacist Independent Prescribing' in all subsequent statements

					appropriate model … -These words should match those below and make clear exactly what you mean.				
1.2.2 A physician must diagnose the medical condition before the pharmacist can prescribe.		Add 'Under the Independent Pharmacist Prescribing'				No Comments		No Comments	Added 'Under the Independent Pharmacist Prescribing for previously diagnosed conditions model'
1.2.3 Under the Independent Pharmacist Prescribing for previously diagnosed conditions model, pharmacists can prescribe any <u>licensed over-the-counter</u> drugs within their competence.		Very wordy and repetitive – must be some way to have this as a stem and then statements under to make it read better		For community		No Comments		No Comments	Removed 'licensed'
1.2.4 Under the Independent Pharmacist Prescribing for previously diagnosed conditions model,						No Comments		No Comments	Removed 'licensed'

pharmacists can prescribe any licensed prescription-only drugs within their competence.									
1.2.5 Under the Independent Pharmacist Prescribing for previously diagnosed conditions model, pharmacists can prescribe any licensed controlled drugs within their competence.						No Comments		No Comments	Removed 'licensed'
1.2.6 Under the Independent Pharmacist Prescribing for previously diagnosed conditions model, pharmacists can prescribe any off-label over-the-counter drugs within their competence.						No Comments		No Comments	Deleted

1.2.7 Under the Independent Pharmacist Prescribing for previously diagnosed conditions model, pharmacists can prescribe any off-label prescription-only drugs within their competence.						No Comments		No Comments	Deleted
1.2.8 Under the Independent Pharmacist Prescribing for previously diagnosed conditions model, pharmacists can prescribe any off-label controlled drugs within their competence.						No Comments		No Comments	Deleted
1.2.9 Under the Independent Pharmacist Prescribing for previously diagnosed conditions model, pharmacists can prescribe any unlicensed	Colleagues at RGU refer to as PIP rather than IPP			Participants may not understand this terms until we elaborate on this, so as to why do we use unlicensed drug?		No Comments		No Comments	Deleted

drugs within their competence.									
1.3 Pharmacist Independent Prescribing for medical conditions not previously diagnosed by a physician									
1.3.1 An independent model of pharmacist prescribing for undiagnosed medical conditions is appropriate for Qatar.					-Minor ailment is not in the definition although it's fine if you want to add it. -diagnosed and previously undiagnosed conditions. I won't comment again but suggest you add this throughout.	No Comments		No Comments	Reworded + Changed 'Independent Pharmacist Prescribing' to 'Pharmacist Independent Prescribing' in all subsequent statements
1.3.2 All pharmacist prescribers under this model must be authorised to prescribe for undiagnosed conditions including minor ailments within their competence.					by whom?	No Comments		No Comments	Deleted
1.3.3 Under the Independent Pharmacist Prescribing for undiagnosed conditions model, pharmacists						No Comments	See above	No Comments	Removed 'licensed'

can prescribe any licensed over-the-counter drugs within their competence.									
1.3.4 Under the Independent Pharmacist Prescribing for undiagnosed conditions model, pharmacists can prescribe any licensed prescription-only drugs within their competence.						No Comments		No Comments	Removed 'licensed'
1.3.5 Under the Independent Pharmacist Prescribing for undiagnosed conditions model, pharmacists can prescribe any licensed controlled drugs within their competence.						No Comments		No Comments	Removed 'licensed'
1.3.6 Under the Independent Pharmacist Prescribing for undiagnosed conditions model,						No Comments		No Comments	Deleted

pharmacists can prescribe any off-label over-the-counter drugs within their competence.									
1.3.7 Under the Independent Pharmacist Prescribing for undiagnosed conditions model, pharmacists can prescribe any off-label prescription-only drugs within their competence.						No Comments		No Comments	Deleted
1.3.8 Under the Independent Pharmacist Prescribing for undiagnosed conditions model, pharmacists can prescribe any off-label controlled drugs within their competence.						No Comments		No Comments	Deleted
1.3.9 Under the Independent Pharmacist Prescribing for undiagnosed conditions				Same as above		No Comments		No Comments	Deleted

model, pharmacists can prescribe any unlicensed drugs within their competence.									
2. Education and Training									
2.1 All pharmacist prescribers must complete a university-led education and training programme accredited by Qatar Council for Healthcare Professionals (QCHP).	At diploma or Masters level?	-What if they feel that some need and some do not -You call it 'prescribing programme' below - consistency?			Independent prescribers?	No Comments		No Comments	Deleted 'Qatar Council for Healthcare Professionals'
2.2 The education and training programme must be related to the medical condition/ patient group area in which the pharmacist is planning to prescribe.		What if this is broad? I.e they want to focus on more than one	the medical condition 'or' patient group area			No Comments	What is a "patient group area"?	No Comments	Deleted 'patient group area'
2.3 The education and training programme must include a period of learning in practice relating to the		Definition of this – need to be clear	-period of learning in practice (i.e. experiential training) -the medical			No Comments		No Comments	Added '(i.e training)' after 'period of learning in practice' +

medical condition/ patient group in which the pharmacist is planning to prescribe.			condition ‘or’ patient group area						Deleted ‘patient group area’
2.4 The period of learning in practice must be supervised by a senior physician.	Why senior? Designated medical professional?	What is a senior physician – define			Do you need to define this role?	No Comments	What is a “senior physician”? How many years of practical experience as a prescriber should they have as a minimum?	No Comments	
2.5 The senior physician supervising the period of learning in practice must be familiar with the programme’s aims and objectives.	What is the quality control of the supervising physician?				Which programme?	No Comments		No Comments	Added ‘education and training’ before ‘programme’ s aims and objectives.
2.6 All pharmacists enrolling in the prescribing programme must have a postgraduate qualification in clinical pharmacy or a related field.	What are the options for this? Suggest delete this part		Need to define or give clear example in bracket. Example is PharmD degree from QU vs. Canada vs. USA	Not sure, this will mostly apply for hospital pharmacists	Do you need to define what this might be?	No Comments		No Comments	Changed ‘prescribing programme’ to ‘education and training programme’ + Removed ‘or a related field’

			considered as such.						
2.7 All pharmacists enrolling in the prescribing programme must have at least 2 years of direct clinical patient care experience in the medical condition/ patient group area in which they are planning to prescribe, with the application endorsed by the senior physician responsible for the period of learning in practice.	This is two statements				This is quite tight and may be too restrictive. Do you want to re-word it or leave it and see what response you get?	No Comments		No Comments	Split into two statements
2.8 All pharmacists enrolling for the prescribing programme must have the endorsement of the pharmacy leader in their organisation.		Meaning of pharmacy leader			As before. Lead pharmacist or other title – whatever is used	No Comments		No Comments	Changed 'prescribing programme' to 'education and training programme' and 'pharmacy leader' to 'pharmacy director'

2.9 All pharmacists enrolling in the prescribing programme must submit a portfolio outlining the set of skills and experience they possess and how they plan to develop further.	A pre-templated portfolio?	Portfolio is really about 'evidence' of these skills				No Comments	When is the portfolio to be submitted – before they start, or when they finish their learning in practice?	No Comments	Reworded
2.10 All pharmacists enrolling in the prescribing programme must demonstrate that there is a clinical need for their role endorsed by a physician.		Within their workplace / area of practice?				No Comments		No Comments	Reworded
2.11 Prior to registration with QCHP as a prescriber, pharmacists must have completed the education and training programme and be deemed by the senior physician responsible for					I would think about re-wording this: On successful completion of the education and training programme and certification as competent by the senior physician responsible for the period of learning in	No Comments		No Comments	Reworded

the period of learning in practice as competent.					practice, the pharmacist is eligible for registration with the QCHP.				
2.12 Pharmacist prescribers registered in countries other than Qatar must be registered with QCHP prior to commencing prescribing practice.					This is assuming that pharmacist prescribing becomes possible in Qatar?	No Comments	Would you want to insert the word “independent” here?	No Comments	
3. Prescribing Practice and Governance									
3.1 Pharmacist prescribers must not commence prescribing practice until registered with Qatar Council for Healthcare Professionals (QCHP).		Why QCHP full here when abbreviated elsewhere?			Sometimes you only use the abbreviation, other times the name and abbreviation. Decide which you want to use and be consistent	No Comments	See above	No Comments	Deleted ‘Qatar Council for Healthcare Professionals ’
3.2 All newly registered pharmacist prescribers must first practise collaborative prescribing for a period of time prior to progressing to					Now I’m getting confused. I think you need some more explanatory text here.	No Comments	Now the above two statements become clearer.	No Comments	

independent prescribing.									
3.3 The job description of the pharmacist prescribers must be amended to include prescribing.			“scope of practice”?		What does this mean? Could you make it clearer?	No Comments		No Comments	
3.4 If in doubt, the pharmacist prescriber must refer the patient back to the physician.		If in doubt about what?		This looks out of place	Need to be clearer. If in doubt about what? Could say something about the importance of the PIP recognising the limits of their competence and referring patients on to physicians if appropriate	No Comments		No Comments	Reworded
3.5 All pharmacist prescribers must prescribe according to local policies, guidelines and protocols available at their organisation.					What about national ones?	No Comments		No Comments	Changed ‘available at’ to ‘of’
3.6 Pharmacist prescribers are legally accountable for their		Cannot really answer this with Likert – either it is legal or not				No Comments		No Comments	Deleted

prescribing actions.									
3.7 Once registered, all pharmacist prescribers must undertake Continuing Professional Development (CPD) within the medical conditions/ patient population in which they are prescribing.					You're very definite about these medical conditions but pharmacist prescribing has moved on in the UK so that some PIPs are prescribing for a wide range of patients and conditions.	No Comments	You called them "patient GROUP" earlier – change?	No Comments	Deleted 'patient population'
3.8 All CPD sessions must be accredited by Qatar Council for Healthcare Professionals (QCHP).		CPD sessions for what?		Some activities are not accredited but still recognised and accepted (such as ACPE, ASHP). There are self-learning online sessions which does not need QCHP accreditation (category 2 & 3)	Is this usual practice?	No Comments		No Comments	Deleted
3.9 All pharmacist prescribers must have ready access to all pertinent sources of patient information.		Meaning of pertinent sources? Includes what?			What does this mean? How will this happen? Any issues? Legislation to support?	No Comments		No Comments	Reworded

3.10 All pharmacist prescribers must document every prescribing action in the patient clinical records.					-Will PIPs have contemp-oraneous access to these? If not, what will they do? -What is a prescribing action?	No Comments		No Comments	Changed 'action' to 'activity'
3.11 All pharmacist prescribers must have the authority to order laboratory tests.					-Where is all this going to occur? -'appropriate? laboratory tests for their patients, or to inform their prescribing decisions'?	No Comments		No Comments	Reworded
3.12 All pharmacist prescribers must have the authority to order other relevant tests and investigations (e.g. ECG, X-ray..).	Not keen on open lists but if doing this it must be three…				As above	No Comments		No Comments	Changed points of ellipsis to three
3.13 All pharmacist prescribers must NOT have any role in the dispensing process for the patients in	Does not need 'all' – check other statements				-'for whom' they prescribe -Do you mean this, or do you mean that they may not have a role in dispending prescriptions	No Comments	'For whom' they prescribe instead of 'in which'	No Comments	Changed 'in which they prescribe' to 'for whom' they prescribe'

which they prescribe.					which they have written?				
3.14 All pharmacist prescribers must report prescribing errors according to the policy of their organisation.					-what does this mean? Is there national guidance or what currently happens? -How will these be defined? Good to think about this but very hard to pin down. What to doctors currently do? You could ask about eg 'significant prescribing-related events' or similar – make sure you capture what you want to capture.	No Comments		No Comments	
3.15 All pharmacist prescribers must report adverse drug reactions (ADRs) according to the policy of their organisation.					As above	No Comments		No Comments	

3.16 Pharmacists' prescribing practise must be audited regularly against set and accepted standards.		By whom? How?			What will these be? Who will set them? Again what happens with doctors? I think this would be a huge job.	No Comments	Practice with two Cs– it is a noun here	No Comments	Changed 'practise' to 'practice'
3.17 Patients' feedback on the prescribing practise must be collected regularly, using standardised tools.		'Practice'			Again, what do you mean? Do these tools exist? Are they currently used? Try not to tie yourself in knots.	No Comments	See above	No Comments	Changed 'practise' to 'practice'
3.18 A state-wide campaign should be launched to educate the general public about pharmacist prescribing.			'statewide'		Sounds a bit draconian, sorry (as do some of the statements above). Could you word it differently? Same below.	No Comments		No Comments	
3.19 A state-wide campaign should be launched to educate healthcare providers about pharmacist prescribing.			'statewide'			No Comments		No Comments	

The final list of statements used in this modified Delphi is presented in Table 6.2.

Statements were updated then formatted in Survey Monkey® (Survey Monkey Inc., San Mateo, California, USA), an online survey development cloud-based software.

Throughout the different rounds of the Delphi, experts were asked to rate the statements according to a 6-point scale (strongly disagree — disagree — somewhat disagree - somewhat agree — agree — strongly agree). No neutral option was provided to ensure that the participants provided a rating that was either in agreement or disagreement.

Table 6.2: Statements included in the modified Delphi project						
Statements	**Responses**					**Additional comments**
	Strongly Disagree	**Disagree**	**Somewhat Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
1. Definitions, models and scope						
1.1 Pharmacist Collaborative Prescribing						
1.1.1 A collaborative model of pharmacist prescribing is appropriate for Qatar.						
1.1.2 The protocol for collaborative pharmacist prescribing should have a defined generic format approved by Qatar Council for Healthcare Professionals (QCHP).						
1.1.3 The protocol for collaborative pharmacist prescribing must state the targeted medical condition(s).						
1.1.4 The protocol for collaborative pharmacist prescribing must state the scope of prescribing for the pharmacists (e.g. what, when, and how to initiate/continue/discontinue/change drugs, dose, duration…).						
1.1.5 The protocol for collaborative pharmacist prescribing must be approved by the pharmacist prescriber(s), physician(s), and the pharmacy director within the organisation.						
1.1.6 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any over-the-counter drug stated in the protocol.						
1.1.7 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any prescription-only drug stated in the protocol.						
1.1.8 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any controlled drug stated in the protocol.						

1.2 Pharmacist Independent Prescribing for medical conditions previously diagnosed by a physician
1.2.1 Pharmacist Independent Prescribing for previously diagnosed medical conditions is an appropriate model for Qatar.
1.2.2 Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, a physician must diagnose the medical condition before the pharmacist can prescribe.
1.2.3 Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any over-the-counter drugs.
1.2.4 Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any prescription-only drugs.
1.2.5 Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any controlled drugs.
1.3 Pharmacist Independent Prescribing for medical conditions which have not been previously diagnosed by a physician
1.3.1 Pharmacist Independent Prescribing for undiagnosed medical conditions is an appropriate model for Qatar.
1.3.2 Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any over-the-counter drugs.
1.3.3 Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any prescription-only drugs.
1.3.4 Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any controlled drugs.
2. Education & Training
2.1 All pharmacist prescribers must complete a university-led education and training programme accredited by QCHP.
2.2 The education and training programme must be related to the medical condition(s) in which the pharmacist is planning to prescribe.
2.3 The education and training programme must include a period of learning in practice (i.e training) relating to the medical condition(s) in which the pharmacist is planning to prescribe.
2.4 The period of learning in practice must be supervised by a senior physician.

2.5 The senior physician supervising the period of learning in practice must be familiar with the education and training programme's aims and objectives.
2.6 All pharmacists enrolling in the education and training programme must have a postgraduate qualification in clinical pharmacy.
2.7 All pharmacists enrolling in the education and training programme must have at least 2 years of direct clinical patient care experience in the medical condition(s) in which they are planning to prescribe.
2.8 All pharmacists enrolling in the education and training programme must have their application endorsed by the senior physician responsible for the period of learning in practice.
2.9 All pharmacists enrolling for the education and training programme must have the endorsement of the pharmacy director in their organisation.
2.10 All pharmacists planning to enrol in the education and training programme must submit a portfolio outlining the set of skills and experience they possess and how they plan to develop further.
2.11 All pharmacists enrolling in the education and training programme must demonstrate that, within their area of practice, there is a clinical need for their role endorsed by a physician.
2.12 Prior to registration with QCHP as a prescriber, pharmacists must successfully complete the education and training programme and be deemed competent by the senior physician responsible for the period of learning in practice.
2.13 Pharmacist prescribers registered in countries other than Qatar must be registered with QCHP prior to commencing prescribing practice.
3. Prescribing Practice & Governance
3.1 Pharmacist prescribers must not commence prescribing practice until registered with QCHP.
3.2 All newly registered pharmacist prescribers must first practise collaborative prescribing for a period of time prior to progressing to independent prescribing.
3.3 The job description of the pharmacist prescribers must be amended to include prescribing.
3.4 If in doubt about their ability to prescribe for a patient, the pharmacist prescriber must refer him/her back to the physician.
3.5 All pharmacist prescribers must prescribe according to local policies, guidelines and protocols of their organisation.

3.6 Once registered, all pharmacist prescribers must undertake Continuing Professional Development (CPD) within the medical condition(s) in which they are prescribing.	
3.7 All pharmacist prescribers must have ready access to patient clinical records.	
3.8 All pharmacist prescribers must document every prescribing activity in the patient clinical records.	
3.9 All pharmacist prescribers must have the authority to order appropriate laboratory tests to inform their prescribing decisions.	
3.10 All pharmacist prescribers must have the authority to order other relevant tests and investigations (e.g. ECG, X-ray...).	
3.11 All pharmacist prescribers must NOT have any role in the dispensing process for the patients for whom they prescribe.	
3.12 All pharmacist prescribers must report prescribing errors according to the policy of their organisation.	
3.13 All pharmacist prescribers must report adverse drug reactions (ADRs) according to the policy of their organisation.	
3.14 Pharmacists' prescribing practice must be audited regularly against set and accepted standards.	
3.15 Patients' feedback on the prescribing practice must be collected regularly, using standardised tools.	
3.16 A state-wide campaign should be launched to educate the general public about pharmacist prescribing.	
3.17 A state-wide campaign should be launched to educate healthcare providers about pharmacist prescribing.	

6.2.8. Data collection

a. Recruitment

Once a list of all key health stakeholders in Qatar was created, invitation emails were sent to:

- All academic stakeholders
- At least two HMC, one PHCC and one MoPH medical, nursing, pharmacy, and quality improvement directors
- At least one director of the largest chain community pharmacies
- At least one representatives from Qatar Council of Health Practitioners

All stakeholders were sent emails by one of the research members detailing the project's title, researchers, objectives, brief description of the topic in question in addition to the significance of this study along with a participant information sheet (Appendices 6D and 6E). The content of the email was drafted and approved by the investigators before it was sent. A reminder email was sent on two-weekly basis if no response was received. Invitation and reminder emails were sent until at least five representatives from each group agreed to participate or all stakeholders on the list were contacted. Once the stakeholders confirmed their participation, a second email was sent with instructions and a link for the online survey containing the Delphi statements.

b. Delphi rounds

The Delphi rounds took place from June 10th till July 19th 2018. All data were handled primarily by TJ under the supervision of the other research team members for quality assurance.

In order to collect enough information to answer the current project objectives and to ensure the robustness, validity and reliability of the collected data, there were two rounds. Each round was heterogeneous (i.e. different expertise and professions included) in order to ensure that all relevant aspects of the topic are deliberated (Von der Gracht 2012).

As detailed by Hsu and Sandford (2007), the rounds were as follow:

Round one: A link for the online Delphi questionnaire prepared was sent to each expert for review via email. They were all requested to rate the items to establish priorities as well as provide comments on each statement. They were also offered the opportunity to add any additional comments or statements they wish to be included. The experts were allowed two weeks in order to provide their feedback. Once responses were received, the rate of agreement was calculated and for statements that did not reach consensus were circulated again during the second round either unchanged or after revision depending on the comments provided by the experts. As stated in Chapter 2, consensus was achieved if a statement achieved 70% agreement (summative of agree/strongly agree) and less than 15% disagreement (summative of disagree/strongly disagree) between the panel members to ensure that there was no strong disagreement to any statement.

Round two: Expert panel members during this round received a questionnaire with the rating and comments collected from the previous round and were allowed two weeks to provide their feedback only on the statements that did not meet the cut-off point. Similar to previous round, the rate of agreement was also calculated. Depending on the feedback provided, a third round was considered unnecessary.

The scheme, described in Figure 6.1, was followed in circulating the questionnaire items in each round.

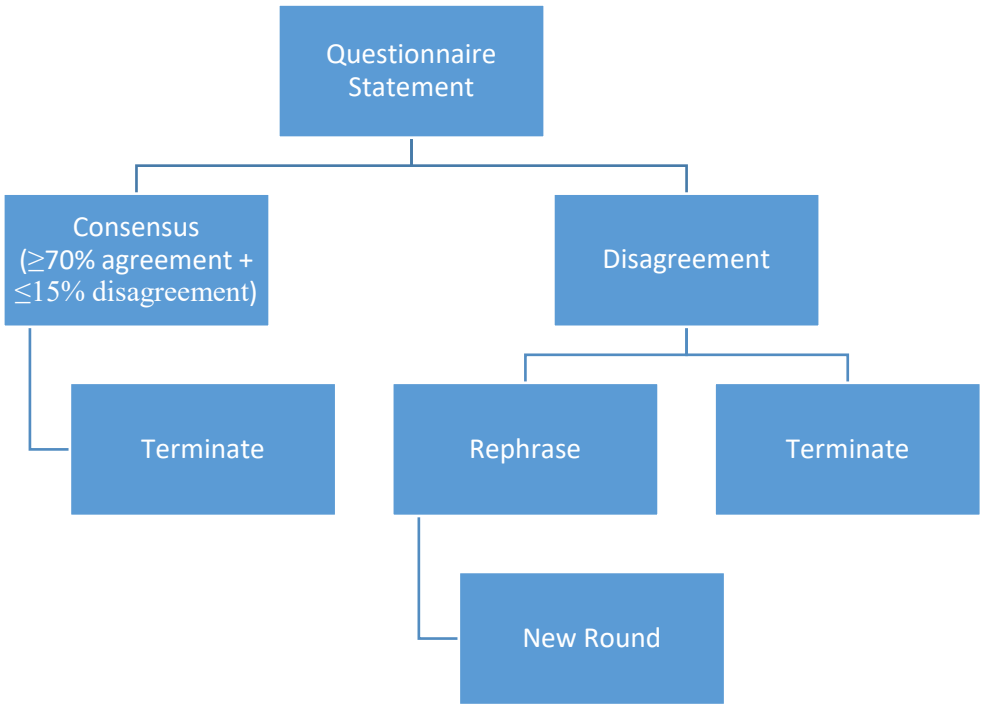


Figure 6.1: Stopping criteria for Delphi studies (modified from Von der Gracht 2012)

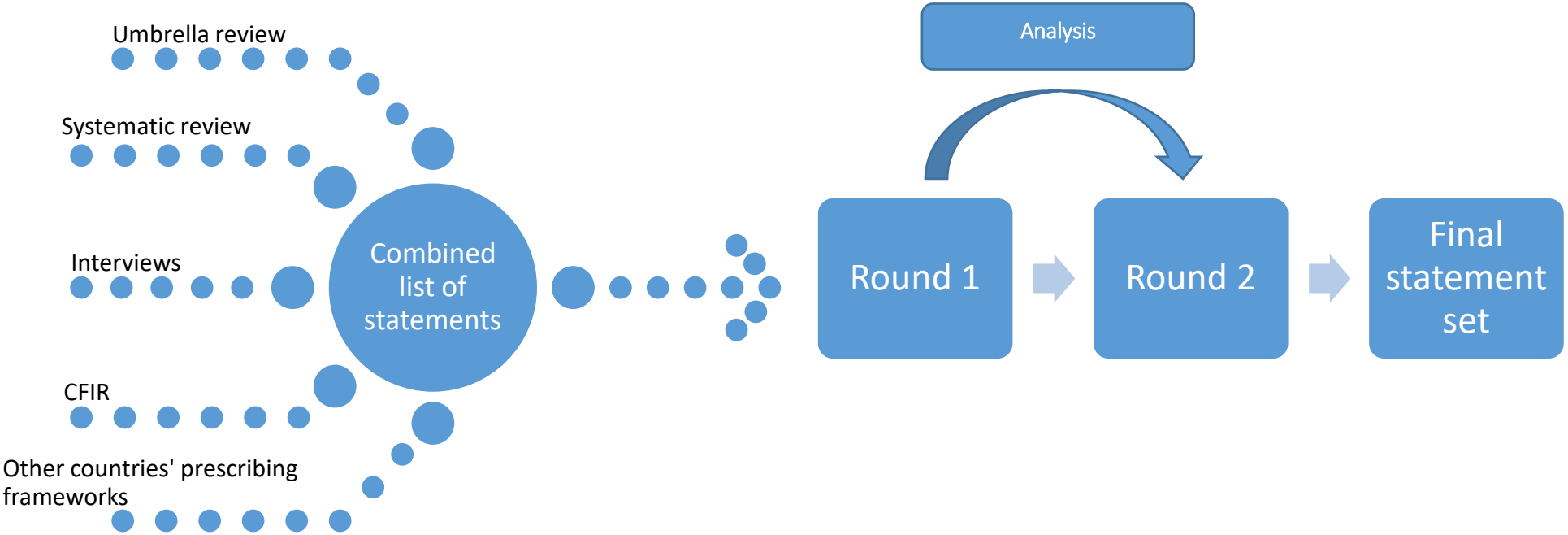


Figure 6.2: Summary of the modified Delphi study

6.2.9. Data analysis

Numerical voting was employed to rate the ideas generated by the experts. Thus, Microsoft Excel 2010 (Microsoft Office 2010, Microsoft Corp. Redmond, WA, USA) was used which is a spreadsheet programme that allows basic and complex mathematical functions. The votes were reported descriptively as frequencies and percentages. Open comments and panel members' feedback were analysed using content analysis to determine trends often reported by the experts.

6.2.10. Data storage

The identity of the participants and their personal information remained anonymous. In addition, all data provided by participants were stored in secure laptops with restricted access granted only to researchers taking part in the current project. All research materials including informed consents will be handled and stored for 10 years and subsequently destroyed in accordance with School of Pharmacy and Life Sciences standard operating procedures.

6.3. Results

6.3.1. Expert panel

Of the 61 stakeholders invited, 33 agreed to participate in this Delphi study representing academia (n=5), medicine (n=3), pharmacy (n=8), nursing (n= 5), healthcare policy makers (n= 8) and patient safety (n=4). The panel composition is summarised in Figure 6.3.

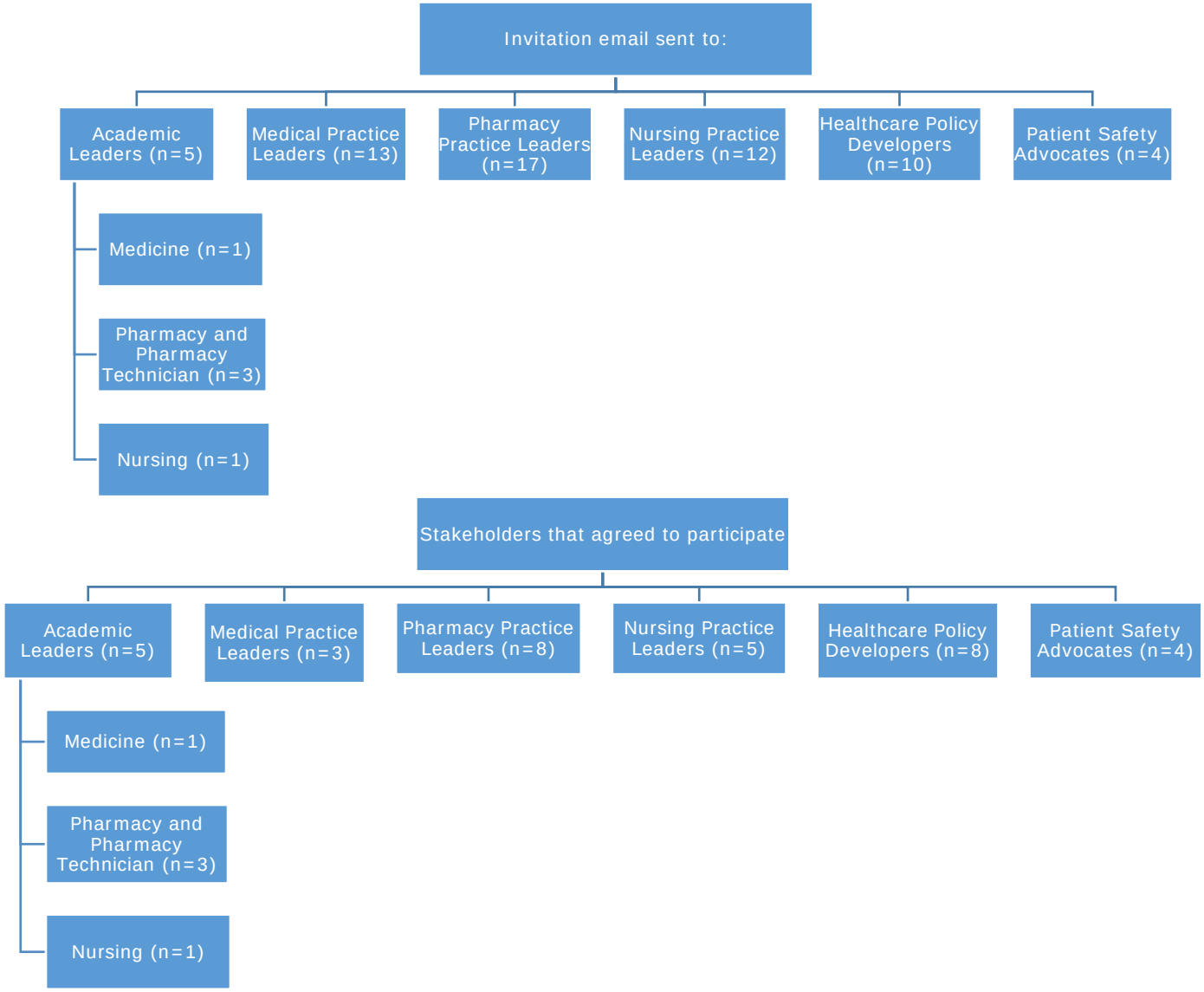


Figure 6.3: Process followed in recruiting the expert panel

The practice settings of the experts included in this phase were diverse and ranged from primary, secondary and tertiary care as well as from the different health academic institutions, and the ministry.

Table 6.3: Characteristics of included experts according to practice setting

Expert category	Setting: Number of experts
Academic Leaders	• Medicine: 1 • Pharmacy and pharmacy technician: 3 • Nursing: 1
Healthcare Policy Developers	• Secondary care: 1 • Tertiary care: 1 • Corporate/Ministry: 6
Medical Practice Leaders	• Primary care/Community: 1 • Secondary care: 1 • Tertiary care: 1
Pharmacy Practice Leaders	• Primary care/Community: 3 • Secondary care: 1 • Tertiary care: 4
Nursing Practice Leaders	• Secondary care: 2 • Tertiary care: 1 • Corporate/Ministry: 2
Patient Safety Advocates	• Primary care/Community: 1 • Tertiary care: 2 • Corporate/Ministry: 1

6.3.2. Round 1

Out of 33 experts who agreed to participate, 31 completed Round 1 (Response rate= 94%). Of the 47 statements, consensus was achieved for 32. The following section presents the level of consensus on each statement, the feedback provided by the experts as well as any changes made to statements that did not reach consensus.

Section 1: Definitions, Models, and Scope

1.1 Pharmacist Collaborative Prescribing

Statement 1.1.1: A collaborative model of pharmacist prescribing is appropriate for Qatar. ***No Consensus**

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	1 (3.2)	0 (0)	10 (32.3)	7 (22.6)	13 (41.9)	1 (3.2)	20 (64.5)

Comments were received from 8 panel members in themes of:

1. need for physician involvement: "Should be in touch with the physician of care when prescribing any new medication."

2. need for governance: "Requires a robust legislative structure to support individual practitioners."

3. resistance from physicians: "Some physicians may find this hard to accept in Qatar."

→ Based on the response and comments, the statement **was not altered**.

Statement 1.1.2: The protocol for collaborative pharmacist prescribing should have a defined generic format approved by Qatar Council for Healthcare Professionals (QCHP). ***Consensus**

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	0 (0)	1 (3.2)	1 (3.2)	8 (25.8)	20 (64.5)	1 (3.2)	28 (90.3)

Comments were received from 6 panel members in themes of:

1. need of governance: "There needs to be a standardised approach to achieve a minimal safe and professional level of service."

2. importance of QCHP involvement: "recognition by QCHP about this model will help in spreading the awareness about this essential service."

Statement 1.1.3: The protocol for collaborative pharmacist prescribing must state the targeted medical condition(s). ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	1 (3.2)	0 (0)	1 (3.2)	15 (48.4)	14 (45.2)	1 (3.2)	29 (93.5)

Comments were received from 6 panel members in themes of:

1. benefits: "This is required to ensure pharmacists remain inside the competency boundaries and do not go outside of them."

2. future expansion: "As practice develops and advances, this could be reassessed in the future."

Statement 1.1.4: The protocol for collaborative pharmacist prescribing must state the scope of prescribing for the pharmacists (e.g. what, when, and how to initiate/continue/discontinue/change drugs, dose, duration…). ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	2 (6.5)	2 (6.5)	6 (19.4)	21 (67.7)	0 (0)	27 (87.1)

Comments were received from 5 panel members in themes of:

1. need for governance: "There needs to be a quality and safety and governance framework in place to support this."

2. need to an unconstrained practice: "Your protocol must not be too restrictive. Otherwise, the pharmacist will be impotent."

Statement 1.1.5: The protocol for collaborative pharmacist prescribing must be approved by the pharmacist prescriber(s), physician(s), and the pharmacy director within the organisation. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	1 (3.2)	1 (3.2)	4 (12.9)	8 (25.8)	17 (54.8)	1 (3.2)	25 (80.6)

Comments were received from 6 panel members in themes of:

1. process and patient care: "If the process will not take long and there will be smooth discharge."

2. applicability to all settings: "This raises a barrier to community pharmacy practitioners."

Statement 1.1.6: Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any over-the-counter drug stated in the protocol. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	1 (3.2)	0 (0)	1 (3.2)	11 (35.5)	17 (54.8)	2 (6.5)	28 (90.3)

Comments were received from 3 panel members in the theme of:

1. focus on prescription medicines: "Let's not dilute the power of the Prescribing Pharmacist by talking about OTC medication, but focus on Prescription Medication where they can have the biggest impact."

Statement 1.1.7: Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any prescription-only drug stated in the protocol. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	2 (6.5)	3 (9.7)	16 (51.6)	10 (32.3)	0 (0)	26 (83.9)

Comments were received from 10 panel members in themes of:

1. need for governance: "As long as there are robust systems in place to support the model and the pharmacist."

2. need to practice within competence: "Yes within their training and assured competence."

Statement 1.1.8: Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any controlled drug stated in the protocol. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
2 (6.5)	9 (29)	1 (3.2)	8 (25.8)	7 (22.6)	4 (12.9)	11 (35.5)	11 (35.5)

Comments were received from 8 panel members in themes of:

1. need for physician involvement: "I think this would need consultation with a physician for the INITIAL prescription."

2. need for additional training: "I would suggest this be phased in as prescribing pharmacists get more experience in this competency."

→ Based on the response and comments, the statement **was not altered**.

1.2 Pharmacist Independent Prescribing for medical conditions previously diagnosed by a physician

Statement 1.2.1: Pharmacist Independent Prescribing for previously diagnosed medical conditions is an appropriate model for Qatar.

No Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	4 (12.9)	5 (16.1)	5 (16.1)	12 (38.7)	4 (12.9)	5 (16.1)	16 (51.6)

Comments were received from 9 panel members in themes of:

1. risk associated with independent prescribing: "It will increase the risk of duplicating medications and fragmenting patient's care among healthcare providers."

2. maturity of the organisation: "I don't think Qatar with its diverse recruitment and training of pharmacists is mature enough for this step."

3. possibility for role development: "Although ideal, this model would not suit the Qatar market from a patient safety point of view. However, over time, this would be the model to inspire to in the future."

→ Based on the response and comments, the statement **was not altered**.

Statement 1.2.2: Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, a physician must diagnose the medical condition before the pharmacist can prescribe. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	2 (6.5)	15 (48.4)	14 (45.2)	0 (0)	29 (93.5)

Comments were received from 3 panel members in the theme of:

1. need for physician involvement: "Yes, you can't expect the pharmacist to suddenly develop diagnostic skills too."

Statement 1.2.3: Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any over-the-counter drugs. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
2 (6.5)	2 (6.5)	0 (0)	3 (9.7)	13 (41.9)	11 (35.5)	4 (12.9)	24 (77.4)

Comments were received from 6 panel members in themes of:

1. need for governance: "The number of non-prescription drugs in Qatar is much greater than the UK or North America, so I would suggest this list be developed in comparison with those countries."

2. need for defined roles: "Let's allow our basic Pharmacists to recommend OTC meds for patients with minor ailments e.g. coughs, colds, hay fever, cold sores etc. and keep this distinct from the more clinically challenging role of Prescribing Pharmacists."

Statement 1.2.4: Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any prescription-only drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	5 (16.1)	3 (9.7)	7 (22.6)	12 (38.7)	3 (9.7)	6 (19.4)	15 (48.4)

Comments were received from 6 panel members in themes of:

1. need for a defined clinical area: "better to become a specialist in one area and then focus on prescribing those meds."

2. need for competent pharmacists: "As long as trained and competence assured."

3. need for physician involvement: "Only with medical input."

→ Based on the response and comments, the statement **was not altered**.

Statement 1.2.5: Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any controlled drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
5 (16.1)	11 (35.5)	2 (6.5)	5 (16.1)	6 (19.4)	2 (6.5)	16 (51.6)	8 (25.8)

Comments were received from 5 panel members in themes of:

1. need for physician involvement: "More to dosing/ titrating the drug; starting and discontinuation should be done by the physician."

2. risks associated with independent prescribing: "If independent of physicians looking after the patient, I feel this would be putting them at risk given the current legal situation in Qatar."

→ Based on the response and comments, the statement **was not altered**.

1.3 Pharmacist Independent Prescribing for medical conditions NOT previously diagnosed by a physician

Statement 1.3.1: Pharmacist Independent Prescribing for undiagnosed medical conditions is an appropriate model for Qatar. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
14 (45.2)	10 (32.3)	2 (6.5)	2 (6.5)	1 (3.2)	2 (6.5)	24 (77.4)	3 (9.7)

Comments were received from 7 panel members in themes of:

1. risks associated with independent prescribing: :This would be unsafe and cause patient harm."

2. maturity of the organisation: "Definitely too much of a leap from current practice."

3. need for training and governance: "We need to have well-defined roles and structured regulations plus extensive education to empower pharmacists to implement this model confidently."

→ Based on the response and comments, the statement **was not altered**.

Statement 1.3.2: Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any over-the-counter drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
4 (12.9)	3 (9.7)	2 (6.5)	10 (32.3)	9 (29)	3 (9.7)	7 (22.6)	12 (38.7)

Comments were received from 6 panel members in themes of:

1. need for defined roles: "Have a separate Minor Ailments Scheme where the basic pharmacist can diagnose simple conditions and make recommendations to purchase OTC meds - no need for physician involvement at all here."

2. need for governance: "With the proviso that regular reporting and auditing of adverse events is essential as part of the annual appraisal and credentialing of the independent pharmacist."

→ Based on the response and comments, the statement **was not altered**.

Statement 1.3.3: Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any prescription-only drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
8 (25.8)	10 (32.3)	5 (16.1)	3 (9.7)	3 (9.7)	2 (6.5)	18 (58.1)	5 (16.1)

Comments were received from 4 panel members in themes of:

1. need for physician involvement: "Yes but I still feel diagnosis needs support by a physician."

2. need for an agreed list: "There needs to be an agreed formulary."

→ Based on the response and comments, the statement **was not altered**.

Statement 1.3.4: Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any controlled drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
13 (41.9)	12 (38.7)	3 (9.7)	2 (6.5)	0 (0)	1 (3.2)	25 (80.6)	1 (3.2)

Comments were received from 4 panel members in themes of:

1. lack of diagnostic skills: "Pharmacists practicing in Qatar have not been trained in diagnosis, and a short certification programme would not be sufficient to ensure competency for the variety of medical conditions that exist."

2. risks associated with independent prescribing: "It is too much of a risk within the legal setting in Qatar."

→ Based on the response and comments, the statement **was not altered**.

Section 2: Education and Training

Statement 2.1: All pharmacist prescribers must complete a university-led education and training programme accredited by QCHP. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	1 (3.2)	1 (3.2)	8 (25.8)	21 (67.7)	0 (0)	29 (93.5)

Comments were received from 5 panel members in the theme of:

1. need for a robust training programme: "This needs to be evidence based and supported with international standards."

Statement 2.2: The education and training programme must be related to the medical condition(s) in which the pharmacist is planning to prescribe.

Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	1 (3.2)	0 (0)	3 (9.7)	10 (32.3)	17 (54.8)	1 (3.2)	27 (87.1)

Comments were received from 4 panel members in themes of:

1. need for a robust programme: "The University course must have two levels: Level 1 - Basic prescribing principles, disease aetiology, pathology, investigations etc. - covering all major diseases Level 2 - Disease Specialisation, once Level 1 has been mastered."

2. importance of practising within a specialised area: "it would be much better to study for, and work within specialist areas within which a pharmacist can gain considerable expertise."

Statement 2.3: The education and training programme must include a period of learning in practice (i.e. training) relating to the medical condition(s) in which the pharmacist is planning to prescribe. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	0 (0)	1 (3.2)	1 (3.2)	10 (32.3)	18 (58.1)	1 (3.2)	28 (90.3)

Comments were received from 3 panel members in the theme of:

1. preferred structure of learning: "Preferably closely aligned to a physician who embraces the idea and pharmacists already working in the area."

Statement 2.4: The period of learning in practice must be supervised by a senior physician. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	2 (6.5)	2 (6.5)	7 (22.6)	7 (22.6)	13 (41.9)	2 (6.5)	20 (64.5)

Comments were received from 8 panel members in themes of:

1. criteria for supervising physician: "If we want safe Pharmacist Prescribers, we must have excellent mentors who can identify weaknesses and unsafe practices to ensure our Prescribing Pharmacists are fully competent to practice and not just good in a paper exam."

2. potential for other health professionals to supervise: "Any certified competent trainer/health professional."

3. need for senior pharmacist involvement: "I would suggest a senior pharmacist needs to be involved here."

→ Based on the response and comments, the statement **was revised** to: "The period of learning in practice must be supervised by a senior physician **with a particular interest in prescribing**."

Statement 2.5: The senior physician supervising the period of learning in practice must be familiar with the education and training programme's aims and objectives. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	1 (3.2)	0 (0)	1 (3.2)	5 (16.1)	23 (74.2)	2 (6.5)	28 (90.3)

No relevant comments were received.

Statement 2.6: All pharmacists enrolling in the education and training programme must have a postgraduate qualification in clinical pharmacy.

No Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	3 (9.7)	2 (6.5)	4 (12.9)	7 (22.6)	14 (45.2)	4 (12.9)	21 (67.7)

Comments were received from 10 panel members in themes of:

1. need for support regardless of practice setting: "I feel this restricts prescribing only to Hospital based pharmacists, and in countries where this is most successful, community based pharmacists are also involved."

2. need for clinically trained pharmacists: "Or advanced pharmacy training like "structured clinical training"."

→ Based on the response and comments, the statement **was revised** to: "All pharmacists enrolling in the education and training programme must have a postgraduate qualification in clinical pharmacy **or a related field**."

Statement 2.7: All pharmacists enrolling in the education and training programme must have at least 2 years of direct clinical patient care experience in the medical condition(s) in which they are planning to prescribe. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	1 (3.2)	2 (6.5)	5 (16.1)	9 (29)	14 (45.2)	1 (3.2)	23 (74.2)

Comments were received from 10 panel members in themes of:

1. differing views on clinical practice experience: "we should be asking these candidates to come with at least 10 years' experience and then 5 years specialisation"; "I think two years too long, one year is okay";

2. definition of direct clinical experience: "Community pharmacy service should be considered as direct clinical patient care experience."

Statement 2.8: All pharmacists enrolling in the education and training programme must have their application endorsed by the senior physician responsible for the period of learning in practice. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	2 (6.5)	3 (9.7)	5 (16.1)	14 (45.2)	7 (22.6)	2 (6.5)	21 (67.7)
Comments were received from 3 panel members in the theme of: 1. criteria for senior physician: "Important that physician really embraces and understands what is needed and the full scope of the role."							

→ Based on the response and comments, the statement **was not altered.**

Statement 2.9: All pharmacists enrolling for the education and training programme must have the endorsement of the pharmacy director in their organisation. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	3 (9.7)	2 (6.5)	10 (32.3)	16 (51.6)	0 (0)	26 (83.9)
No relevant comments were received.							

Statement 2.10: All pharmacists planning to enrol in the education and training programme must submit a portfolio outlining the set of skills and experience they possess and how they plan to develop further.

Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	2 (6.5)	15 (48.4)	14 (45.2)	0 (0)	29 (93.5)
No relevant comments were received.							

Statement 2.11: All pharmacists enrolling in the education and training programme must demonstrate that, within their area of practice, there is a clinical need for their role endorsed by a physician. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	4 (12.9)	1 (3.2)	10 (32.3)	11 (35.5)	5 (16.1)	4 (12.9)	16 (51.6)
Comments were received from 9 panel members in the theme of: 1. resistance from physicians: "Physician resistance and fear of the unknown new pharmacist prescribers may hinder the introduction of new innovative services."							

→ Based on the response and comments, the statement **was revised** to: "All pharmacists enrolling in the education and training programme must demonstrate that, within their area of practice, there is a clinical need for their **prescribing role**."

Statement 2.12: Prior to registration with QCHP as a prescriber, pharmacists must successfully complete the education and training programme and be deemed competent by the senior physician responsible for the period of learning in practice. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	1 (3.2)	3 (9.7)	3 (9.7)	9 (29)	14 (45.2)	2 (6.5)	23 (74.2)
Comments were received from 6 panel members in the theme of: 1. need for senior pharmacist involvement: "A senior competent pharmacist needs to be involved as well."							

Statement 2.13: Pharmacist prescribers registered in countries other than Qatar must be registered with QCHP prior to commencing prescribing practice. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	1 (3.2)	0 (0)	2 (6.5)	10 (32.3)	17 (54.8)	2 (6.5)	27 (87.1)
Comments were received from 5 panel members in the theme of: 1. need for competency assessment: "With evidence of fitness to practice prescribing and a safety record e.g. number of prescribing errors and patient harm caused."							

Section 3: Prescribing Practice & Governance

Statement 3.1: Pharmacist prescribers must not commence prescribing practice until registered with QCHP. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	2 (6.5)	9 (29)	20 (64.5)	0 (0)	29 (93.5)
No relevant comments were received.							

Statement 3.2: All newly registered pharmacist prescribers must first practise collaborative prescribing for a period of time prior to progressing to independent prescribing. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	3 (9.7)	0 (0)	3 (9.7)	12 (38.7)	13 (41.9)	3 (9.7)	25 (80.6)
No relevant comments were received.							

Statement 3.3: The job description of the pharmacist prescribers must be amended to include prescribing. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
2 (6.5)	0 (0)	0 (0)	1 (3.2)	10 (32.3)	18 (58.1)	2 (6.5)	28 (90.3)
No relevant comments were received.							

Statement 3.4: If in doubt about their ability to prescribe for a patient, the pharmacist prescriber must refer him/her back to the physician.

Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	0 (0)	7 (22.6)	24 (77.4)	0 (0)	31 (100)

Comments were received from 5 panel members in themes of:

1. culture: "Unfortunately, the culture in the Arab World does not lend itself to being open, honest and transparent when admitting to mistakes or having a lack of knowledge."

2. need for clear referral process: "There should be a clear referral and referral- back mechanism."

Statement 3.5: All pharmacist prescribers must prescribe according to local policies, guidelines and protocols of their organisation. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	0 (0)	5 (16.1)	26 (83.9)	0 (0)	31 (100)

Comments were received from 4 panel members in themes of:

1. safety implications: "Following protocol ensures greater prescribing safety."

2. need for robust guidelines: "But validated protocols approved by multidisciplinary committees."

Statement 3.6: Once registered, all pharmacist prescribers must undertake Continuing Professional Development (CPD) within the medical condition(s) in which they are prescribing. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	0 (0)	8 (25.8)	23 (74.2)	0 (0)	31 (100)

Comments were received from 6 panel members in themes of:

1. need for control: "Agree but not additional to the current burden of CPD."

2. need for CPD: "It should not only be the medical condition, as they must have general CPD for regular pharmacy knowledge as well."

Statement 3.7: All pharmacist prescribers must have ready access to patient clinical records. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	1 (3.2)	1 (3.2)	5 (16.1)	24 (77.4)	0 (0)	29 (93.5)

Comments were received from 6 panel members in themes of:

1. benefits: "This is an key tool that must be accessible for successful and safe prescribing practice."

2. need for integration across settings: "need to see interactions for that patient across the whole sector to get the full picture (i.e. PHCC and HMC and other providers etc)."

Statement 3.8: All pharmacist prescribers must document every prescribing activity in the patient clinical records. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	0 (0)	6 (19.4)	25 (80.6)	0 (0)	31 (100)

No relevant comments were received.

Statement 3.9: All pharmacist prescribers must have the authority to order appropriate laboratory tests to inform their prescribing decisions.

Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	1 (3.2)	1 (3.2)	2 (6.5)	8 (25.8)	19 (61.3)	1 (3.2)	27 (87.1)

Comments were received from 8 panel members in themes of:

1. need for protocol: "Within pre-agreed limits relevant to the conditions they are licensed to treat."

2. communication: "Communication and coordination with medical team to prevent any unnecessary additional blood drawing."

Statement 3.10: All pharmacist prescribers must have the authority to order other relevant tests and investigations (e.g. ECG, X-ray...). ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	4 (12.9)	2 (6.5)	11 (35.5)	5 (16.1)	9 (29)	4 (12.9)	14 (45.2)

Comments were received from 7 panel members in themes of:

1. risk: "This could lead to a confusion of roles."

2. benefit: "Don't see any point in restriction if they have this much responsibility."

3. need for evidence-based practice: "This needs to be supported with international best practice."

→ Based on the response and comments, the statement **was revised** to: "All pharmacist prescribers must have the authority to order other relevant tests and investigations (e.g. ECG, X-ray...) **if clinically indicated**."

Statement 3.11: All pharmacist prescribers must NOT have any role in the dispensing process for the patients for whom they prescribe.

No Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.2)	2 (6.5)	2 (6.5)	10 (32.3)	7 (22.6)	9 (29)	3 (9.7)	16 (51.6)

Comments were received from 7 panel members in themes of:

1. importance of separating roles: “Conflict of interest” and “To ensure the double check methodology.”

2. confusion over need for separation: “In Canada there is no restriction.” and “Not sure what the issue is here: is it financial? probity issues?” and “Where there is a sound CIS like Cerner CIS at HMC and PHCC or a facility has an auditable electronic record the risk of fraud is low.”

→ Based on the response and comments, the statement **was not altered**.

Statement 3.12: All pharmacist prescribers must report prescribing errors according to the policy of their organisation. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	0 (0)	6 (19.4)	25 (80.6)	0 (0)	31 (100)

No relevant comments were received.

Statement 3.13: All pharmacist prescribers must report adverse drug reactions (ADRs) according to the policy of their organisation.

Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	0 (0)	4 (12.9)	27 (87.1)	0 (0)	31 (100)

Comments were received from 3 panel members in the theme of:

1. need for a national repository: "There should be a common standard across Qatar, should not be just linked to one organisation, there should be centralised collection and analysis."

Statement 3.14: Pharmacists' prescribing practice must be audited regularly against set and accepted standards. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	1 (3.2)	8 (25.8)	22 (71)	0 (0)	30 (96.8)

Comments were received from 5 panel members in the theme of:

1. importance: "This will be highly required as quality control for new practice."

Statement 3.15: Patients' feedback on the prescribing practice must be collected regularly, using standardised tools. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	4 (12.9)	13 (41.9)	14 (45.2)	0 (0)	27 (87.1)

Comments were received from 7 panel members in themes of:

1. importance: "It would be interesting to measure patient satisfaction before implementation and after. This would support the initiative." and "Especially in the first few years."

2. need for other sources of feedback: "Also other HCPs feedback on process."

3. disadvantages: “May be a complete waste of time.” and “It a good idea but we need to avoid extra-work by having it done as random audit not regularly.”

Statement 3.16: A state-wide campaign should be launched to educate the general public about pharmacist prescribing. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	5 (16.1)	6 (19.4)	20 (64.5)	0 (0)	26 (83.9)
No relevant comments were received.							

Statement 3.17: A state-wide campaign should be launched to educate healthcare providers about pharmacist prescribing. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	0 (0)	0 (0)	1 (3.2)	10 (32.3)	20 (64.5)	0 (0)	30 (96.8)
No relevant comments were received.							

Section 4: Additional comments

Comments were received from 3 panel members in themes of:

1. benefits: “this programme will almost certainly make a very significant impact on OP waiting times as many slots filled with request for drug refills etc.”

2. need for support: “Pharmacists advanced role need to be recognised and acknowledged by the hospital administration.”

3. need for education about role: “A lot of work is needed to enhance the role of the pharmacists to the public, other healthcare professionals and to the hospital administration.”

4. need for defined roles: “For every patient there should be ONE defined medical lead. This special competency pharmacists is adding in and supporting this. No DUAL leadership!”

6.3.3. Round 2

Out of 33 experts who agreed to participate, 30 completed Round 2 (response rate= 91%). The 15 statements that did not reach consensus during Round 1 were revised and shared again with the experts during this round. Consensus was reach in six of them. The following section presents the level of consensus on each statement as well as the feedback provided by the experts.

Section 1: Definitions, Models, and Scope

1.1 Pharmacist Collaborative Prescribing

Statement 1.1.1: A collaborative model of pharmacist prescribing is appropriate for Qatar. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.3)	0 (0)	1 (3.3)	2 (6.7)	11 (36.7)	15 (50)	1 (3.3)	26 (86.7)
No relevant comments were received.							

Statement 1.1.8: Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any controlled drug stated in the protocol. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
2 (6.7)	4 (13.3)	3 (10)	6 (20)	13 (43.3)	2 (6.7)	6 (20)	15 (50)
Comments were received from 12 panel members in themes of: 1. criteria for prescribing: “It is possible if the qualified well-trained pharmacist has a very defined role clearly stated in the written collaborative agreement protocol.” 2. need for training and governance: “I feel this needs additional training and very tight governance if we are to adopt it, particularly in Qatar.”							

3. potential for role development: “This approach should work well in Qatar before moving forward to full independent pharmacist prescribing in the future.”

4. need for physician involvement: “I agree that the initial decision to prescribe should be taken in conjunction with the physician who has overall responsibility for the patient.”

1.2 Pharmacist Independent Prescribing for medical conditions previously diagnosed by a physician

Statement 1.2.1: Pharmacist Independent Prescribing for previously diagnosed medical conditions is an appropriate model for Qatar.

***No Consensus**

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
3 (10)	6 (20)	3 (10)	6 (20)	7 (23.3)	5 (16.7)	9 (30)	12 (40)

Comments were received from 13 panel members in themes of:

1. maturity of the organisation: “Qatar is not ready for this approach yet – but yes in the future when the processes have matured and there is greater acceptance from physicians.”

2. need for training and governance: “I am guarded about its adoption without good additional training and governance.”

3. need for guidelines and piloting: “There should be protocols to support this and small steps/pilots should start to develop experience and learning.”

4. risks: “I think that this model blurs the lines between the role of doctor and pharmacist. There are risks that pharmacists may practice outside their levels of experience and competence and also there are risks that too many different people will be involved in care without talking to each other.”

Statement 1.2.4: Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any prescription-only drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
2 (6.7)	3 (10)	0 (0)	5 (16.7)	15 (50)	5 (16.7)	5 (16.7)	20 (66.7)

Comments were received from 9 panel members in themes of:

1. need for competent pharmacists: "If having competencies in specific specialty."

2. need for change: "We need to have a strategic plan in which all pharmacy sectors work together on changing laws and policies, train and educate pharmacists, standardise practices, utilise technologies that help to implement and hold the responsibility to such privilege in the future."

3. need for physician involvement: "I do not think that the pharmacist should be managing the patient separately from the clinicians."

Statement 1.2.5: Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any controlled drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
5 (16.1)	11 (35.5)	2 (6.5)	5 (16.1)	6 (19.4)	2 (6.5)	16 (51.6)	8 (25.8)

No relevant comments were received.

1.3 Pharmacist Independent Prescribing for medical conditions NOT previously diagnosed by a physician

Statement 1.3.1: Pharmacist Independent Prescribing for undiagnosed medical conditions is an appropriate model for Qatar. ***No Consensus**

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
14 (46.7)	9 (30)	2 (6.7)	1 (3.3)	3 (10)	1 (3.3)	23 (76.7)	4 (13.3)

Comments were received from 9 panel members in themes of:

1. lack of sustainability: "I feel that that is not a suitable model as pharmacists are not trained in diagnosis, and even a short certification programme is not sufficient for the best patient care outcomes."

2. need for training, education and governance: "Pharmacists should be trained, public should be aware of the new expanding pharmacist role and there should be laws governing the practice."

Statement 1.3.2: Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any over-the-counter drugs. ***Consensus**

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	2 (6.7)	0 (0)	7 (23.3)	11 (36.7)	10 (33.3)	2 (6.7)	21 (70)

Comments were received from 8 panel members in themes of:

1. risk: "No different to what happens already in any chemist shop BUT there is a risk that a diagnosis may be missed."

2. need for training: "With proper training this is possible, where I come from it is done all the time."

3. need for change in laws: "I would recommend that the OTC drug list become more restrictive than the current list. There are many more drugs in Qatar that are available without prescription than in North American or European countries."

Statement 1.3.3: Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any prescription-only drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
9 (30)	11 (36.7)	3 (10)	3 (10)	3 (10)	1 (3.3)	20 (66.7)	4 (13.3)

Comments were received from 7 panel members in themes of:

1. need for physician involvement: "Must have a diagnosis first."

2. need for training: "pharmacists training would need to be broader and more extensive to allow this to happen safely."

Statement 1.3.4: Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any controlled drugs. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
16 (53.3)	7 (23.3)	2 (6.7)	1 (3.3)	2 (6.7)	2 (6.7)	23 (76.7)	4 (13.3)

Comments were received from 6 panel members in the theme of:

1. maturity of the organisation: "The medico-legal situation and the lack of current training and experience makes this a dangerous step."

Section 2: Education and Training

Statement 2.4: The period of learning in practice must be supervised by a senior physician with a particular interest in prescribing. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.3)	2 (6.7)	0 (0)	6 (20)	11 (36.7)	10 (33.3)	3 (10)	21 (70)

Comments were received from 7 panel members in themes of:

1. benefits: "Indeed the physician must have a really strong interest in good prescribing practice for this to be a suitable training/ supervisory period." and "This would assist with learning and promote medicine safety."

2. potential for other providers to supervise: "They may need mentorship and supervision at the beginning but not necessarily by a physician."

3. need for adapting to community setting: "I feel that this eliminate any community pharmacy practitioner and some method should be formulated to ensure they have an opportunity to be trained in prescribing as well."

Statement 2.6: All pharmacists enrolling in the education and training programme must have a postgraduate qualification in clinical pharmacy or a related field. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.3)	1 (3.3)	0 (0)	3 (10)	15 (50)	10 (33.3)	2 (6.7)	25 (83.3)

Comments were received from 8 panel members in the theme of:

1. criteria for postgraduate qualification: "As long as the possible qualifications are accessible by all appropriate pharmacists." and "Need a list of international agreed qualifications or equivalence list."

Statement 2.8: All pharmacists enrolling in the education and training programme must have their application endorsed by the senior physician responsible for the period of learning in practice. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	3 (10)	0 (0)	4 (13.3)	17 (56.7)	6 (20)	3 (10)	23 (76.7)

Comments were received from 3 panel members in the theme of:

1. criteria for senior physician: "those supervisors must be carefully selected as proper support is really needed here."

Statement 2.11: All pharmacists enrolling in the education and training programme must demonstrate that, within their area of practice, there is a clinical need for their prescribing role. ***Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	2 (6.7)	0 (0)	3 (10)	23 (76.7)	2 (6.7)	2 (6.7)	25 (83.3)

Comments were received from 5 panel members in the theme of:

1. need for endorsement of role: "It still needs senior endorsement. Perhaps a facility director of pharmacy in conjunction with the chief medical officer (CMO)."

Section 3: Prescribing Practice & Governance

Statement 3.10: All pharmacist prescribers must have the authority to order other relevant tests and investigations (e.g. ECG, X-ray...) if clinically indicated. ***No Consensus***

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
1 (3.3)	2 (6.7)	1 (3.3)	7 (23.3)	12 (40)	7 (23.3)	3 (10)	19 (63.3)

Comments were received from 9 panel members in themes of:

1. need for physician involvement: "Shall also be under supervision from the treating clinician/team."

2. need for training and governance: "They would need specific training. This must subject to regular audit."

3. need for a pre-agreed list: "The list of tests which can be ordered by the pharmacist should be specified in the collaborative agreement."

4. need for evidence-based practice: "Should be in line with international best practice."

5. risks: "Who decides what is clinically indicated? Again we risk blurring the lines about responsibilities of different individuals in the team and fragmenting care."

Statement 3.11: All pharmacist prescribers must NOT have any role in the dispensing process for the patients for whom they prescribe.

No Consensus

Responses n (%)						Level of Consensus n (%)	
Strongly Disagree	Disagree	Some what Disagree	Some what Agree	Agree	Strongly Agree	Disagreement	Agreement
0 (0)	4 (13.3)	4 (13.3)	4 (13.3)	12 (40)	6 (20)	4 (13.3)	18 (60)

Comments were received from 7 panel members in themes of:

1. importance of separating roles: "Conflict of interest may arise" and "Ensures every prescription is double checked as it is now. Nothing less is acceptable."

2. confusion over need for separation: "What is the point in having a pharmacist prescribe and then having a patient go to a different pharmacy to get the medication dispensed, if no other pharmacist is on staff?"

Section 4: Additional comments

Comments were received from 2 panel members in themes of:

1. potential for combining prescribing and dispensing: “Pharmacists could have role in dispensing if medication verified by other pharmacists.”

2. need for more research: “There should be a comprehensive study on (1) the benefits to the society by the current practice of pharmacists dispensing medicines for minor ailments, (2) Possible benefits of pharmacists prescribing models, (3) Prescription errors in the current system, (4) Pharmacist intervention on these prescription errors, (5) Gaps in the knowledge and training required for full prescribing rights.”

Although nine statements did not reach consensus following Rounds 1 and 2 (See Table 6.4), another round was deemed unnecessary based on the open comments provided by the panel members. These comments highlighted that independent prescribing was not considered appropriate at this point in time of developing pharmacy practice in Qatar. Consensus was not achieved for most statements on independent prescribing and stakeholder views were unlikely to alter in further rounds.

Table 6.4: Summary of Delphi consensus for Rounds 1 and 2 results	
Statements	**Level of consensus**
1. Definitions, models and scope	
1.1. Pharmacist Collaborative Prescribing	
1.1.1 A collaborative model of pharmacist prescribing is appropriate for Qatar.	**Consensus**
1.1.2 The protocol for collaborative pharmacist prescribing should have a defined generic format approved by Qatar Council for Healthcare Professionals (QCHP).	**Consensus**
1.1.3 The protocol for collaborative pharmacist prescribing must state the targeted medical condition(s).	**Consensus**
1.1.4 The protocol for collaborative pharmacist prescribing must state the scope of prescribing for the pharmacists (e.g. what, when, and how to initiate/continue/discontinue/change drugs, dose, duration…).	**Consensus**
1.1.5 The protocol for collaborative pharmacist prescribing must be approved by the pharmacist prescriber(s), physician(s), and the pharmacy director within the organisation.	**Consensus**
1.1.6 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any over-the-counter drug stated in the protocol.	**Consensus**
1.1.7 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any prescription-only drug stated in the protocol.	**Consensus**
1.1.8 Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any controlled drug stated in the protocol.	**No Consensus**
1.2. Pharmacist Independent Prescribing for medical conditions previously diagnosed by a physician	
1.2.1 Pharmacist Independent Prescribing for previously diagnosed medical conditions is an appropriate model for Qatar.	**No Consensus**
1.2.2 Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, a physician must diagnose the medical condition before the pharmacist can prescribe.	**Consensus**
1.2.3 Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any over-the-counter drugs.	**Consensus**
1.2.4 Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any prescription-only drugs.	**No Consensus**
1.2.5 Under the Pharmacist Independent Prescribing for previously diagnosed conditions model, pharmacists can prescribe, within their competence, any controlled drugs.	**No Consensus**
1.3. Pharmacist Independent Prescribing for medical conditions which have not been previously diagnosed by a physician	
1.3.1 Pharmacist Independent Prescribing for undiagnosed medical conditions is an appropriate model for Qatar.	**No Consensus**
1.3.2 Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any over-the-counter drugs.	**Consensus**

1.3.3	Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any prescription-only drugs.	**No Consensus**
1.3.4	Under the Pharmacist Independent Prescribing for undiagnosed conditions model, pharmacists can prescribe, within their competence, any controlled drugs.	**No Consensus**
2.	**Education & Training**	
2.1	All pharmacist prescribers must complete a university-led education and training programme accredited by QCHP.	**Consensus**
2.2	The education and training programme must be related to the medical condition(s) in which the pharmacist is planning to prescribe.	**Consensus**
2.3	The education and training programme must include a period of learning in practice (i.e training) relating to the medical condition(s) in which the pharmacist is planning to prescribe.	**Consensus**
2.4	The period of learning in practice must be supervised by a senior physician with a particular interest in prescribing.	**Consensus**
2.5	The senior physician supervising the period of learning in practice must be familiar with the education and training programme's aims and objectives.	**Consensus**
2.6	All pharmacists enrolling in the education and training programme must have a postgraduate qualification in clinical pharmacy or a related field.	**Consensus**
2.7	All pharmacists enrolling in the education and training programme must have at least 2 years of direct clinical patient care experience in the medical condition(s) in which they are planning to prescribe.	**Consensus**
2.8	All pharmacists enrolling in the education and training programme must have their application endorsed by the senior physician responsible for the period of learning in practice.	**Consensus**
2.9	All pharmacists enrolling for the education and training programme must have the endorsement of the pharmacy director in their organisation.	**Consensus**
2.10	All pharmacists planning to enrol in the education and training programme must submit a portfolio outlining the set of skills and experience they possess and how they plan to develop further.	**Consensus**
2.11	All pharmacists enrolling in the education and training programme must demonstrate that, within their area of practice, there is a clinical need for their prescribing role.	**Consensus**
2.12	Prior to registration with QCHP as a prescriber, pharmacists must successfully complete the education and training programme and be deemed competent by the senior physician responsible for the period of learning in practice.	**Consensus**
2.13	Pharmacist prescribers registered in countries other than Qatar must be registered with QCHP prior to commencing prescribing practice.	**Consensus**
3.	**Prescribing Practice & Governance**	
3.1	Pharmacist prescribers must not commence prescribing practice until registered with QCHP.	**Consensus**
3.2	All newly registered pharmacist prescribers must first practise collaborative prescribing for a period of time prior to progressing to independent prescribing.	**Consensus**
3.3	The job description of the pharmacist prescribers must be amended to include prescribing.	**Consensus**
3.4	If in doubt about their ability to prescribe for a patient, the pharmacist prescriber must refer him/her back to the physician.	**Consensus**

3.5 All pharmacist prescribers must prescribe according to local policies, guidelines and protocols of their organisation.	**Consensus**
3.6 Once registered, all pharmacist prescribers must undertake Continuing Professional Development (CPD) within the medical condition(s) in which they are prescribing.	**Consensus**
3.7 All pharmacist prescribers must have ready access to patient clinical records.	**Consensus**
3.8 All pharmacist prescribers must document every prescribing activity in the patient clinical records.	**Consensus**
3.9 All pharmacist prescribers must have the authority to order appropriate laboratory tests to inform their prescribing decisions.	**Consensus**
3.10 All pharmacist prescribers must have the authority to order other relevant tests and investigations (e.g. ECG, X-ray...) if clinically indicated.	**No Consensus**
3.11 All pharmacist prescribers must NOT have any role in the dispensing process for the patients for whom they prescribe.	**No Consensus**
3.12 All pharmacist prescribers must report prescribing errors according to the policy of their organisation.	**Consensus**
3.13 All pharmacist prescribers must report adverse drug reactions (ADRs) according to the policy of their organisation.	**Consensus**
3.14 Pharmacists' prescribing practice must be audited regularly against set and accepted standards.	**Consensus**
3.15 Patients' feedback on the prescribing practice must be collected regularly, using standardised tools.	**Consensus**
3.16 A state-wide campaign should be launched to educate the general public about pharmacist prescribing.	**Consensus**
3.17 A state-wide campaign should be launched to educate healthcare providers about pharmacist prescribing.	**Consensus**

6.4. Discussion

6.4.1. Summary of key findings

The aim of this phase of the research was to determine consensus around the most appropriate framework for pharmacist prescribing in Qatar. Of the 47 statements, consensus was achieved for 38, with high levels of agreement for statements relating to the Collaborative Pharmacist Prescribing model, thus indicating it as being the most appropriate for Qatar. There was also very strong agreement that pharmacist prescribers in Qatar must undergo additional training and have experience in the clinical area in which they plan to prescribe. The need for robust governance to support pharmacist prescribing training and practice was highlighted.

Consensus was not reached around adopting a pharmacist independent prescribing for Qatar, nor was it reached in relation to pharmacists prescribing any controlled drugs, with comments from panel members indicating that this may be due to the immaturity of pharmacy practice and strict regulations to be imposed when prescribing these controlled substances in Qatar. While the statement that pharmacist prescribers must not have any role in the dispensing process for the patients they prescribe did not reach consensus, almost two thirds of panel members agreed with this statement, highlighting the need to explore this issue further.

6.4.2. Interpretation of findings

This Delphi study identified that the most appropriate prescribing model for pharmacist prescribing in Qatar is the collaborative model. Such model has been successfully implemented in countries such as the USA and New Zealand. Collaborative Pharmacist Prescribing permits trained pharmacist prescribers practising within an interprofessional team setting to initiate or modify therapy (including discontinuation or maintenance of therapy originally initiated by another prescriber) according to a defined plan. Consensus was not obtained for independent prescribing, which has been successfully implemented in the UK and allows the pharmacist prescriber to practice more autonomously.

Opting for a collaborative model initially for pharmacist prescribing in Qatar prior to advancing to the more autonomous independent practice is very similar to progress in other countries, as described in Chapter 1. In the US, the pharmacist prescribing model is one of 'Collaborative Drug Therapy Management' which allows pharmacists to assess patients, order laboratory tests, choose and monitor drug therapy, and prescribe drugs according to a predefined protocol (Centers for Disease Control and Prevention 2013). This model has been implemented in more than 75% of USA's States and the armed forces (Gauvin, Lavis and McCarthy 2015). A randomised trial conducted in 2014 comparing pharmacist managed hypertension to usual care gave significantly better blood pressure control in pharmacist managed group (81% achieved target vs. 44% at 6 months; 70% vs. 52% at 9 months) and had significantly less encounters with their healthcare providers compared to the usual care group ($p = 0.001$) (Hirsch et al. 2014). Currently, there are no plans for pharmacist prescribers in the US to progress to an independent prescribing model.

New Zealand, the most recent country to legislate pharmacist prescribing, has also opted for a collaborative model (New Zealand Ministry of Health 2014). As of August 2016, there were 18 pharmacist prescribers, half of which were working in primary care or between primary and secondary care (New Zealand Ministry of Health 2017). Studies on the impact of collaborative prescribing in New Zealand are beginning to emerge. Collaborative pharmacist prescribers were acknowledged by health professionals (psychiatrists, nurses, and pharmacists) and mental health consumers as being vital members of the healthcare team, with the pharmacists perceiving improved patient care (Wheeler et al. 2012). The need for additional education and training and established relationships with physicians were highlighted as being crucial to counter concerns of competence, public perception and encroaching physician roles (Wheeler et al. 2012). These findings are consistent with the level of agreement achieved in Qatar and also evident in the themes derived from the open comments, highlighting the need for additional training, robust educational programme, practising within competence, thorough planning, and importance of QCHP and physician involvement in Qatar to accommodate for this new role.

Furthermore, panel members also supported adopting the UK prescribing training programme structure of a university-provided element and a period of learning in practice under the supervision and support of a designated medical practitioner (General Pharmaceutical Council 2018). To be eligible to enrol into the UK programme, applicants must: be registered as pharmacists with the General Pharmaceutical Council; have at least two years of patient-orientated experience; have identified a need for their future prescribing practice; demonstrate how they reflect on their own performance and take responsibility for their own continuing professional development; and have an appropriate designated medical practitioner to supervise their learning in practice. Consensus was reached for adopting these criteria in Qatar, which will also provide confidence by benchmarking to the UK where pharmacist prescribing has been part of the legislative framework for 15 years.

A Delphi study by Tonna et al. (2014) aimed to develop consensus guidance to facilitate service redesign around pharmacist prescribing in a UK hospital setting. Similar to the current research, the authors reported high level of consensus around aspects related to 'service development' (e.g. succession planning, multidisciplinary working, quality evaluation, practice development and outcome measures) and 'pharmacist prescribing role development' (e.g. education and future orientation of service).

As noted earlier, there was no agreement to implement pharmacist independent prescribing in Qatar, with comments around concerns over pharmacist diagnosis skills and the relative immaturity of pharmacy practice. These findings are consistent with those of the systematic review presented in Chapter 4, which identified similar patient safety concerns in studies pre-implementation of pharmacist prescribing. Interestingly, these issues were not identified in the post-implementation studies highlighting the value of the lived experiences and published research.

There may, however, be scope to progress to an independent prescribing model in the future. This would be similar to the UK which legalised supplementary prescribing in 2003, allowing pharmacist prescribers to implement an agreed patient-specific clinical management plan (CMP) agreed with the physician and the patient (UK Department of Health 2003). At a

later point in time, the exemptions around controlled drugs (other than schedule 1) and unlicensed medicines were removed. In 2006, additional legislation was introduced to permit pharmacist independent prescribing, which removed many of the obstacles experienced with supplementary prescribing (e.g. the need for each patient to have an agreed CMP) (Cooper et al. 2008).

The lack of agreement for pharmacist prescribers to prescribe controlled drugs, either collaboratively or independently in Qatar, is likely to be due to the strict legislations governing their handling and use. For instance, Article 17 in Law 9 of 1987 on 'Control and Regulation of Narcotic Drugs and Dangerous Psychotropic Substances (NDDPS)' forbids pharmacists from dispensing controlled drugs, except with a prescription from a licensed physician or upon permission from the Ministry of Public Health (Al Thani 1987).

Interestingly, agreement was not achieved for separating prescribing and dispensing by the same pharmacist. While consensus was not achieved, 60% of panel members agreed with this statement. Those disagreeing gave comments highlighting concern that this would limit implementation to hospital setting or community pharmacies employing more than one pharmacist. In New Zealand, although not stated in the Medicines (Designated Pharmacist Prescribers) Regulations of 2013 (New Zealand Government 2013), the pharmacist prescribing competency framework clearly states under Principle 6 that each organisation must 'have robust procedures in place to ensure the separation of prescribing and dispensing' in order to promote public trust and confidence in pharmacists and enhance the reputation of the profession (Pharmacy Council of New Zealand 2013). The rationale for the separation is to protect patient safety.

While the key themes derived from the open comments are unlikely to be at the level of saturation (given the relatively low numbers), these could be mapped to CFIR: innovation characteristics (need to ensure that implementation is evidence-based and gradual), outer setting (need to tailor service to patient needs), inner setting (need to consider benefits and risks and ensure compatibility with healthcare structure, pharmacy practice and

organisation's goals mostly by involving physicians and practising within a specialised area), characteristics of individuals (need for training, experience and competence), and process (need for governance, planning and engagement of key stakeholders). There is therefore merit in adopting CFIR in all subsequent stages of development and implementation of pharmacist prescribing in Qatar.

6.4.3. Strengths and weaknesses

This study employed a consensus approach in developing pharmacist prescribing frameworks in Qatar. As described in Chapter 2, this approach was particularly appropriate for synthesising accumulated expert opinions, facilitating policy development, supporting quality improvement and clinical governance, and stimulating debate around areas of limited evidence or uncertainty (Campbell and Cantrill 2001, Nair, Aggarwal and Khanna 2011). Applying a research-based consensus approach to developing any non-medical prescribing framework is novel. While Tonna et al. (2014) described a similar approach around pharmacist prescribing, the aim was to determine standards of practice according to the legislative framework in the UK. Courtenay et al. (2018) also used the Delphi approach to define the conditions which community practitioner nurse prescribers could manage.

One strength of this phase is that all Delphi statements were developed comprehensively, being based on an extensive review of literature, the findings presented in Chapters 3-5 and review of pharmacist prescribing frameworks in other countries. This phase also had a theoretical foundation with CFIR underpinning the research questions, developing the data collection tools, and data analysis (Damschroder et al. 2009). Using theory also allows the data and findings to be presented in a more meaningful context and contribute towards building an integrated body of knowledge around implementation (Nilsen 2015). Further strengths include the high response rates in all rounds, with engagement from a diverse group of stakeholders with strategic positions in Qatar in policy development, leadership and academia.

Although it appears that there was over-representation of pharmacy leaders and under-representation of physician leaders, it is worthy to note that many of the experts held dual positions. For instance, in the Healthcare Policy Leaders group, three of the experts were physicians, two were nurses, two have a healthcare and business administration background and one was a pharmacist. Thus, overall, there was a good representation of all the key healthcare professions in this study.

On the other hand, data were collected in Qatar. Hence, the findings may lack generalisability to other countries. However, it is likely that statements relating to education and training as well as prescribing practice and governance may be relevant to other healthcare professions and other countries. It is also likely that all the findings may be applicable to many countries within the 'Arab World', especially the Gulf Cooperation Council (GCC) and the Middle East and North Africa (MENA) regions. This is because most of the GCC countries share similar healthcare systems as well as similar demographics and backgrounds for healthcare practitioners.

6.5. Conclusion

High levels of agreement were obtained for statements which can constitute a framework for the development and implementation of pharmacist prescribing in Qatar. Implications, impact, further development and research are considered in Chapter 7.

Chapter 7:
Discussion

7. Introduction to the chapter

This chapter reiterates the overall aim of the doctoral research, the aim and key findings of each phase, highlighting the originality and potential impact of the research. Future work related to the implementation (development, trialability and evaluation) of pharmacist prescribing in Qatar is described.

7.1. Aims and key findings

The overall aim of the doctoral research was to explore the development of frameworks of pharmacist prescribing in Qatar. As part of the research, the framework was described in terms of: definitions, models and scope of prescribing; education and training; and prescribing practice and governance.

The research was conducted in four phases, each building upon the findings of the previous phase(s), underpinned by a comprehensive theoretical framework of implementation, and the peer-reviewed literature and policy guidance on pharmacist prescribing.

7.1.1. Phase 1: Umbrella review

Chapter 1 highlighted that nonmedical prescribers' training, competencies and ongoing continuing professional development may lead to safe and effective prescribing. There remained, however, a need for robust and rigorous evidence of NMP safety and effectiveness on which to base future developments. While there were multiple published literature reviews exploring different aspects of NMP, there had been no comprehensive overview.

Thus, the first phase of this doctoral research was an umbrella review that aimed to collate and summarise all the published systematic reviews on NMP in order to report aspects, including, but not limited to: models and definitions; legal frameworks; outcomes and benefits; perceptions and satisfaction of different stakeholders (e.g. general public, patients, health professionals and decision makers); and facilitators and barriers to implementing NMP.

The umbrella review identified seven systematic reviews of: influences on prescribing decision-making; processes of prescribing; and barriers and

facilitators to implementation. Decision-making was reported as complex with many, and often conflicting, influences. Facilitators of NMP included perceived improved patient care and professional autonomy, while barriers included lack of defined roles and resource pressures. Three systematic reviews explored patient outcomes that were noted to be equivalent or better to physician prescribing. Despite positive findings, authors highlighted high bias, poor definition and description of 'prescribing' and the 'prescribing process' and difficulty in separating NMP effects from the contributions of other healthcare team members.

7.1.2. Phase 2: Systematic review

The umbrella review conducted identified that no published systematic review had synthesised studies on stakeholders' views and experiences of NMP. Feedback from key stakeholder groups of their views and experiences on pharmacist prescribing is vital to determine the possible factors influencing its implementation and thus inform the development and realisation of such initiatives in other countries. This is also necessary to explore whether views of stakeholders prior to implementing pharmacist prescribing would change upon experiencing the service, and to determine whether post-implementation studies described similar facilitators and barriers to studies conducted pre-implementation.

The aim of this phase was therefore to critically appraise, synthesise and present the available evidence on the views and experiences of stakeholders on pharmacist prescribing, including potential facilitators and barriers, regardless of implementation status.

Most studies included in the systematic review pre- and post-implementation reported positive views and experiences with main benefits described as: increased access to healthcare services; perceptions of enhanced patients' outcomes; better utilisation of pharmacists' skills and knowledge; improved job satisfaction; and reduced physicians' workload. However, concerns were noted around issues of: liability; limited pharmacists' diagnosis skills; access to medical records; and lack of organisational and financial support. While review findings were derived from many studies of generally high methodological quality, there was a lack of mixed-methods approaches.

7.1.3. Phase 3: Qualitative semi-structured interviews

In addition to the key findings described above, the systematic review also identified a gap and therefore the need for primary research to be conducted in the 'Arab World'. There are several reasons why findings from studies conducted in other parts of the world cannot easily be generalised or transferred including differences in ethnicity, culture and work practices. Furthermore, it became evident that there was a lack of studies researching diverse stakeholder groups, of qualitative studies and studies grounded in implementation theory.

The research conducted in Phase 3 aimed to determine key health stakeholders' (patients, physicians, nurses, pharmacists, hospital administrators, regulatory bodies' representatives) expectations, attitudes and beliefs around implementing pharmacist prescribing in Qatar. Data saturation was achieved following 37 interviews. The interviewees were generally aware of models of pharmacist prescribing in other countries and the clinical activities of pharmacist in Qatar, most notably in Hamad Medical Corporation. There was also support for the development and implementation of pharmacist prescribing in Qatar, with many potential benefits, facilitators, and barriers highlighted. It was also clear that there was a requirement to systematically plan the development and implementation of pharmacist prescribing, with reference to all five domains of CFIR.

7.1.4. Phase 4: Quantitative modified-Delphi study

The previous phase highlighted support for the potential development and implementation of pharmacist prescribing in Qatar. The aim of the final phase of the doctoral research was to determine the levels of agreement amongst key stakeholders in Qatar around the development of pharmacist prescribing frameworks.

Of the 47 statements included in a Delphi study, consensus was achieved for 38, with high levels of agreement for statements relating to the collaborative pharmacist prescribing model thus indicating it as being most appropriate for Qatar. There was also very strong agreement that pharmacist prescribers in Qatar must undergo additional training and have experience in the clinical

area in which they planned to prescribe. The need for robust governance to support pharmacist prescribing training and practice was highlighted. However, consensus was not reached around adopting a pharmacist independent prescribing for Qatar, nor was it reached in relation to pharmacists prescribing any controlled drugs and for separating prescribing and dispensing.

A summary of the methods and key highlights of this doctoral research is provided in Figure 7.1. A detailed discussion of the strengths, limitations, and interpretation of findings of each phase was described in their respective chapters.

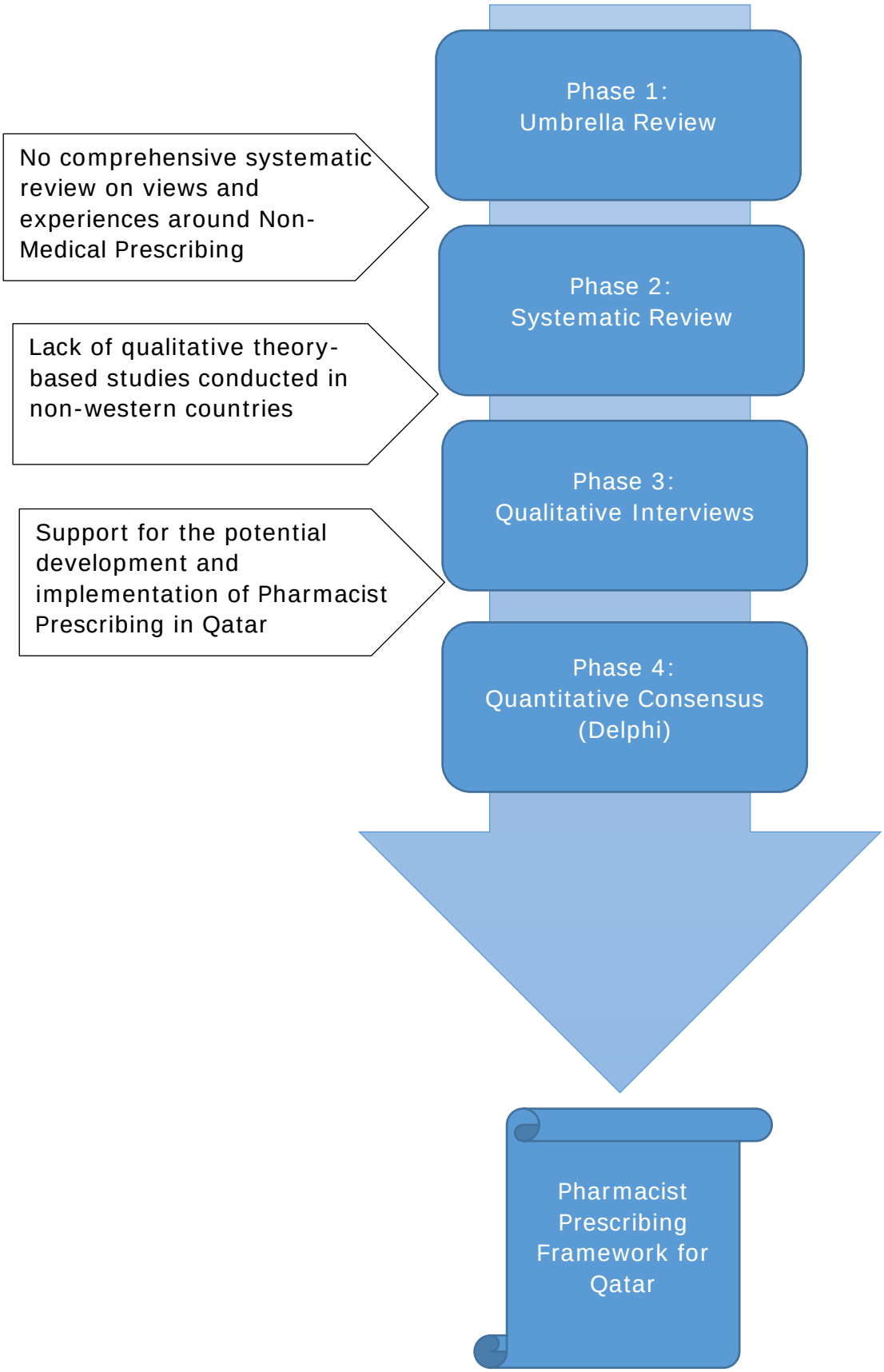


Figure 7.1: Summary of the methods and key findings of doctoral project

7.2. Interpretation of findings

The positive findings of the two literature reviews conducted as part of this doctoral research, together with previous reviews of effectiveness and safety (Kay and Brien 2004, Bhanbhro et al. 2011, Auta et al. 2015, Faruquee and Guirguis 2015, Weeks et al. 2016), provide evidence to support the expansion of pharmacist prescribing. However, it is worthy to note that interpretation and extrapolation of findings from studies conducted pre-implementation are limited in that participants were not necessarily aware of the aim, nature, and scope of the planned models of prescribing and may also have been influenced by either positive or negative experiences of similar or diverse interventions. The qualitative semi-structured interviews with key health stakeholders in Qatar demonstrated the very positive appreciation of clinical pharmacy practice, particularly within Hamad Medical Corporation and high awareness of NMP implementation in other parts of the world. These aspects add credibility to the positive views expressed and themes which emerged around the potential to develop and implement pharmacist prescribing in Qatar.

The umbrella and systematic reviews, together with the interviews identified that major facilitators pre-implementation included pharmacists' personal qualities (e.g. their clinical experience, education and training) and the perceived benefits of pharmacist prescribing (e.g. improved patient access to care and better utilisation of pharmacists' skills). Barriers included the potential lack of acceptance by patients and other healthcare providers, and concerns over pharmacists' poor clinical skills relating to assessment and diagnosing. While the latter may be components of independent models of prescribing practice, this may indicate some confusion of the UK independent prescribing model which does not actually require the diagnosis to be made by the pharmacist independent prescriber (UK Department of Health 2006).

Adopting CFIR throughout the primary research allowed a more comprehensive assessment of facilitators and barriers. This framework had not been included in any of the studies retrieved as part of the umbrella and systematic reviews. CFIR identified the following:

- The need to educate the public and other healthcare providers on pharmacists' education and training
- The potential to collaborate with other countries that had successfully implemented pharmacist prescribing
- The readiness for implementation, particularly within Hamad Medical Corporation
- The need to improve pharmacists' confidence to undertake prescribing
- The need for robust governance
- Involving a diverse group of stakeholders in the design, implementation, and evaluation of innovation

The Delphi study identified that a collaborative model of pharmacist prescribing was the most appropriate prescribing model for Qatar. Opting for a more conservative prescribing model initially prior to advancing to the more autonomous independent prescribing is very similar to progress in other countries such as the UK, as described in Chapter 1.

The interviews and the Delphi study also highlighted the importance of undertaking additional education and training and pharmacists prescribing within their competence. There was support for adopting the UK prescribing training programme eligibility, and structure of a university provided element and a period of learning in practice under the supervision and support of a designated medical practitioner (General Pharmaceutical Council 2018). Together with the involvement of QCHP in accrediting the training programme and registering the prescribers will add confidence in the abilities of pharmacist prescribers in Qatar.

While not yet being considered in Qatar, in certain countries, other healthcare providers such as nurses are also allowed to prescribe. Nurse prescribing was introduced in many countries (e.g. the US, Canada, UK, and New Zealand) to counteract physician shortages. Although this role was first legalised in the US in the 1960s, its development is most advanced in the UK (Lim, North and

Shaw 2014). As described in previous chapters, the Cumberlege Report in 1986 first recommended expanding prescribing privileges to other healthcare professionals to improve access, reduce cost, and allow greater flexibility in healthcare services and delivery with district nurses and health visitors being the first to take up such responsibility (Department of Health and Social Security 1986, Lim, North and Shaw 2014). Nurse prescribing was first introduced in 1994 in pilot sites and, in 1998, on a national level with the introduction of extended formulary independent nurse prescribing in 2002. However, it was not until 2003 when nurses were given the opportunity to train as supplementary prescribers. This led to the introduction of nurse independent prescribing in 2006 which allowed qualified nurses to prescribe any licensed medicine for any medical condition including some controlled drugs (Ryan-Woolley, McHugh and Luker 2008). Before being allowed to prescribe, nurses must undertake an accredited educational preparation programme which comprises of 26 taught days, additional self-directed learning, and 12 days learning in practice with a medical mentor (Nursing and Midwifery Council 2018).

Multiple studies have been published to explore key factors influencing implementation of nurse prescribing. Similar to some findings of the doctoral research, benefits related to professional development (e.g. enhanced job satisfaction, autonomy, increased knowledge and skills, career progression), patient care (e.g. safe, efficient and quicker access to care, patient satisfaction), and to overall healthcare (e.g. promoting evidence-based practice, reducing hospital admissions and cost of care) (Ryan-Woolley, McHugh and Luker 2008, O'Connell et al. 2009, Coull et al. 2013, Creedon et al. 2015, McBrien 2015). The need for appropriate levels of education and training programmes to support nurse prescribers was also reported (McBrien 2015). Barriers to the implementation of nurse prescribing were reported, specifically apprehension in relation to the qualifications and training of nurse prescribers, resources, nurses' knowledge and skills (especially diagnosis expertise), current workload, limited time availability, lack of support from medical colleagues and healthcare organisations (Ryan-Woolley, McHugh and Luker 2008, Coull et al. 2013, Creedon et al. 2015, McBrien 2015). One key

limitation of the literature on nurse prescribing is the failure to include implementation theory in any stages of the research.

7.3. Originality of the research

7.3.1. Novelty of design

The scientific design of this doctoral research is original as no other studies of pharmacist prescribing development and implementation have reported a systematic approach with phase building on the findings of the previous phases, namely the umbrella review (Stewart et al. 2017) and the systematic review (Jebara et al. 2016, Jebara et al. 2018). These were followed by theory driven (CFIR) interviews and a further rapid review of the literature conducted mid-November 2018 that identified no newly published studies of pharmacist prescribing (or any other model of NMP) which used implementation theory. The final phase was a Delphi study and while Tonna et al. (2014) employed a similar consensus approach, their aim was to achieve consensus guidance to facilitate service redesign around pharmacist prescribing in UK hospital settings.

As described in Chapter 2 and throughout the later chapters, to ensure the quality of this project, multiple steps were taken to promote validity and reliability (quantitative study) and trustworthiness (qualitative study) thus optimising the robustness and rigour of the research. The quality of the primary research was enhanced through incorporating CFIR into the stages of data collection and generation tool design, analysis, and reporting.

7.3.2. Novelty of concepts and ideas

Currently, pharmacist prescribing is considered a novel, and somewhat advanced, field of practice not only in the ‘Arab World’ but also globally. As highlighted in Chapter 1, only a limited number of countries in the ‘Western World’ have introduced legislation allowing the implementation of pharmacist prescribing. Furthermore, no published studies have been conducted in the ‘Arab World’ and the findings of studies conducted in other parts of the world cannot necessarily be generalised or transferred to the ‘Arab World’ due to

major differences in healthcare structures, processes, and ethnic cultures, as outlined in Chapter 1.

7.3.3. Dissemination of findings

As a result of the original findings emerging from this doctoral research, a detailed dissemination strategy was formulated to highlight these findings to as wide an audience as possible. As highlighted at the start of this thesis, the findings have been disseminated at several national and international meetings and through peer-reviewed publications. It was also considered important to publish study findings in journals read by pharmacists, other health professionals, and policy makers etc. A further three peer-reviewed papers are planned from the semi-structured interviews and Delphi study. In addition, key findings will be fed back to all research participants and shared with key stakeholders in Qatar, including the Ministry of Public Health, in an effort to further the implementation of pharmacist prescribing in Qatar.

7.4. Pharmacist prescribing framework for Qatar

As described in Chapter 1, there is potential to extend the clinical role of pharmacists to include prescribing in Qatar. This is aligned to several strategic documents: Qatar National Vision 2030 (Qatar General Secretariat for Development Planning and Statistics 2008); Qatar National Research Strategy (Qatar National Research Fund 2014); and the National Health Strategy 2018-2022 (Qatar Ministry of Public Health 2018). These strategies have common goals of increasing access to an integrated world-class health system, the transfer of care from secondary and tertiary care to primary care, better utilisation of the skilled and motivated workforce, and encouraging research.

As described earlier, the comprehensive research phases and the robust and rigorous findings of this doctoral research will advance the case for implementing pharmacist prescribing. The framework for pharmacist prescribing in Qatar is given in Table 7.1, in terms of definitions, models and scope of prescribing; education and training; prescribing practice and governance.

Table 7.1: Pharmacist prescribing framework for Qatar	
1. Definitions, models and scope	
1.1. Pharmacist Collaborative Prescribing	
1.1.1	A collaborative model of pharmacist prescribing is appropriate for Qatar.
1.1.2	The protocol for collaborative pharmacist prescribing should have a defined generic format approved by Qatar Council for Healthcare Professionals (QCHP).
1.1.3	The protocol for collaborative pharmacist prescribing must state the targeted medical condition(s).
1.1.4	The protocol for collaborative pharmacist prescribing must state the scope of prescribing for the pharmacists (e.g. what, when, and how to initiate/continue/discontinue/change drugs, dose, duration…).
1.1.5	The protocol for collaborative pharmacist prescribing must be approved by the pharmacist prescriber(s), physician(s), and the pharmacy director within the organisation.
1.1.6	Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any over-the-counter drug stated in the protocol.
1.1.7	Under the Collaborative Pharmacist Prescribing model, pharmacists can prescribe, within their competence, any prescription-only drug stated in the protocol.
2. Education and Training	
2.1	All pharmacist prescribers must complete a university-led education and training programme accredited by QCHP.
2.2	The education and training programme must be related to the medical condition(s) in which the pharmacist is planning to prescribe.
2.3	The education and training programme must include a period of learning in practice (i.e training) relating to the medical condition(s) in which the pharmacist is planning to prescribe.
2.4	The period of learning in practice must be supervised by a senior physician with a particular interest in prescribing.
2.5	The senior physician supervising the period of learning in practice must be familiar with the education and training programme's aims and objectives.
2.6	All pharmacists enrolling in the education and training programme must have a postgraduate qualification in clinical pharmacy or a related field.
2.7	All pharmacists enrolling in the education and training programme must have at least 2 years of direct clinical patient care experience in the medical condition(s) in which they are planning to prescribe.
2.8	All pharmacists enrolling in the education and training programme must have their application endorsed by the senior physician responsible for the period of learning in practice.
2.9	All pharmacists enrolling for the education and training programme must have the endorsement of the pharmacy director in their organisation.
2.10	All pharmacists planning to enrol in the education and training programme must submit a portfolio outlining the set of skills and experience they possess and how they plan to develop further.
2.11	All pharmacists enrolling in the education and training programme must demonstrate that, within their area of practice, there is a clinical need for their prescribing role.

2.12	Prior to registration with QCHP as a prescriber, pharmacists must successfully complete the education and training programme and be deemed competent by the senior physician responsible for the period of learning in practice.
2.13	Pharmacist prescribers registered in countries other than Qatar must be registered with QCHP prior to commencing prescribing practice.
3.	**Prescribing Practice & Governance**
3.1	Pharmacist prescribers must not commence prescribing practice until registered with QCHP.
3.2	All newly registered pharmacist prescribers must first practise collaborative prescribing for a period of time prior to progressing to independent prescribing.
3.3	The job description of the pharmacist prescribers must be amended to include prescribing.
3.4	If in doubt about their ability to prescribe for a patient, the pharmacist prescriber must refer him/her back to the physician.
3.5	All pharmacist prescribers must prescribe according to local policies, guidelines and protocols of their organisation.
3.6	Once registered, all pharmacist prescribers must undertake Continuing Professional Development (CPD) within the medical condition(s) in which they are prescribing.
3.7	All pharmacist prescribers must have ready access to patient clinical records.
3.8	All pharmacist prescribers must document every prescribing activity in the patient clinical records.
3.9	All pharmacist prescribers must have the authority to order appropriate laboratory tests to inform their prescribing decisions.
3.10	All pharmacist prescribers must report prescribing errors according to the policy of their organisation.
3.11	All pharmacist prescribers must report adverse drug reactions (ADRs) according to the policy of their organisation.
3.12	Pharmacists' prescribing practice must be audited regularly against set and accepted standards.
3.13	Patients' feedback on the prescribing practice must be collected regularly, using standardised tools.
3.14	A state-wide campaign should be launched to educate the general public about pharmacist prescribing.
3.15	A state-wide campaign should be launched to educate healthcare providers about pharmacist prescribing.

7.5. Future work

In addition to this doctoral research, two related studies are currently taking place in Qatar. These are studies of the views of pharmacists (in all settings) and pharmacy academics on the implementation of pharmacist prescribing. Results of these studies will add to the knowledge and evidence gathered in the doctoral research.

As with all research, the results and findings described in this thesis will stimulate further research, as outlined below. All studies will also be grounded in implementation theory.

7.5.1. Study 1: Defining the curriculum content for the education and training of pharmacist prescribers

Research aim

To define and scope the curriculum content for the education and training of pharmacist prescribers

Research philosophy

This study will adopt a positivist stance by attempting to gain consensus on the specific aspects of the curriculum.

Methodology and methods

A nominal group consensus approach will be adopted in an attempt to reach collective agreement around the desired design, learning outcomes, content, delivery, and assessment of the programme. The basis for discussion will be around the domains of CFIR and the approaches used in other countries which have implemented collaborative models of prescribing such as the US (Centers for Disease Control and Prevention 2013) and New Zealand (New Zealand Ministry of Health 2014). The nominal group technique involves face-to-face meetings between experts and the determination of consensus using individual as well as group voting. (Nair, Aggarwal and Khanna 2011). Following the steps outlined by McMillan, King and Tully (2016), participants will first be sent one or two questions in advance related to the proposed training programme to implement. Once all participants gather, they will be

given around 20 minutes to reflect silently on the topic. Each participant will then be asked to present one idea to the group, moving to the other members until no new ideas emerge. Once similar ideas are grouped, participants will be provided with a ranking sheet containing all the grouped ideas and asked to rate their top preferences. Scores will then be summed up and presented for further discussion by all participants.

A nominal group approach has been selected in preference to a Delphi study as it gathers all experts at the same time and location, allowing for generation of a larger number of ideas (van Teijlingen et al. 2006, Humphrey-Murto et al. 2017).

7.5.2. Study 2: Exploring pharmacist and 'designated medical practitioner' perceptions of the prescribing education and training programme

Research aim

To examine pharmacists and their linked 'designated medical practitioners' (exact term to be decided) perceptions of the prescribing education and training programme, and the degree to which it prepared pharmacists for their prescribing role.

Research philosophy

This study will adopt a pragmatic approach, the focus of which is exploratory allowing examination of a phenomena in multiple contexts, conditions, or perspectives thus researchers often use mixed methods (Creswell 2007, Onwuegbuzie and Frels 2016). A pragmatic stance is most appropriate, allowing researchers to use all approaches available to understand phenomena by drawing from quantitative and qualitative assumptions (Creswell 2018).

Methodology and methods

An explanatory sequential mixed methodology will be employed by first conducting a survey-based study to determine pharmacists' perspectives. The online questionnaire will be developed from the literature, reviewed for face and content validity, and piloted prior to use. Respondents will be given the

option of participating in focus group discussions, selected purposively to represent strata of age, years of experience as a pharmacist, and clinical setting. These pharmacists will also be requested to pass invitations to their 'designated medical practitioners' to attend the focus groups. The focus group topic guide will be developed from the questionnaire responses, with emphasis on suitability of education and training for prescribing practice and any improvements which could be made.

Following these two initial studies, later studies will focus on the impact of pharmacist prescribing on objective measures of economic, clinical, and humanistic outcomes. Depending on how pharmacist prescribing is implemented, this could be a randomised controlled trial, uncontrolled before and after study, or cohort study.

7.6. Impact of the research

UK Research and Innovation (2018) defines impact as "the demonstrable contribution that excellent research makes to society and the economy". Impact can occur in variety of ways such as creating and sharing knowledge, inventing products/companies/jobs, developing or improving existing services and policies, enhancing health and quality of life etc.

There are two main types of research impact; academic as well as economic and societal. The first relates to the scientific advances in areas such as understanding, method, theory, and application while the latter refers to the contribution to society, economy, individuals, organisations, and nations.

UK Research and Innovation also outlines potential pathways to impact summarised in Figure 7.2.

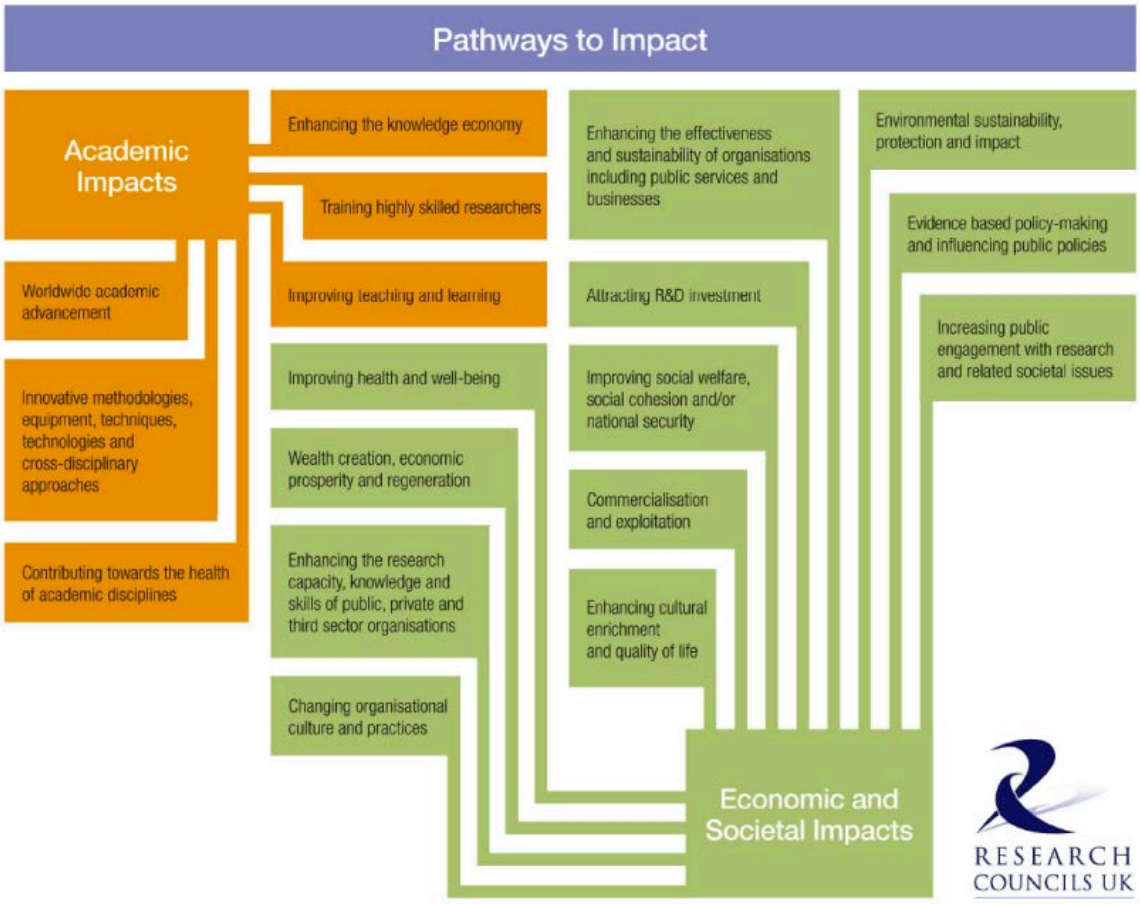


Figure 7.2: Pathways to impact (UK Research and Innovation 2018)

The impact of the current doctoral project can be mapped to these different pathways as shown in Figure 7.3.

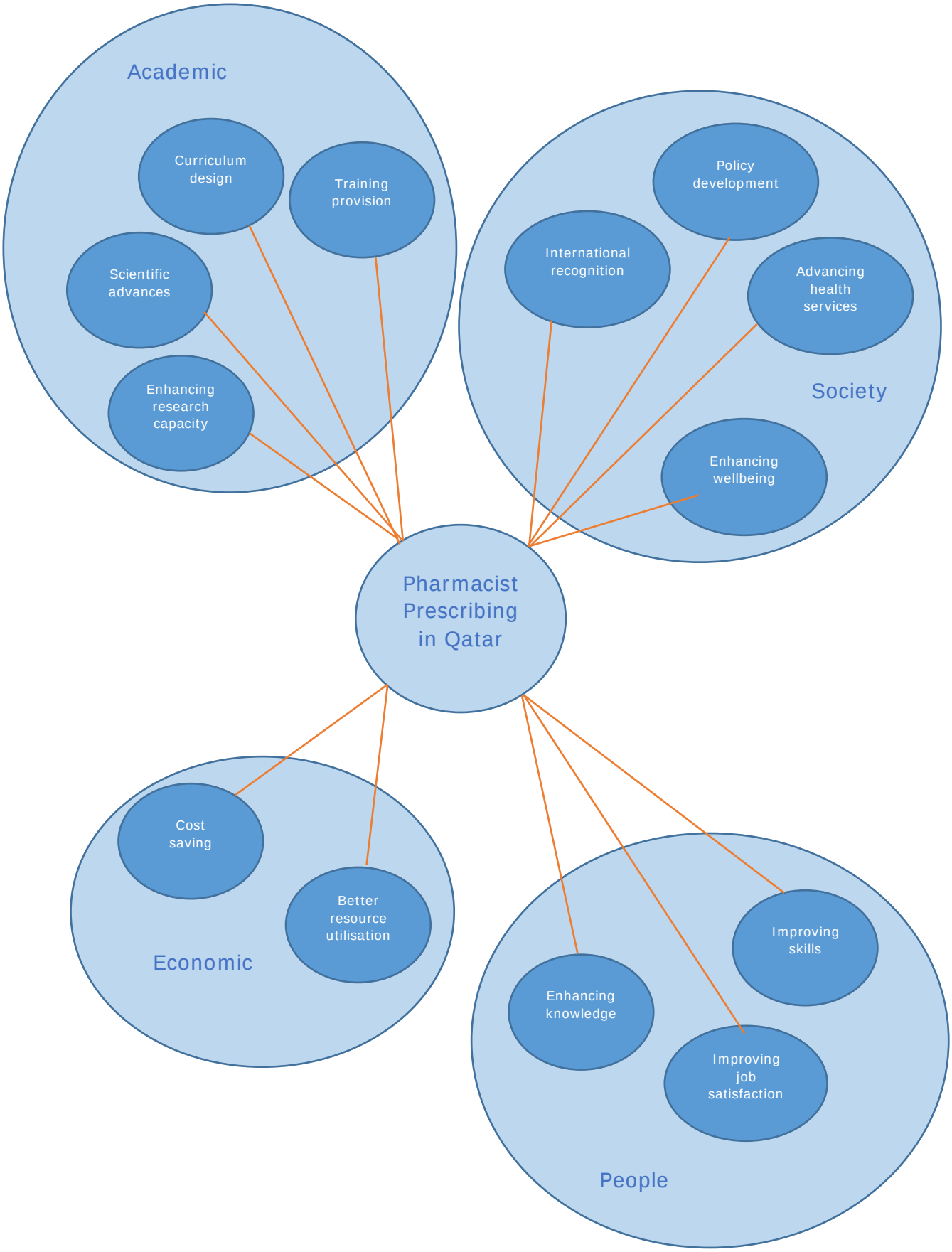


Figure 7.3: Doctoral research impact mapped to UK Research and Innovation pathways

The doctoral research has impacted:

- The doctoral student by developing her knowledge and skills in conducting research, using theory, and building collaboration and networking
- Research team by introducing them to a new theoretical framework (CFIR)
- Participants by giving them the opportunity to be part of potential policy changes and practice development
- The likelihood of development and implementation in Qatar could also have an impact on:
    - patients by increasing their access to healthcare services and improving their health outcomes
    - healthcare structure and delivery by redirecting care and reducing workload from physicians
    - pharmacists by providing an opportunity for professional development and possibly enhancing job satisfaction
    - academic and especially those that will be responsible for the prescribing education and training programme
    - Qatar as it will be the first country in the ‘Arab World’ to implement such innovation

7.7. Conclusion

Prior to conducting this doctoral research, there was a wealth of literature on the development, implementation and impact of pharmacist prescribing on a number of key outcomes. There had, however, been no published research at all relating to the 'Arab World'. Given the various health-strategies and aspirations in Qatar, together with the level of clinical pharmacy in Hamad Medical Corporation, exploration of developing frameworks to enable the implementation of pharmacist prescribing was warranted.

This research has provided original, robust and rigorous findings which can support implementation. Through a staged programme of research, evidence has been provided on the existing evidence on non-medical prescribing practice, derived from an umbrella review of systematic reviews. This was augmented by a systematic review of a large number of studies researching stakeholders' views and experiences. While findings were generally positive pre- and post-implementation, there was a lack of studies grounded in theories of implementation and qualitative studies in particular. These findings were incorporated into the next study of qualitative interviews with a range of key individuals, including those in strategic positions of power. CFIR was employed to ensure comprehensive coverage of different aspects related to implementation. Again, findings were positive and incorporated into the final Delphi stage, which achieved consensus on aspects of a framework supporting implementation of pharmacist prescribing.

On completion of the study, a framework has been proposed which will be disseminated widely within Qatar and beyond. Further research-based developmental work is required to translate this framework into an approved education and training course and practice.

References

ABDEL-LATIF, M. M. and SABRA, K., 2016. Clinical pharmacy practice in Egyptian hospitals. *American Journal of Health System Pharmacy*, 73, pp. e63-66.

ABDUL-HAMID, O. et al., 2015. *OPEC annual statistical bulletin*. [online]. Vienna: OPEC. Available from: http://www.opec.org/opec_web/en/about_us/168.htm [Accessed 25 March 2016].

ABUZOUR, A., LEWIS, P. and TULLY, M., 2017. Practice makes perfect: A systematic review of the expertise development of pharmacist and nurse independent prescribers in the United Kingdom. *Research in Social and Administrative Pharmacy*, 14(1), pp. 6-17.

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY, 2014. *Chapter 3: Getting involved in the research process*. [online]. Rockville: Agency for Healthcare Research and Quality. Available from: http://www.ahrq.gov/research/findings/evidence-based-reports/stakeholderguide/chapter3.html [Accessed 22/08/2016].

AL BAKR, A., 1970. [*Legislation No. 40 for the year 1970 concerning the regulation of pharmacy practice*]. [online]. Baghdad: Revolutionary Command Council. Available from: http://www.iraq-lg-law.org/en/node/1375 [Accessed 09/06/2016]. (In Arabic).

AL KHALIFA, S., 1997. [*Legislative Decree No. (18) for the year 1997 Concerning the regulation of the profession of pharmacy and pharmaceutical centers*]. [online]. Manama: Bahrain Council of Ministers. Available from: http://www.legalaffairs.gov.bh/LegislationSearch.aspx?search=%D9%85%D8%B1%D8%B3%D9%88%D9%85+%D8%A8%D9%82%D8%A7%D9%86%D9%88%D9%86+%D8%B1%D9%82%D9%85+%28+18+%29+%D9%84%D8%B3%D9%86%D8%A9+1997&serach_list=0&search [Accessed 09/09/2016]. (In Arabic).

AL NAHIAN, Z., 1983. [*Federal law No 4 of 1983 on the profession of pharmacy and pharmaceutical institutions*]. [online]. Dubai: United Arab of Emirates Ministry of Health and Prevention. Available from:

http://www.moh.gov.ae/FlipBooks/PublicHealthPolicies/PHP-LAW-AR-4/index.html#p=1 [Accessed 19/01/2017]. (In Arabic).

AL SAUD, S., 2006. *Law of practicing healthcare professions*. [online]. Umm Al-Qura: Kingdom of Saudi Arabia Council of Ministers. Available from: https://www.boe.gov.sa/ViewSystemDetails.aspx?lang=en&SystemID=164&VersionID=178 [Accessed 09/09/2016].

AL THANI, K., 1983. *Law No.(3) of 1983 with regard to regulating the pharmacology professions, mediators and agents of the drugs factories*. [online]. Doha: Qatar Legal Portal (Al-Meezan). Available from: http://almeezan.qa/LawPage.aspx?id=2601&language=en [Accessed 10/03/2018].

AL THANI, K., 1987. *Law No.(9) of 1987 on Control and Regulation of Control and Regulation of Narcotic Drugs and Dangerous Psychotropic Substances (NDDPS)*. [online]. Doha: Qatar Legal Portal (Al-Meezan). Available from: http://www.almeezan.qa/LawPage.aspx?id=3989&language=en [Accessed 16/09/2018].

AL-HARIRI, R., 1994. [*Law No. 367: Pharmacy practice*]. [online]. Beirut: Lebanese Parliament. Available from: http://www.opl.org.lb/site/ar/lois-red.php?&sliderId=3&sliderLinkId=16 [Accessed 09/09/2016]. (In Arabic).

AL-HARIRI, R., 2004. [*Law No. 2004/ 036 concerning drugs, medical devices, other health products and pharmacy practice in the Islamic Republic of Mauritania*]. [online]. Nouakchott: Mauritanian National Assembly and Senate. Available from: https://www.unodc.org/res/cld/document/loi-n-2004-036_html/Loi_N_2004-036_relatif_aux_medicaments_aux_dispositifs_medicaux_aux_autres_produits_de_sante_et_a_lexercice_de_la_pharmacie.pdf [Accessed 09/09/2016]. (In French).

AL-HUSSEIN, F., 2013. [*Law No. 12 of the year 2013: Drug and pharmacy law*]. [online]. Amman: Jordan Council of Ministers. Available from: http://jpa.org.jo/page/%D9%82%D9%88%D8%A7%D9%86%D9%8A%D9

%86-%D8%A7%D9%84%D9%86%D9%82%D8%A7%D8%A8%D8%A9 [Accessed 09/09/2016]. (In Arabic)

AMERICAN PSYCHOLOGICAL ASSOCIATION, 2016. *PsychArticles.* [online]. Washington: American Psychological Association. Available from: http://www.apa.org/pubs/databases/psycarticles/index.aspx [Accessed 23/08/2016].

AROMATARIS, E. et al., 2015. Summarizing systematic reviews: methodological development, conduct and reporting of an umbrella review approach. *International Journal of Evidence Based Healthcare*, 13, pp. 132-40.

AUTA, A. et al., 2014. Patients' views on their consultation experience in community pharmacies and the potential prescribing role for pharmacists in Nigeria. *Journal of Pharmaceutical Health Services Research*, 5, pp. 233-236.

AUTA, A. et al., 2015. Pharmacist prescribing in the United Kingdom and the implication for the Nigerian context. *West African Journal of Pharmacy*, 26(1), pp. 54-61.

AUTA, A. et al., 2018. Pharmacist prescribing: a cross-sectional survey of the views of pharmacists in Nigeria. *International Journal of Pharmacy Practice,* 26(2):111-119.

AUTA, A., STRICKLAND-HODGE, B. and MAZ, J., 2016. Stakeholders' views on granting prescribing authority to pharmacists in Nigeria: A qualitative study. *International Journal of Clinical Pharmacy*, 38(4), pp. 960-967.

AVELLA, J. R., 2016. Delphi panels: Research design, procedures, advantages, and challenges. *International Journal of Doctoral Studies*, 11, pp. 305-321.

BAJMAL, M., 2004. [*A guide to the laws and decisions related to the health sector*]. [online]. Sana'a: Yemen Council of Ministers. Available from: http://www.moh.gov.ye/arabic/docs/Laws.pdf [Accessed 19/01/2017]. (In Arabic).

BAJOREK, B. et al., 2015. The potential role for a pharmacist in a multidisciplinary general practitioner super clinic. *The Australasian Medical Journal,* 8(2), pp. 52-63.

BAQIR, W., 2010. Evaluating pharmacist prescribing across the north east of England. *British Journal of Clinical Pharmacy*, 2, pp. 147-149.

BERNARD, H. R., 2013. *Social research methods: Qualitative and quantitative approaches.* 2nd ed. California: Sage Publications.

BHANBHRO, S. et al., 2011. Assessing the contribution of prescribing in primary care by nurses and professionals allied to medicine: a systematic review of literature. *BMC Health Services Research,* 11, pp. 330-330.

BLENKINSOPP, A. et al., 2008. Opportunity or threat? General practitioner perceptions of pharmacist prescribing. *International Journal of Pharmacy Practice (England),* 16, pp. 29-34.

BOOTH, A., PAPAIOANNOU, D. and SUTTON, A., 2012. *Systematic approaches to a successful literature review*. 1st ed. London: Sage Publications.

BOURNE, R.S. et al., 2016. Pharmacist independent prescribing in critical care: results of a national questionnaire to establish the 2014 UK position. *International Journal of Pharmacy Practice,* 24(2), pp. 104-113.

BOURQUIBA, H., 1973. [*Laws and decisions*]. [online]. Tunis: The Republic of Tunisia Official Journal. Available from: http://www.legislation.tn/sites/default/files/journal-officiel/1973/1973A/Ja03073.pdf [Accessed 19/01/2017]. (In Arabic).

BOURQUIBA, H., 1975. [*Laws and decisions*]. [online]. Tunis: The Republic of Tunisia Official Journal. Available from: http://www.legislation.tn/sites/default/files/journal-officiel/1975/1975A/Ja07875.pdf [Accessed 19/01/2017]. (In Arabic).

BOWLING, A., 2009. *Research methods in health: investigating health and health services*. 3rd ed. London: McGraw Hill Publication.

BRITISH PHARMACOLOGICAL SOCIETY, 2010. *Ten principles of good prescribing*. [online]. London: British Pharmacological Society. Available from: https://www.bps.ac.uk/BPSMemberPortal/media/BPSWebsite/Assets/BPSPrescribingStatement03Feb2010.pdf [Accessed 15/11/2016].

Cambridge Dictionary, 2016. [online]. England: Cambridge University. Available from: http://dictionary.cambridge.org/dictionary/english/ [Accessed 20/07/2016].

CAMPBELL, S. and CANTRILL, J., 2001. Consensus methods in prescribing research. *Journal of Clinical Pharmacy and Therapeutics*, 26, pp. 5-14.

CANADIAN PHARMACISTS ASSOCIATION, 2016. *Pharmacists' expanded scope of practice.* [Online]. Ottawa: Canadian Pharmacists Association. Available from: https://www.pharmacists.ca/pharmacy-in-canada/scope-of-practice-canada/ [Accessed 19/02/2016].

CASTELLAN, C., 2010. Quantitative and qualitative research: A view for clarity. *International Journal of Education,* 2(2).

CENTERS FOR DISEASE CONTROL AND PREVENTION, 2013. *Collaborative practice agreements and pharmacists' patient care services: A resource for pharmacists*. [online]. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention. Available from: https://www.cdc.gov/dhdsp/pubs/docs/Translational_Tools_Pharmacists.pdf [Accessed 16/09/2018].

CENTRAL INTELLIGENCE AGENCY, 2016. *The World Factbook. Middle East: Qatar*. [online]. Washington: Central Intelligence Agency. Available from: https://www.cia.gov/library/publications/the-world-factbook/geos/qa.html [Accessed 20/03/2016].

CENTRE FOR REVIEWS AND DISSEMINATION, 2015. *About PROSPERO*. [online]. York: University of York. Available from: http://www.crd.york.ac.uk/prospero/about.asp [Accessed 02/06/2016].

CHILD, D. and CANTRILL, J.A., 1999. Hospital doctors' perceived barriers to pharmacist prescribing. *International Journal of Pharmacy Practice (England),* 7, pp. 230-237.

CHILD, D., 2001. Hospital nurses' perceptions of pharmacist prescribing. *British Journal of Nursing (Mark Allen Publishing),* 10(1), pp. 48-54.

CHILD, D., HIRSCH, C. and BERRY, M., 1998. Health care professionals' views on hospital pharmacist prescribing in the United Kingdom. *International Journal of Pharmacy Practice (England),* 6, pp. 159-169.

CLEARY, M. et al., 2017. Mental health nurse prescribing: A qualitative systematic review. *International Journal of Mental Health Nursing*, 26(6), pp. 541-553.

COCHRANE LIBRARY, 2016. *About the Cochrane library*. [online]. London: Cochrane Library. Available from: http://www.cochranelibrary.com/about/about-the-cochrane-library.html [Accessed 02/06/2016].

CONSOLIDATED FRAMEWORK FOR IMPLEMENTATION RESEARCH, 2016. *Welcome to the CFIR Technical Assistance Website*. [online]. Plymouth: CFIR Research Team. Available from: http://cfirguide.org/ [Accessed 07/09/2016].

COOPER, R. et al., 2008. Nurse and pharmacist supplementary prescribing in the UK: A thematic review of the literature. *Health Policy,* 85(3), pp. 277-292.

COPE, L., ABUZOUR, A. and TULLY, M., 2016. Nonmedical prescribing: where are we now? *Therapeutic Advances in Drug Safety*, 7(4), pp. 165-172.

CORBIN, J. and STRAUSS, A., 2008. *Basics of qualitative research*. 3rd ed. California: Sage Publications.

COULL, A. et al., 2013. The expansion of nurse prescribing in Scotland: An evaluation. *British Journal of Community Nursing*; 18(5), pp. 234-242.

COUNCIL OF MINISTERS, 1955. [*Legislation No. 127 for the year 1955 concerning the regulation of practicing the profession of pharmacy*]. [online].

Cairo: Egypt Council of Ministers. Available from: http://www.pharmadk.com/%D9%82%D9%88%D8%A7%D9%86%D9%8A%D9%86-%D8%AA%D8%AA%D8%B9%D9%84%D9%82-%D8%A8%D9%85%D8%B2%D8%A7%D9%88%D9%84%D8%A9-%D9%85%D9%87%D9%86%D8%A9-%D8%A7%D9%84%D8%B5%D9%8A%D8%AF%D9%84%D8%A9/ [Accessed 09/09/2016]. (In Arabic).

CRAIG, P. et al., 2008. *Developing and evaluating complex interventions: new guidance*. [online]. London: Medical Research Council. Available from: https://www.**mrc**.ac.uk/documents/pdf/complex-interventions-guidance/ [Accessed 18/07/2016].

CREEDON, R. et al., 2015. The impact of nurse prescribing on the clinical setting. *British Journal of Nursing*; 24(17), pp. 878-885.

CRESWELL, J. and CRESWELL, D., 2018. *Research design: Qualitative, quantitative and mixed methods approaches*. 5th ed. California: Sage Publications.

CRESWELL, J.W., 2007. *Qualitative inquiry and research design: Choosing among five approaches*. 2nd ed. California: Sage Publications.

CRESWELL, J.W., 2013. *Qualitative inquiry and research design: Choosing among five approaches*. 3rd ed. California: Sage Publications.

CRESWELL, J.W., 2014. *Research design: Quantitative, qualitative and mixed methods approaches*. 4th ed. London: Sage Publications.

CRITICAL APPRAISAL SKILLS PROGRAMME (CASP), 2013. *CASP systematic review checklist*. [online]. Oxford: Critical Appraisal Skills Programme. Available from: http://www.casp-uk.net/casp-tools-checklists [Accessed 10/01/2017].

CRONIN, P., RYAN, F. and COUGHIAN, M., 2008. Undertaking a literature review: a step-by-step approach. *British Journal of Nursing,* 17(1), pp. 38-43.

CROWN, J. et al., 1999. *Review of prescribing, supply and administration of medicines*. [online]. London: UK Department of Health. Available from: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4077151 [Accessed 16/11/2016].

CRYSTAL, J.A., 2015. *Qatar*. [online]. NK: Encylopædia Britannica. Available from: http://www.britannica.com/place/Qatar [Accessed 20 March 2016].

DAMSCHRODER, L. et al., 2009. Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. *Implementation Science*, 4, p.50.

DARVISHPOUR, A., JOOLAEE, S. and CHERAGHI, M.A., 2014. A meta-synthesis study of literature review and systematic review published in nurse prescribing. *Medical Journal of the Islamic Republic of Iran,* 28(1), pp. 471-482.

DAWOUD, D. et al., 2011. Pharmacist supplementary prescribing: A step toward more independence? *Research in Social and Administrative Pharmacy*, 7(3), pp. 246–256.

DELBECQ, A. L., VAN DE VEN, A. H. and GUSTAFSON, D. H., 1975. *Group techniques for program planning: A guide to nominal group and Delphi processes*. 1st ed. Glenview: Scott, Foresman, and Company.

DEPARTMENT OF HEALTH AND SOCIAL SECURITY, 1986. *Neighbourhood Nursing: A Focus for Care (Cumberlege Report)*. London: Her Majesty's Stationery Office.

DESLANDES, R.E., JOHN, D.N. and DESLANDES, P.N., 2015. An exploratory study of the patient experience of pharmacist supplementary prescribing in a secondary care mental health setting. *Pharmacy Practice,* 13(2), pp. 553-553.

DIRECTORATE GENERAL OF MEDICAL SUPPLY, 2009. [*Job description of the pharmaceutical staff in medical institutions affiliated with the ministry of health*]. [online]. Muscat: Oman Ministry of Health. Available from:

https://www.moh.gov.om/documents/71477/121151/JOB+DESCRIPTION+%28ARABIC+VERSION%29/d2e36281-a5db-4438-b603-1cec4f23b5b4 [Accessed 19/01/2017]. (In Arabic).

EBSCO HEALTH, 2016. *CINAHL database*. [online]. NK: EBSCO. Available from: https://health.ebsco.com/products/the-cinahl-database [Accessed 02/06/2016].

EL HAJJ, M. et al., 2011. Pharmacist characteristics, medication use perceptions, and professional satisfaction: A first national survey in the State of Qatar. *Journal of Healthcare Leadership*, 3, pp. 9–28.

ELSEVIER, 2016. *What is ScienceDirect*. [online]. NK: Elsevier. Available from: https://www.elsevier.com/solutions/sciencedirect [Accessed 02/06/2016].

ENG, H.J., MCCORMICK, W.C. and KIMBERLIN, C.L., 1990. First year's experience with the Florida pharmacist self-care consultant law: Pharmacist perspective. *Journal of Pharmaceutical Marketing and Management (USA),* 4, pp. 15-32.

ERHUN, W., OSIGBESAN, T. and AWOGBEMI, K., 2013. Study of pharmacists' and physicians' views on pharmacist prescribing in Nigeria. *West African Journal of Pharmacy,* 24(2), pp. 76-82.

ERWIN, J., BRITTEN, N. and JONES, R., 1996. General practitioners' views on over the counter sales by community pharmacists. *British Medical Journal (England),* 312, pp. 617-618.

FAMIYEH, I. and MCCARTHY, L., 2017. Pharmacist prescribing: A scoping review about the views and experiences of patients and the public. *Research in Social and Administrative Pharmacy*, 13(1), pp. 1-16.

FARUQUEE, C.F. and GUIRGUIS, L.M., 2015. A scoping review of research on the prescribing practice of Canadian pharmacists. *Canadian Pharmacists Journal,* 148(6), pp. 325-348.

FATOUH, R., 2004. [*Law of public health No. 40 for the year 2004*]. [online]. Gaza: Palestinian National Authority. Available from: http://www.moh.ps/index/ArticleView/ArticleId/75/Language/ar [Accessed 24/01/2017]. (In Arabic).

FEDERAL MINISTRY OF HEALTH, 2001. [*Regulation of pharmacy and poison*]. [online]. Khartoum: Sudan Federal Ministry of Health. Available from: http://www.fmoh.gov.sd/laws.php [Accessed 09/09/2016]. (In Arabic).

FEEHAN, M. et al., 2016. Qualitative interviews regarding pharmacist prescribing in the community setting. *American Journal of Health-System Pharmacy,* 73(18), pp. 1456-1461.

FRANCIS, J. et al., 2010. What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychology & Health,* 25(10), pp. 1229-1245.

GAUVIN, FP., LAVIS, JN. and MCCARTHY, L., 2015. *Evidence Brief: Exploring models for pharmacist prescribing in primary and community care settings in Ontario*. [online]. Hamilton: McMaster Health Forum. Available from: https://www.mcmasterhealthforum.org/docs/default-source/Product-Documents/evidence-briefs/models-for-pharmacist-prescribing-in-ontario-eb.pdf [Accessed 22/06/2016].

GENERAL PHARMACEUTICAL COUNCIL, 2016. *Pharmacist independent prescriber*. [online]. London: General Pharmaceutical Council. Available from: https://www.pharmacyregulation.org/education/pharmacist-independent-prescriber [Accessed 16/11/2016].

GENERAL PHARMACEUTICAL COUNCIL, 2018. *Standards for pharmacy education*. [online]. London: General Pharmaceutical Council. Available from: https://www.pharmacyregulation.org/education/education-standards [Accessed 27/04/2018].

GEORGE, J. et al., 2006a. Supplementary prescribing: Early experiences of pharmacists in Great Britain. *Annals of Pharmacotherapy,* 40(10), pp. 1843-1850.

GEORGE, J. et al., 2006b. Independent prescribing by pharmacists: A study of the awareness, views and attitudes of Scottish community pharmacists. *Pharmacy World and Science,* 28, pp. 45-53.

GEORGE, J. et al., 2007. Benefits and challenges of prescribing training and implementation: Perceptions and early experiences of RPSGB prescribers. *International Journal of Pharmacy Practice,* 15(1), pp. 23-30.

GERRISH, K. and LATHLEAN, J., eds., 2015. *The research process in nursing*. 1st ed. Chichester: John Wiley & Sons.

GIELEN, S.C. et al., 2014. The effects of nurse prescribing: A systematic review. *International Journal of Nursing Studies,* 51(7), pp. 1048-1061.

GLOVER, J. et al., 2006. *EBM Pyramid*. [online]. NK: Trustees of Dartmouth College and Yale University. Available from: http://www.ebmpyramid.org/images/pyramid.gif [Accessed 26/08/2018].

GOOGLE, 2016. *Google Scholar*. [online]. California: Google. Available from: https://scholar.google.co.uk/intl/en/scholar/about.html [Accessed 14/07/2016].

GOUNDREY-SMITH, S., 2016. *Electronic Health Records (EHR): Guidance for community pharmacists and pharmacy technicians*. [online]. London: Royal Pharmaceutical Society in England. Available from: https://www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Support/EHR-GuidanceUpdateMar2016.pdf [Accessed 05/02/2018].

GRANT, M. and BOOTH, A., 2009. A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal,* 26, pp. 91–108.

GREEN, J. and THOROGOOD, N., 2009. *Qualitative methods for health research*. 2nd ed. London: Sage Publications.

HALE, A. et al., 2016. Patient satisfaction from two studies of collaborative doctor - pharmacist prescribing in Australia. *Health Expectations,* 19(1), pp. 49-61.

HAMAD MEDICAL CORPORATION, 2018. *Our hospitals*. [online]. Doha: Hamad Medical Corporation. Available from: https://www.hamad.qa/EN/Pages/default.aspx#Hospital11 [Accessed 09/03/2018].

HAMMOND, R.W. et al., 2003. Collaborative drug therapy management by pharmacists. *Pharmacotherapy*, 23(9), pp. 1210-1225.

HANES, C. and BAJOREK, B., 2005. Pharmacist prescribing: Views of Australian hospital pharmacists. *Journal of Pharmacy Practice and Research (Australia),* 35, pp. 178-180.

HATAH, E. et al., 2013. General practitioners' views of pharmacists' current and potential contributions to medication review and prescribing in New Zealand. *Journal of Primary Health Care,* 5(3), pp. 223-233.

HEALTH & CARE PROFESSIONS COUNCIL, 2016. *Medicines and prescribing*. [online]. London: Health and Care Professions Council. Available from: http://www.hpc-uk.org/aboutregistration/medicinesandprescribing/ [Accessed 06/05/2016].

HILL, D.R. et al., 2014. Stakeholder views on pharmacist prescribing in addiction services in NHS Lanarkshire. *Journal of Substance Use,* 19(1), pp. 56-67.

HIRSCH, J.D. et al., 2014. Primary care–based, pharmacist–physician collaborative medication-therapy management of hypertension: A randomized, pragmatic trial. *Clinical Therapeutics*, 36(9), pp. 1244-54.

HOBSON, R.J. and SEWELL, G.J., 2006a. Supplementary prescribing by pharmacists in England. *American Journal of Health System Pharmacy*, 63, pp.244-253.

HOBSON, R.J. and SEWELL, G.J., 2006b. Risks and concerns about supplementary prescribing: Survey of primary and secondary care pharmacists. *Pharmacy World and Science,* 28, pp. 76-90.

HOBSON, R.J., SCOTT, J. and SUTTON, J., 2010. Pharmacists and nurses as independent prescribers: Exploring the patient's perspective. *Family Practice*, 27, pp. 110-120.

HOTI, K. et al., 2010. An evaluation of Australian pharmacist's attitudes on expanding their prescribing role. *Pharmacy World and Science,* 32(5), pp. 610-621.

HOTI, K., HUGHES, J. and SUNDERLAND, B., 2011. Pharmacy clients' attitudes to expanded pharmacist prescribing and the role of agency theory on involved stakeholders. *International Journal of Pharmacy Practice,* 19(1), pp. 5-12.

HOTI, K., HUGHES, J. and SUNDERLAND, B., 2013. Expanded prescribing: A comparison of the views of Australian hospital and community pharmacists. *International Journal of Clinical Pharmacy,* 35(3), pp. 469-475.

HOWITT, D., 2016. *Introduction to qualitative research method in psychology*. 3rd ed. Malaysia: Pearson Education Limited.

HSU, C. and SANDFORD, B. A., 2007. The Delphi technique: Making sense of consensus. *Practical Assessment, Research and Evaluation*. [online]. Available from: http://pareonline.net/pdf/v12n10.pdf [Accessed 06/02/2017].

HUKOOMI: QATAR E-GOVERNMENT, 2016. *Government and legislatives*. [online]. Doha: Hukoomi: Qatar e-Government. Available from: http://portal.www.gov.qa/wps/portal/about-qatar/Government-Legislatives [Accessed 20/03/2016].

HUMPHREY-MURTO, S. et al., 2017. Using consensus group methods such as Delphi and Nominal Group in medical education research. *Medical Teacher*; 39(1), pp. 14-19.

HUTCHISON, J. et al., 2012. Survey of Alberta hospital pharmacists' perspectives on additional prescribing authorization. *American Journal of Health System Pharmacy*, 69, pp. 1983-1992.

INDEX MUNDI, 2015. *Qatar Economy Profile*. [online]. NK: Index Mundi. Available from: http://www.indexmundi.com/qatar/economy_profile.html [Accessed 21/03/2016].

INFOQAT.COM, 2016. *Neighboring countries of Qatar*. [online]. Doha: Infoqat.com. Available from: http://www.infoqat.com/qatar/neighbours [Accessed 18/03/2016].

ISENOR, J. et al., 2018. Identification of the relationship between barriers and facilitators of pharmacist prescribing and self-reported prescribing activity using the theoretical domains framework. *Research in Social and Administrative Pharmacy*, 14(8), pp. 784-791.

JABBOUR, S., 2013. Public health in the Arab World: At a crossroads. *Journal of Public Health Policy*, 34(2), pp. 356–360.

JEBARA, T. et al., 2016. *Stakeholders' views and experiences of pharmacist prescribing: A systematic review protocol*. [online]. York: PROSPERO. Available from: http://www.crd.york.ac.uk/PROSPERO_REBRANDING/display_record.asp?ID=CRD42016048072 [Accessed 06/12/2016].

JEBARA, T. et al., 2018. Stakeholders' views and experiences of pharmacist prescribing: A systematic review. *British Journal of Clinical Pharmacology*, 84, pp. 1883–1905.

JENSEN, E.A. and LAURIE, C., 2016. *Doing real research: A practical guide to social research*. 1st ed. London: Sage Publications.

JONES, J. and HUNTER, D., 1995. Qualitative research: Consensus methods for medical and health services research. *British Medical Journal*. [online]. Available from: http://www.bmj.com/content/311/7001/376 [Accessed 03/02/2017].

KAY, O. and BRIEN, J.E., 2004. Pharmacist prescribing: Review of literature. *Journal of Pharmacy Practice and Research*, 34(4), pp. 1-5.

KAY, O., BAJOREK, B. and BRIEN, J., 2006. Pharmacist prescribing activities - An electronic survey on the opinions of Australian pharmacists. *Journal of Pharmacy Practice and Research (Australia),* 36, pp. 199-203.

KEENEY, S., HASSON, F. and MCKENNA, H., 2011. *The Delphi technique in nursing and health research*. 1st ed. Chichester: Wiley-Blackwell Publishing.

KHAN, M. et al., 2017. A cross-sectional survey on the attitudes and interests of rural population towards expanded pharmacist prescribing in India. *International Journal of Clinical Pharmacy,* 39, pp. 473-477.

KHEIR, N. and FAHEY, M., 2011. Pharmacy practice in Qatar: Challenges and opportunities. *Southern Med Review*, 4(2), pp. 92-96.

KIRK, M. et al., 2016. A systematic review of the use of the Consolidated Framework for Implementation Research. *Implementation Science*, 11(72).

KROEZEN, M. et al., 2011. Nurse prescribing of medicines in Western European and Anglo-Saxon countries: A systematic review of the literature. *BMC Health Services Research,* 11, p. 127.

LE, P-P., BRAUNACK-MAYER, A. and LAURENCE, C., 2017. Collaborative pharmacist prescribing within the opioid substitution treatment program in South Australia: Patient and pharmacist views. *Research in Social and Administrative Pharmacy,* 14(2), pp. 187-195.

LIM, A.G., NORTH, N. and SHAW, J., 2014. Nurse prescribing: The New Zealand context. *Nursing Praxis in New Zealand*; 30(2), pp. 18-27.

LLOYD, F. and HUGHES, C.M., 2007. Pharmacists' and mentors' views on the introduction of pharmacist supplementary prescribing: A qualitative evaluation of views and context. *International Journal of Pharmacy Practice,* 15, pp. 31-37.

LLOYD, F., PARSONS, C. and HUGHES, C.M., 2010. 'It's showed me the skills that he has': Pharmacists' and mentors' views on pharmacist supplementary prescribing. *International Journal of Pharmacy Practice,* 18(1), pp. 29-36.

LYONS, E. and COYLE, A., eds., 2015. *Analysing qualitative data in psychology*. 2nd ed. London: Sage Publications.

MACLURE, K. et al., 2013. Views of the Scottish general public on non-medical prescribing. *International Journal of Clinical Pharmacy,* 35(5), pp. 704-710.

MAKOWSKY, M.J. et al., 2013. Factors influencing pharmacists' adoption of prescribing: Qualitative application of the diffusion of innovations theory. *Implementation Science,* 8(1), p. 109.

MANN, S., 2016. *The research interview: Reflective practice and reflexivity in research process*. 1st ed. New York: Palgrave Macmillan.

MANSELL, K. et al., 2015. Evaluating pharmacist prescribing for minor ailments. *International Journal of Pharmacy Practice,* 23(2), pp. 95-101.

MCBRIEN, B., 2015. Personal and professional challenges of nurse prescribing in Ireland. *British Journal of Nursing*; 24(10), pp. 524-528.

MCCANN, L. et al., 2011. Pharmacist prescribing in Northern Ireland: A quantitative assessment. *International Journal of Clinical Pharmacy,* 33(5), pp. 824-831.

MCCANN, L. et al., 2012a. A patient perspective of pharmacist prescribing: 'Crossing the specialisms-crossing the illnesses'. *Health Expectations,* 18(1), pp. 58-68.

MCCANN, L. et al., 2012b. "They come with multiple morbidities": A qualitative assessment of pharmacist prescribing. *Journal of Interprofessional Care,* 26(2), pp. 127-133.

MCINTOSH, T. and STEWART, D., 2016. A qualitative study of UK pharmacy pre-registration graduates' views and reflections on pharmacist prescribing. *International Journal of Pharmacy Practice,* 24(2), pp. 139-141.

MCINTOSH, T. et al., 2012. A cross sectional survey of the views of newly registered pharmacists in Great Britain on their potential prescribing role: A

cautious approach. *British Journal of ClinicalPpharmacology,* 73(4), pp. 656-660.

MCINTOSH, T. et al., 2016. Influences on prescribing decision-making among non-medical prescribers in the United Kingdom: Systematic review. *Family Practice*, 33(6), pp. 572-579.

MCMILLAN, S., KING, M. and TULLY, M., 2016. How to use the nominal group and Delphi techniques. *International Journal of Clinical Pharmacy*; 38, pp. 655–662.

MEDICAL RESEARCH COUNCIL, 2016. *About us*. [online]. London: Medical Research Council. Available from: http://www.mrc.ac.uk/about/ [Accessed 20/07/2016].

MILLS, J. and BIRKS, M., eds., 2014. *Qualitative methodology: A practical guide*. 1st ed. England: Sage Publications.

MINISTRY OF PUBLIC HEALTH, 2016. *National OTC Medicines List*. [online]. Beirut: Lebanese Ministry of Public Health. Available from: http://www.moph.gov.lb/en/DynamicPages/view/3531/national-otc-medicines-list-draft-01 [Accessed 09/09/2016].

MOHER, D. et al., 2009. *Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement*. [online]. NK: PRISMA. Available from: http://www.prisma-statement.org/ [Accessed 10/01/2017].

MOHER, D. et al., 2015. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement. *Systematic Review*, 4(1).

MOORE, T., KENNEDY, J. and MCCARTHY, S., 2014. Exploring the general practitioner-pharmacist relationship in the community setting in Ireland. *International Journal of Pharmacy Practice,* 22(5), pp. 327-334.

NAIR, R., AGGARWAL, R. and KHANNA, D., 2011. Methods of formal consensus in classification/diagnostic criteria and guideline development. *Seminars in Arthritis and Rheumatism,* 41(2), pp. 95-105.

NATIONAL ASSOCIATION OF PHARMACY REGULATORY AUTHORITIES, 2009. *Model standards of practice for Canadian pharmacists*. [online]. Ottawa: National Association of Pharmacy Regulatory Authorities. Available from: https://napra.ca/sites/default/files/2017-09/Model_Standards_of_Prac_for_Cdn_Pharm_March09_layout2017_Final.pdf [Accessed 16/09/2018].

NESS, V. et al., 2016. Influences on independent nurse prescribers' antimicrobial prescribing behaviour: A systematic review. *Journal of Clinical Nursing,* 25, pp. 1206-1217.

NEW ZEALAND GOVERNMENT, 2013. *Medicines (Designated Pharmacist Prescribers) Regulations*. [online]. Wellington: New Zealand Government-Parliamentary Counsel Office. Available from: http://legislation.govt.nz/regulation/public/2013/0237/4.0/whole.html#TMPN138B5 [Accessed 18/09/2018].

NEW ZEALAND MINISTRY OF HEALTH, 2014. *Regulatory Impact Statement: Overview of required information*. [online]. Wellington: New Zealand Ministry of Health. Available from: http://www.health.govt.nz/about-ministry/legislation-and-regulation/regulatory-impact-statements/medicines-designated-prescriber-pharmacists-regulations [Accessed 22/06/2016].

NEW ZEALAND MINISTRY OF HEALTH, 2017. *Pharmacist prescriber*. [online]. Wellington: New Zealand Ministry of Health. Available from: http://www.health.govt.nz/our-work/health-workforce/new-roles-and-initiatives/established-initiatives/pharmacist-prescriber [Accessed 20/09/2018].

NGUYEN, N. and BAJOREK, B., 2008. Pharmacist prescribing in warfarin therapy: Exploring clinical utility in the hospital setting. *Journal of Pharmacy Practice and Research (Australia),* 38, pp. 35-39.

NHS EDUCATION FOR SCOTLAND, 2012. *A Guidance for Good Prescribing Practice for Prescribing Pharmacists in NHSScotland*. [online]. Edinburgh: NHS Education for Scotland. Available from:

https://www.nes.scot.nhs.uk/media/1457463/nesd0061_goodprescribingpractice.pdf [Accessed 01/11/2018].

NILSEN, P., 2015. Making sense of implementation theories, models and frameworks. *Implementation Science*, 10, p.53.

NOBLET, T. et al., 2017. Barriers and facilitators of independent non-medical prescribing in clinical practice: A mixed-methods systematic review. *Journal of Physiotherapy*, 63, pp. 221-234.

NOBLET, T. et al., 2018. Clinical and cost-effectiveness of non-medical prescribing: A systematic review of randomised controlled trials. *PLoS One*, 13(3).

NOYES, J. et al., eds., 2011. *Supplementary guidance for inclusion of qualitative research in Cochrane systematic reviews of interventions*. [online]. NK: Cochrane Collaboration Qualitative Methods Group. Available from: http://cqrmg.cochrane.org/supplemental-handbook-guidance [Accessed 15/08/2016].

NURSING AND MIDWIFERY COUNCIL, 2018. *Standards for prescribers*. [online]. London: Nursing and Midwifery Council. Available from: https://www.nmc.org.uk/standards/standards-for-post-registration/standards-for-prescribers/ [Accessed 19/11/2018].

O'CONNELL, E. et al., 2009. An evaluation of nurse prescribing. Part 2: A literature review. *British Journal of Nursing*; 18(22), pp. 1398-1402.

O'LEARY, Z., 2014. *Doing your research project*. 2nd ed. London: Sage Publications.

ONWUEGBUZIE, A. and FRELS, R., 2016. *7 steps to a comprehensive literature review: A multimodal and cultural approach*. 1st ed. London: Sage Publications.

PAYNE, G. and PAYNE, J., 2004. *Key concepts in social research*. 1st ed. London: Sage Publications.

PENNOCK, A.S. et al., 1988. Consumer acceptance of pharmacist prescribing. *Journal of Pharmaceutical Marketing and Management (USA),* 3, pp. 19-40.

PEREPELKIN, J., 2011. Public opinion of pharmacists and pharmacist prescribing. *Canadian Pharmacists Journal,* 144, pp. 86-93.

PHARMACEUTICAL SOCIETY OF NORTHERN IRELAND, 2013. *Standards and Guidance for Pharmacist Prescribers*. [online]. Belfast: Pharmaceutical Society of Northern Ireland. Available from: http://www.psni.org.uk/wp-content/uploads/2012/09/Standards-and-Guidance-for-Pharmacist-Prescribing-April-2013.pdf [Accessed 16/09/2018].

PHARMACY COUNCIL OF NEW ZEALAND, 2010. *Pharmacist prescribers*. [Online]. Wellington: Pharmacy Council of New Zealand. Available from: http://www.pharmacycouncil.org.nz/prescriber [Accessed 19/02/2016].

PHARMACY COUNCIL OF NEW ZEALAND, 2013. *Safe effective pharmacy practice: Standards and guidance for pharmacist prescribers*. [online]. Wellington: Pharmacy Council of New Zealand. Available from: http://www.pharmacycouncil.org.nz/Portals/12/Documents/prescribers/Pharmacist_Prescriber_Standards_July2013.pdf?ver=2017-02-20-130511-963 [Accessed 16/09/2018].

PLUYE, P. and HONG, Q.N., 2014. Combining the power of stories and the power of numbers: Mixed methods research and mixed studies reviews. *Annual Review of Public Health,* 35, pp. 29–45.

PLUYE, P. et al., 2011. *Proposal: A mixed methods appraisal tool for systematic mixed studies reviews*. [online]. Montreal: McGill University. Available from: http://mixedmethodsappraisaltoolpublic.pbworks.com/w/file/fetch/84371689/MMAT%202011%20criteria%20and%20tutorial%202011-06-29updated2014.08.21.pdf [Accessed 10/01/2017].

POJSKIC, N. et al., 2014. Initial perceptions of key stakeholders in Ontario regarding independent prescriptive authority for pharmacists. *Research in Social and Administrative Pharmacy,* 10(2), pp. 341-354.

POLGAR, S. and THOMAS, S., 2013. *Introduction to research in the health sciences*. 6th ed. NK: Churchill Livingstone.

PRIMARY HEALTH CARE CORPORATION, 2017. *Primary health centres catchment area map*. [online]. Doha: Primary Health Care Corporation. Available from: https://www.phcc.qa/portal_new/map.html [Accessed 09/03/2018].

PRIMARY HEALTH CARE CORPORATION, 2018a. *Corporate Profile*. [online]. Doha: Primary Health Care Corporation. Available from: https://www.phcc.qa/portal_new/index/index.php?limit=profile [Accessed 29/10/2018].

PRIMARY HEALTH CARE CORPORATION, 2018b. *Health care services*. [online]. Doha: Primary Health Care Corporation. Available from: https://www.phcc.qa/portal_new/index/index.php?limit=services [Accessed 09/03/2018].

PROQUEST, 2016. *ProQuest Dialog ProSheets*. [online]. Michigan: ProQuest. Available from: http://www.proquest.com/customer-care/title-lists/ProQuest-Dialog-Prosheets.html [Accessed 01/06/2016].

QATAR CIVIL AVIATION AUTHORITY, 2013. *Political system*. [online]. Doha: Qatar Civil Aviation Authority. Available from: http://www.caa.gov.qa/en/political-system [Accessed 20 March 2016].

QATAR COUNCIL FOR HEALTHCARE PRACTITIONERS, 2016. *About us*. [online]. Doha: Qatar Council for Healthcare Practitioners. Available from: http://www.qchp.org.qa/en/Pages/AboutUs.aspx [Accessed 18/11/2016].

QATAR GENERAL SECRETARIAT FOR DEVELOPMENT PLANNING AND STATISTICS, 2008. *Qatar National Vision 2030*. [online]. Doha: Qatar General Secretariat for Development Planning and Statistics. Available from: http://www.gsdp.gov.qa/portal/page/portal/gsdp_en/qatar_national_vision [Accessed 10/01/2016].

QATAR MINISTRY OF DEVELOPMENT PLANNING AND STATISTICS, 2013. *Health Services Statistics*. [online]. Doha: Qatar Ministry of Development

Planning and Statistics. Available from: https://www.google.com/url?q=http://www.gsdp.gov.qa/portal/page/portal/GSDP_AR/knowledge_center_ar/publications/Tab8/6_Health%25202013.pdf&sa=U&ved=0ahUKEwiP0fTv4eXLAhWGORQKHYAPAkUQFggEMAA&client=internal-uds-cse&usg=AFQjCNFwwCWJODUbHviNf1TGGtchudZOrg [Accessed 29/03/2016].

QATAR MINISTRY OF DEVELOPMENT PLANNING AND STATISTICS, 2015. *Qatar in figures*. [online]. Doha: Ministry of Development Planning and Statistics. Available from: http://www.mdps.gov.qa/en/statistics1/pages/topicslisting.aspx?parent=General&child=QIF [Accessed 28/11/2016].

QATAR MINISTRY OF FOREIGN AFFAIRS, 2013. *Constitutional authorities*. [online]. Doha: Qatar Ministry of Foreign Affairs. Available from: http://www.mofa.gov.qa/en/Qatar/Pages/ConstitutionalAuthorities.aspx [Accessed 20/03/2016].

QATAR MINISTRY OF INTERIOR, 2015. *Information about Qatar*. [online]. Doha: Qatar Ministry of Interior. Available from: https://www.moi.gov.qa/unccpcjdoha/english/General_Information.html [Accessed 18/03/2016].

QATAR MINISTRY OF PUBLIC HEALTH, 2016. *Vision & Mission*. [online]. Doha: Qatar Ministry of Public Health. Available from: http://www.moph.qa/about/vision-n-mission [Accessed 22/03/2016].

QATAR MINISTRY OF PUBLIC HEALTH, 2018. *National Health Strategy 2018-2022*. [online]. Doha: Qatar Ministry of Public Health. Available from: https://www.moph.gov.qa/HSF/Pages/NHS-18-22.aspx [Accessed 10/06/2018].

QATAR NATIONAL RESEARCH FUND, 2014. *Qatar National Research Strategy (QNRS)*. [online]. Doha: Qatar National Research Fund. Available from: http://www.qnrf.org/en-us/About-Us/QNRS [Accessed 18/01/2016].

QATAR PETROLEUM, 2015. *Medical services*. [online]. Doha: Qatar Petroleum. Available from: http://www.qp.com.qa/en/AboutQP/Pages/CorporateProfileDetails.aspx?CID=12 [Accessed 28/03/2016].

QATAR STATISTICS AUTHORITY, 2009a. *General information about Qatar*. [online]. Doha: Qatar Statistics Authority. Available from: http://www.qsa.gov.qa/qatarcensus/generalinfo.aspx [Accessed 18/03/2016].

QATAR STATISTICS AUTHORITY, 2009b. *Population*. [online]. Doha: Qatar Statistics Authority. Available from: http://www.qsa.gov.qa/qatarcensus/Populations.aspx [Accessed 20/03/2016].

QATAR SUPREME COUNCIL OF HEALTH, 2013a. *National Health Strategy 2011-2016*. [online]. Doha: Qatar Supreme Council of Health. Available from: http://www.qu.edu.qa/pharmacy/components/upcoming_events_material/Qatar_National_Health_Strategy.pdf [Accessed 10/01/2016].

QATAR SUPREME COUNCIL OF HEALTH, 2013b. *Qatar Health Report*. [online]. Doha: Qatar Supreme Council of Health. Available from: http://www.nhsq.info/app/media/2941 [Accessed on 30/03/2016].

QATAR SUPREME COUNCIL OF HEALTH, 2014. *Qatar healthcare facilities master plan 2013- 2033*. [online]. Doha: Qatar Supreme Council of Health. Available from: www.nhsq.info/app/media/1509 [Accessed 28/03/2016].

RITCHIE, J. and SPENCER, L., 1994. Qualitative data analysis for applied policy research. In: Bryman, A. and Burgess, B., Eds. *Analyzing Qualitative Data*. 1st ed. London: Routledge. pp. 173-194.

ROSENTHAL, M.M. et al., 2015. Prescribing by pharmacists in Alberta and its relation to culture and personality traits. *Research in Social and Administrative Pharmacy*, 11(3), pp. 401–411.

ROYAL COLLEGE OF GENERAL PRACTITIONERS IN SCOTLAND and ROYAL PHARMACEUTICAL SOCIETY IN SCOTLAND, 2016. *Joint Policy Statement on*

General Practice Based Pharmacists. [online]. Edinburgh: Royal College of General Practitioners Scotland and Royal Pharmaceutical Society in Scotland. Available from: https://www.rpharms.com/Portals/0/RPS%20document%20library/Open%20access/Policy/rcgps-rps-joint-statement-on-general-practice-based-pharmacists---final-full-version-Scotland.pdf [Accessed 05/02/2018].

ROYAL PHARMACEUTICAL SOCIETY, 2016. *A competency framework for all prescribers*. [online]. London: Royal Pharmaceutical Society of Great Britain. Available from: https://www.rpharms.com/resources/frameworks/prescribers-competency-framework [Accessed 16/09/2018].

RYAN-WOOLLEY, B., MCHUGH, G. and LUKER, K., 2008. Exploring the views of nurse prescribing among Macmillan nurses. *British Journal of Community Nursing*; 13(4), pp. 171-177.

SAKS, M. and ALLSOP, J., 2013. *Researching health: Qualitative, quantitative and mixed methods*. 2nd ed. London: Sage Publications.

SAUNDERS, B. et al., 2018. Saturation in qualitative research: Exploring its conceptualization and operationalization. *Quality and Quantity,* 52, pp. 1893–1907.

SEGAL, R. and GRINES, L.L., 1988. Prescribing authority for pharmacists as viewed by organized pharmacy, organized medicine and the pharmaceutical industry. *Drug Intelligence and Clinical Pharmacy,* 22, pp. 241-246.

SIDRA MEDICINE, 2018. *About Sidra*. [online]. Doha: Sidra Medicine. Available from: http://www.sidra.org/about/ [Accessed 09/03/2018].

SMALLEY, L., 2006. Patients' experience of pharmacist-led supplementary prescribing in primary care. *Pharmaceutical Journal (England),* 276, pp. 567-569.

SONG, J. and CHUNG, K., 2010. Observational Studies: Cohort and case-control studies. *Plastic and Reconstructive Surgery,* 126(6), pp. 2234–2242.

SPENCER, J.A. and EDWARDS, C., 1992. Pharmacy beyond the dispensary: General practitioners' views. *British Medical Journal (Clinical research ed.),* 304(6843), pp. 1670-1672.

STEWART, D. and KLEIN, S., 2016. The use of theory in research. *International Journal of Clinical Pharmacy*, 8(3), pp. 615-619.

STEWART, D., MACLURE, K. and GEORGE, J., 2012. Educating non medical prescribers. *British Journal of Clinical Pharmacology*, (74), pp. 662-667.

STEWART, D.C. et al., 2008. Exploring patients' perspectives of pharmacist supplementary prescribing in Scotland. *Pharmacy World and Science,* 30(6), pp. 892-897.

STEWART, D.C. et al., 2009a. Cross sectional survey of the Scottish general public's awareness of, views on, and attitudes toward nonmedical prescribing. *Annals of Pharmacotherapy,* 43(6), pp. 1115-1121.

STEWART, D.C. et al., 2009b. Views of pharmacist prescribers, doctors and patients on pharmacist prescribing implementation. *International Journal of Pharmacy Practice,* 17(2), pp. 89-94.

STEWART, D.C. et al., 2011. Pharmacist prescribing in primary care: The views of patients across Great Britain who had experienced the service. *International Journal of Pharmacy Practice,* 19(5), pp. 328-332.

STEWART, D.C. et al., 2017. Future perspectives on nonmedical prescribing. *Therapeutic Advances in Drug Safety*, 8(6), pp. 183–197.

STUCKEY, H.L., 2013. Three types of interviews: Qualitative research methods in social health*. Journal of Social Health and Diabetes,* 1(2), pp. 56-59.

TABESH, M., MAGLIANO, D., KOYE, D. and SHAW, J., 2018. The effects of nurse prescribers on glycaemic control in type 2 diabetes: A systematic review and meta-analysis. *International Journal of Nursing Studies*, 78, pp. 37-43.

TASHAKKORI, A. and TEDDLIE, C., 1998. *Mixed methodology: Combining qualitative and quantitative approaches.* 1st ed. California: Sage Publications.

TINELLI, M. et al., 2013. Survey of patients' experiences and perceptions of care provided by nurse and pharmacist independent prescribers in primary care. *Health Expectations*, 18, pp. 1241-1255.

TONG, A., SAINSBURY, P. and CRAIG, J., 2007. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, 19(6), pp. 349-357.

TONNA, A. et al., 2007. Pharmacist prescribing in the UK – A literature review of current practice and research. *Journal of Clinical Pharmacy and Therapeutics*, 32(6), pp. 545-556.

TONNA, A. et al., 2014. Development of consensus guidance to facilitate service redesign around pharmacist prescribing in UK hospital practice. *International Journal of Clinical Pharmacy*, 36, pp.1069–1076.

TONNA, A.P. et al., 2010. Exploring pharmacists' perceptions of the feasibility and value of pharmacist prescribing of antimicrobials in secondary care in Scotland. *International Journal of Pharmacy Practice,* 18(5), pp. 312-319.

TULLY, M. et al., 2007. Pharmacists' changing views of their supplementary prescribing authority. *Pharmacy World and Science (Netherlands),* 29, pp. 628-634.

UK DEPARTMENT OF HEALTH, 2003. *Supplementary prescribing by nurses and pharmacists within the NHS in England. A guide for implementation*. [online]. London: UK Department of Health. Available from: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4009717 [Accessed 03/08/2016].

UK DEPARTMENT OF HEALTH, 2006. *Improving patient's access to medicines: A guide to implementing nurse and pharmacist independent prescribing within the NHS in England*. [online]. London: UK Department of Health.

Available from: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/PublicationsandStatistics/Publications/PublicationsPolicyandGuidance/DH_4133743 [Accessed 13/05/2016].

UK RESEARCH AND INNOVATION, 2018. *Excellence with impact*. [online]. Swindon: UK Research and Innovation. Available from: https://www.ukri.org/innovation/excellence-with-impact/ [Accessed 15/11/2018].

UNG, E. et al., 2016. Assessing pharmacists' readiness to prescribe oral antibiotics for limited infections using a case-vignette technique. *International Journal of Clinical Pharmacy,* 39(1), pp. 61-69.

VAN RUTH, L., MISTIAEN, P. and FRANCKE, A., 2007. Effects of nurse prescribing of medication: A systematic review. *Internet Journal of Healthcare Administration*, 5(2).

VAN TEIJLINGEN, E. et al., 2006. Delphi method and nominal group technique in family planning and reproductive health research. *Journal of Family Planning and Reproductive Health*; 32(4):249-252.

VERNON, W., 2009. A Delphi technique: A review. *International Journal of Therapy and Rehabilitatio*n, 16(2), pp. 69-76.

VON DER GRACHT, H. A., 2012. Consensus measurement in Delphi studies: Review and implications for future quality assurance. *Technological Forecasting and Social Change,* 79, pp. 1525-1536.

VRACAR, D. and BAJOREK, B., 2008. Australian general practitioners' views on pharmacist prescribing. *Journal of Pharmacy Practice and Research (Australia),* 38, pp. 96-02.

WATSON, R., 2015. Quantitative research. *Nursing Standard,* 29(31), pp. 44-48.

WEATHER ONLINE, 2016. *Qatar*. [online]. Leeds: Weather Online. Available from: http://www.weatheronline.co.uk/reports/climate/Qatar.htm [Accessed 20/03/2016].

WEEKS, G. and MARRIOTT, J., 2008. Collaborative prescribing: Views of SHPA pharmacist members. *Journal of Pharmacy Practice and Research*, 38, pp. 271-275.

WEEKS, G. et al., 2016. Non-medical prescribing versus medical prescribing for acute and chronic disease management in primary and secondary care. *Cochrane Database of Systematic Reviews*, 11, CD011227.

WEEKS, G., MARRIOTT, J. and GEORGE, J., 2010. Australian Hospital Pharmacists' Experiences of a UK Non-Medical Prescribing Course. *Journal of Pharmacy Practice and Research (Australia),* 40, pp. 187.

WEISS, M.C. and SUTTON, J., 2009. The changing nature of prescribing: Pharmacists as prescribers and challenges to medical dominance. *Sociology of Health and Illness,* 31(3), pp. 406-421.

WHEELER, A. et al., 2012. Collaborative prescribing: A qualitative exploration of a role for pharmacists in mental health. *Research in Social and Administrative Pharmacy*, 8(3), pp. 179-92.

WHITE-MEANS, S. and OKUNADE, A.A., 1992. Current status of prescribing pharmacists in Florida: Implications from the 1989 Florida Prescriber Pharmacists Practice Survey (FPPPS). *Journal of Pharmaceutical Marketing and Management (USA),* 7, pp. 3-6.

WIKIMEDIA COMMONS, 2016. *File: A map of the Arab World with flags*. [online]. NK: Wikimedia Commons. Available from: https://commons.wikimedia.org/wiki/File:A_map_of_the_Arab_World_with_flags.png [Accessed 22/06/2016].

WOLTERS KLUWER, 2016. *About the journal: JBI database of systematic reviews and implementation reports*. [online]. Adelaide: Wolters Kluwer. Available from: http://journals.lww.com/jbisrir/pages/aboutthejournal.aspx [Accessed 02/06/2016].

WORLD BANK, 2016. *Arab World*. [online]. Washington: World Bank. Available from: http://data.worldbank.org/region/ARB [Accessed 22/06/2016].

WORLD BANK, 2016. *Qatar*. [online]. Washington: World Bank. Available from: http://data.worldbank.org/country/qatar [Accessed 21/03/2016].

WORLD HEALTH ORGANIZATION, 2019. *Qatar*. [online]. Cairo: World Health Organization. Available from: http://www.who.int/countries/qat/en/ [Accessed 01/03/2019].

WORLD WEATHER AND CLIMATE INFORMATION, 2015. *Doha, Qatar*. [online]. NK: World Weather and Climate Information. Available from: https://weather-and-climate.com/average-monthly-Rainfall-Temperature-Sunshine,doha,Qatar [Accessed 20/03/2016].

YILMAZ, K., 2013. Comparison of Quantitative and Qualitative Research Traditions: Epistemological, theoretical, and methodological differences. *European Journal of Education,* 48(2).

ZAIDAN, M. et al., 2011. Physicians' perceptions, expectations, and experience with pharmacists at Hamad Medical Corporation in Qatar. *Journal of Multidisciplinary Healthcare*, (4), pp. 85–90.

Appendices

Appendix 3A: CASP Tool

(A) Are the results of the review valid?

Screening Questions

1. Did the review address a clearly focused question? ❒ Yes ❒ Can't tell ❒ No

HINT: An issue can be 'focused' In terms of

- The population studied
- The intervention given
- The outcome considered

---

2. Did the authors look for the right type of papers? ❒ Yes ❒ Can't tell ❒ No

HINT: 'The best sort of studies' would

- Address the reviews question
- Have an appropriate study design (usually RCTs for papers evaluating interventions)

Is it worth continuing?

Detailed questions

3. Do you think all the important, relevant studies were included? ❒ Yes ❒ Can't tell ❒ No

HINT: Look for

- Which bibliographic databases were used
- Follow up from reference lists
- Personal contact with experts
- Search for unpublished as well as published studies
- Search for non-English language studies

---

4. Did the review's authors do enough to assess the quality of the included studies? ❒ Yes ❒ Can't tell ❒ No

HINT: The authors need to consider the rigour of the studies they have identified. Lack of rigour may affect the studies' results. ("All that glisters is not gold" Merchant of Venice – Act II Scene 7)

---

5. If the results of the review have been combined, was it reasonable to do so? ❒ Yes ❒ Can't tell ❒ No

HINT: Consider whether

- The results were similar from study to study
- The results of all the included studies are clearly displayed
- The results of the different studies are similar
- The reasons for any variations in results are discussed

(B) What are the results?

6. What are the overall results of the review?

HINT: Consider

- If you are clear about the review's 'bottom line' results
- What these are (numerically if appropriate)
- How were the results expressed (NNT, odds ratio etc)

---

7. How precise are the results?

HINT: Look at the confidence intervals, if given

(C) Will the results help locally?

8. Can the results be applied to the local population? ❒ Yes ❒ Can't tell ❒ No

HINT: Consider whether

- The patients covered by the review could be sufficiently different to your population to cause concern
- Your local setting is likely to differ much from that of the review

---

9. Were all important outcomes considered? ❒ Yes ❒ Can't tell ❒ No

HINT: Consider whether

- Is there other information you would like to have seen

---

10. Are the benefits worth the harms and costs? ❒ Yes ❒ Can't tell ❒ No

HINT: Consider

- Even if this is not addressed by the review, what do you think?

Appendix 4A: Screenshot of systematic review protocol

PROSPERO
International prospective register of systematic reviews

NHS
National Institute for Health Research

Stakeholders' views and experiences of pharmacist prescribing: a systematic review protocol

Tesnime Jebara, Derek Stewart, Scott Cunnigham, Katie MacLure, Ahmed Awaisu, Pallivalapila Abdulrouf

Citation

Tesnime Jebara, Derek Stewart, Scott Cunnigham, Katie MacLure, Ahmed Awaisu, Pallivalapila Abdulrouf. Stakeholders' views and experiences of pharmacist prescribing: a systematic review protocol. PROSPERO 2016 CRD42016048072 Available from: http://www.crd.york.ac.uk/PROSPERO/display_record.php?ID=CRD42016048072

Review question

1. identify the views of stakeholders (e.g. patients, the general public, health professionals, policy makers, educators etc.) on pharmacist prescribing, irrespective of implementation status
2. report the different experiences of stakeholders in countries that have already implemented pharmacist prescribing
3. describe the potential barriers and facilitators of implementing pharmacist prescribing

Appendix 4B: PRISMA-P Checklist

Section / topic	#	Checklist item	Information reported		Page number(s)
			Yes	No	
ADMINISTRATIVE INFORMATION					
Title					
Identification	1a	Identify the report as a protocol of a systematic review	☒	☐	1
Update	1b	If the protocol is for an update of a previous systematic review, identify as such	☐	☐	N/A
Registration	2	If registered, provide the name of the registry (e.g., PROSPERO) and registration number in the Abstract	☒	☐	1
Authors					
Contact	3a	Provide name, institutional affiliation, and e-mail address of all protocol authors; provide physical mailing address of corresponding author	☒	☐	3-4
Contributions	3b	Describe contributions of protocol authors and identify the guarantor of the review	☐	☒	
Amendments	4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	☐	☐	N/A
Support					
Sources	5a	Indicate sources of financial or other support for the review	☒	☐	4
Sponsor	5b	Provide name for the review funder and/or sponsor	☒	☐	4
Role of sponsor/funder	5c	Describe roles of funder(s), sponsor(s), and/or institution(s), if any, in developing the protocol	☐	☒	

Section / topic	#	Checklist item	Information reported		Page number(s)
			Yes	No	
INTRODUCTION					
Rationale	6	Describe the rationale for the review in the context of what is already known	☒	☐	2
Objectives	7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	☒	☐	1
METHODS					
Eligibility criteria	8	Specify the study characteristics (e.g., PICO, study design, setting, time frame) and report characteristics (e.g., years considered, language, publication status) to be used as criteria for eligibility for the review	☒	☐	1-2
Information sources	9	Describe all intended information sources (e.g., electronic databases, contact with study authors, trial registers, or other grey literature sources) with planned dates of coverage	☒	☐	1
Search strategy	10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	☒	☐	1
STUDY RECORDS					
Data management	11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	☐	☒	
Selection process	11b	State the process that will be used for selecting studies (e.g., two independent reviewers) through each phase of the review (i.e., screening, eligibility, and inclusion in meta-analysis)	☒	☐	1
Data collection process	11c	Describe planned method of extracting data from reports (e.g., piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	☐	☒	

Section / topic	#	Checklist item	Information reported		Page number(s)
			Yes	No	
Data items	12	List and define all variables for which data will be sought (e.g., PICO items, funding sources), any pre-planned data assumptions and simplifications	☒	☐	3
Outcomes and prioritization	13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	☒	☐	2-3
Risk of bias in individual studies	14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	☒	☐	3
DATA					
Synthesis	15a	Describe criteria under which study data will be quantitatively synthesized	☒	☐	3
	15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data, and methods of combining data from studies, including any planned exploration of consistency (e.g., I^2, Kendall's tau)	☒	☐	3
	15c	Describe any proposed additional analyses (e.g., sensitivity or subgroup analyses, meta-regression)	☒	☐	3
	15d	If quantitative synthesis is not appropriate, describe the type of summary planned	☒	☐	3
Meta-bias(es)	16	Specify any planned assessment of meta-bias(es) (e.g., publication bias across studies, selective reporting within studies)	☐	☒	
Confidence in cumulative evidence	17	Describe how the strength of the body of evidence will be assessed (e.g., GRADE)	☐	☒	

Appendix 4C: MMAT

McGill

Mixed Methods Appraisal Tool (MMAT) – Version 2011
For dissemination, application, and feedback: Please contact pierre.pluye@mcgill.ca, Department of Family Medicine, McGill University, Canada.

The MMAT is comprised of two parts (see below): criteria (Part I) and tutorial (Part II). While the content validity and the reliability of the pilot version of the MMAT have been examined, this critical appraisal tool is still in development. Thus, the MMAT must be used with caution, and users' feedback is appreciated. Cite the present version as follows.

> Pluye, P., Robert, E., Cargo, M., Bartlett, G., O'Cathain, A., Griffiths, F., Boardman, F., Gagnon, M.P., & Rousseau, M.C. (2011). *Proposal: A mixed methods appraisal tool for systematic mixed studies reviews.* Retrieved on [date] from http://mixedmethodsappraisaltoolpublic.pbworks.com. Archived by WebCite® at http://www.webcitation.org/5tTRTc9yJ

Purpose: The MMAT has been designed for the appraisal stage of complex systematic literature reviews that include qualitative, quantitative and mixed methods studies (mixed studies reviews). The MMAT permits to concomitantly appraise and describe the methodological quality for three methodological domains: mixed, qualitative and quantitative (subdivided into three sub-domains: randomized controlled, non-randomized, and descriptive). Therefore, using the MMAT requires experience or training in these domains. E.g., MMAT users may be helped by a colleague with specific expertise when needed. The MMAT allows the appraisal of most common types of study methodology and design. For appraising a qualitative study, use section 1 of the MMAT. For a quantitative study, use section 2 or 3 or 4, for randomized controlled, non-randomized, and descriptive studies, respectively. For a mixed methods study, use section 1 for appraising the qualitative component, the appropriate section for the quantitative component (2 or 3 or 4), and section 5 for the mixed methods component. For each relevant study selected for a systematic mixed studies review, the methodological quality can then be described using the corresponding criteria. This may lead to exclude studies with lowest quality from the synthesis, or to consider the quality of studies for contrasting their results (e.g., low quality vs. high).

Scoring metrics: For each retained study, an overall quality score may be not informative (in comparison to a descriptive summary using MMAT criteria), but might be calculated using the MMAT. Since there are only a few criteria for each domain, the score can be presented using descriptors such as *, **, ***, and ****. For qualitative and quantitative studies, this score can be the number of criteria met divided by four (scores varying from 25% (*) -one criterion met- to 100% (****) -all criteria met-). For mixed methods research studies, the premise is that the overall quality of a combination cannot exceed the quality of its weakest component. Thus, the overall quality score is the lowest score of the study components. The score is 25% (*) when *QUAL=1 or QUAN=1 or MM=0*; it is 50% (**) when *QUAL=2 or QUAN=2 or MM=1*; it is 75% (***) when *QUAL=3 or QUAN=3 or MM=2*; and it is 100% (****) when *QUAL=4 and QUAN=4 and MM=3* (QUAL being the score of the qualitative component; QUAN the score of the quantitative component; and MM the score of the mixed methods component).

Rationale: There are general criteria for planning, designing and reporting mixed methods research (Creswell and Plano Clark, 2010), but there is no consensus on key specific criteria for appraising the methodological quality of mixed methods studies (O'Cathain, Murphy and Nicholl, 2008). Based on a critical examination of 17 health-related systematic mixed studies reviews, an initial 15-criteria version of MMAT was proposed (Pluye, Gagnon, Griffiths and Johnson-Lafleur, 2009). This was pilot tested in 2009. Two raters assessed 29 studies using the pilot MMAT criteria and tutorial (Pace, Pluye, Bartlett, Macaulay et al., 2010). Based on this pilot exercise, it is anticipated that applying MMAT may take on average 15 minutes per study (hence efficient), and that the Intra-Class Correlation might be around 0.8 (hence reliable). The present 2011 revision is based on feedback from four workshops, and a comprehensive framework for assessing the quality of mixed methods research (O'Cathain, 2010).

Conclusion: The MMAT has been designed to appraise the *methodological quality* of the studies retained for a systematic mixed studies review, not the quality of their *reporting* (writing). This distinction is important, as good research may not be 'well' reported. If reviewers want to genuinely assess the former, companion papers and research reports should be collected when some criteria are not met, and authors of the corresponding publications should be contacted for additional information. Collecting additional data is usually necessary to appraise *qualitative research and mixed methods studies*, as there are no uniform standards for reporting study characteristics in these domains (www.equator-network.org), in contrast, e.g., to the CONSORT statement for reporting randomized controlled trials (www.consort-statement.org).

Authors and contributors: Pierre Pluye[1], Marie-Pierre Gagnon[2], Frances Griffiths[3] and Janique Johnson-Lafleur[1] proposed an initial version of MMAT criteria (Pluye et al., 2009). Romina Pace[1] and Pierre Pluye[1] led the pilot test. Gillian Bartlett[1], Belinda Nicolau[4], Robbyn Seller[1], Justin Jagosh[1], Jon Salsberg[1] and Ann Macaulay[1] contributed to the pilot work (Pace et al., 2010). Pierre Pluye[1], Émilie Robert[5], Margaret Cargo[6], Alicia O'Cathain[7], Frances Griffiths[3], Felicity Boardman[3], Marie-Pierre Gagnon[2], Gillian Bartlett[1], and Marie-Claude Rousseau[8] contributed to the present 2011 version.

Affiliations: 1. Department of Family Medicine, McGill University, Canada; 2. Faculté des sciences infirmières, Université Laval, Canada; 3. Warwick Medical School, University of Warwick, UK; 4. Faculty of Dentistry, McGill University, Canada; 5. Centre de recherche du CHUM, Université de Montréal, Canada; 6. School of Health Sciences, University of South Australia, Australia; 7. Medical Care Research Unit, ScHARR, University of Sheffield, UK; 8. INRS-Institut Armand Frappier, Laval, Canada.

PART I. MMAT criteria & one-page template (to be included in appraisal forms)

Types of mixed methods study components or primary studies	Methodological quality criteria (see tutorial for definitions and examples)	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	• Are there clear qualitative and quantitative research questions (or objectives*), or a clear mixed methods question (or objective*)?				
	• Do the collected data allow address the research question (objective)? E.g., consider whether the follow-up period is long enough for the outcome to occur (for longitudinal studies or study components).				
	Further appraisal may be not feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.				
1. Qualitative	1.1. Are the sources of qualitative data (archives, documents, informants, observations) relevant to address the research question (objective)?				
	1.2. Is the process for analyzing qualitative data relevant to address the research question (objective)?				
	1.3. Is appropriate consideration given to how findings relate to the context, e.g., the setting, in which the data were collected?				
	1.4. Is appropriate consideration given to how findings relate to researchers' influence, e.g., through their interactions with participants?				
2. Quantitative randomized controlled (trials)	2.1. Is there a clear description of the randomization (or an appropriate sequence generation)?				
	2.2. Is there a clear description of the allocation concealment (or blinding when applicable)?				
	2.3. Are there complete outcome data (80% or above)?				
	2.4. Is there low withdrawal/drop-out (below 20%)?				
3. Quantitative non-randomized	3.1. Are participants (organizations) recruited in a way that minimizes selection bias?				
	3.2. Are measurements appropriate (clear origin, or validity known, or standard instrument; and absence of contamination between groups when appropriate) regarding the exposure/intervention and outcomes?				
	3.3. In the groups being compared (exposed vs. non-exposed; with intervention vs. without; cases vs. controls), are the participants comparable, or do researchers take into account (control for) the difference between these groups?				
	3.4. Are there complete outcome data (80% or above), and, when applicable, an acceptable response rate (60% or above), or an acceptable follow-up rate for cohort studies (depending on the duration of follow-up)?				
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the quantitative research question (quantitative aspect of the mixed methods question)?				
	4.2. Is the sample representative of the population understudy?				
	4.3. Are measurements appropriate (clear origin, or validity known, or standard instrument)?				
	4.4. Is there an acceptable response rate (60% or above)?				
5. Mixed methods	5.1. Is the mixed methods research design relevant to address the qualitative and quantitative research questions (or objectives), or the qualitative and quantitative aspects of the mixed methods question (or objective)?				
	5.2. Is the integration of qualitative and quantitative data (or results*) relevant to address the research question (objective)?				
	5.3. Is appropriate consideration given to the limitations associated with this integration, e.g., the divergence of qualitative and quantitative data (or results*) in a triangulation design?				
	Criteria for the qualitative component (1.1 to 1.4), and appropriate criteria for the quantitative component (2.1 to 2.4, or 3.1 to 3.4, or 4.1 to 4.4), must be also applied.				

*These two items are not considered as double-barreled items since in mixed methods research, (1) there may be research questions (quantitative research) or research objectives (qualitative research), and (2) data may be integrated, and/or qualitative findings and quantitative results can be integrated.

PART II. MMAT tutorial

Types of mixed methods study components or primary studies	Methodological quality criteria
1. Qualitative Common types of qualitative research methodology include: A. Ethnography The aim of the study is to describe and interpret the shared cultural behaviour of a group of individuals. B. Phenomenology The study focuses on the subjective experiences and interpretations of a phenomenon encountered by individuals. C. Narrative The study analyzes life experiences of an individual or a group. D. Grounded theory Generation of theory from data in the process of conducting research (data collection occurs first). E. Case study In-depth exploration and/or explanation of issues intrinsic to a particular case. A case can be anything from a decision-making process, to a person, an organization, or a country. F. Qualitative description There is no specific methodology, but a qualitative data collection and analysis, e.g., in-depth interviews or focus groups, and hybrid thematic analysis (inductive and deductive). Key references: Creswell, 1998; Schwandt, 2001; Sandelowski, 2010.	**1.1. Are the sources of qualitative data (archives, documents, informants, observations) relevant to address the research question (objective)?** E.g., consider whether (a) the selection of the participants is clear, and appropriate to collect relevant and rich data; and (b) reasons why certain potential participants chose not to participate are explained.
	1.2. Is the process for analyzing qualitative data relevant to address the research question (objective)? E.g., consider whether (a) the method of data collection is clear (in depth interviews and/or group interviews, and/or observations and/or documentary sources); (b) the form of the data is clear (tape recording, video material, and/or field notes for instance); (c) changes are explained when methods are altered during the study; and (d) the qualitative data analysis addresses the question.
	1.3. Is appropriate consideration given to how findings relate to the context, e.g., the setting, in which the data were collected?* E.g., consider whether the study context and how findings relate to the context or characteristics of the context are explained (how findings are influenced by or influence the context). "For example, a researcher wishing to observe care in an acute hospital around the clock may not be able to study more than one hospital. (…) Here, it is essential to take care to describe the context and particulars of the case [the hospital] and to flag up for the reader the similarities and differences between the case and other settings of the same type" (Mays & Pope, 1995). The notion of context may be conceived in different ways depending on the approach (methodology) tradition.
	1.4. Is appropriate consideration given to how findings relate to researchers' influence, e.g., through their interactions with participants?* E.g., consider whether (a) researchers critically explain how findings relate to their perspective, role, and interactions with participants (how the research process is influenced by or influences the researcher); (b) researcher's role is influential at all stages (formulation of a research question, data collection, data analysis and interpretation of findings); and (c) researchers explain their reaction to critical events that occurred during the study. The notion of reflexivity may be conceived in different ways depending on the approach (methodology) tradition. E.g., "at a minimum, researchers employing a generic approach [qualitative description] must explicitly identify their disciplinary affiliation, what brought them to the question, and the assumptions they make about the topic of interest" (Caelli, Ray & Mill, 2003, p. 5).

*See suggestion on the MMAT wiki homepage (under '2011 version'): Independent reviewers can establish a common understanding of these two items prior to beginning the critical appraisal.

Types of mixed methods study components or primary studies	Methodological quality criteria
2. Quantitative randomized controlled (trials) Randomized controlled clinical trial: A clinical study in which individual participants are allocated to intervention or control groups by randomization (intervention assigned by researchers). Key references: Higgins & Green, 2008; Porta, 2008; Oxford Center for Evidence based medicine, 2009.	**2.1. Is there a clear description of the randomization (or an appropriate sequence generation)?** In a randomized controlled trial, the allocation of a participant (or a data collection unit, e.g., a school) into the intervention or control group is based solely on chance, and researchers describe how the randomization schedule is generated. "A simple statement such as 'we randomly allocated' or 'using a randomized design' is insufficient". *Simple randomization:* Allocation of participants to groups by chance by following a predetermined plan/sequence. "Usually it is achieved by referring to a published list of random numbers, or to a list of random assignments generated by a computer". *Sequence generation:* "The rule for allocating interventions to participants must be specified, based on some chance (random) process". Researchers provide sufficient detail to allow a readers' appraisal of whether it produces comparable groups. E.g., blocked randomization (to ensure particular allocation ratios to the intervention groups), or stratified randomization (randomization performed separately within strata), or minimization (to make small groups closely similar with respect to several characteristics).
	2.2. Is there a clear description of the allocation concealment (or blinding when applicable)? *The allocation concealment protects assignment sequence until allocation.* E.g., researchers and participants are unaware of the assignment sequence up to the point of allocation. E.g., group assignment is concealed in opaque envelops until allocation. *The blinding protects assignment sequence after allocation.* E.g., researchers and/or participants are unaware of the group a participant is allocated to during the course of the study.
	2.3. Are there complete outcome data (80% or above)? E.g., almost all the participants contributed to almost all measures.
	2.4. Is there low withdrawal/drop-out (below 20%)? E.g., almost all the participants completed the study.

Types of mixed methods study components or primary studies	Methodological quality criteria
3. Quantitative non-randomized Common types of design include (A) non-randomized controlled trials, and (B-C-D) observational analytic study or component where the intervention/exposure is defined/assessed, but not assigned by researchers. A. Non-randomized controlled trials The intervention is assigned by researchers, but there is no randomization, e.g., a pseudo-randomization. A non-random method of allocation is not reliable in producing alone similar groups. B. Cohort study Subsets of a defined population are assessed as exposed, not exposed, or exposed at different degrees to factors of interest. Participants are followed over time to determine if an outcome occurs (prospective longitudinal). C. Case-control study Cases, e.g., patients, associated with a certain outcome are selected, alongside a corresponding group of controls. Data is collected on whether cases and controls were exposed to the factor under study (retrospective). D. Cross-sectional analytic study At one particular time, the relationship between health-related characteristics (outcome) and other factors (intervention/exposure) is examined. E.g., the frequency of outcomes is compared in different population sub-groups according to the presence/absence (or level) of the intervention/exposure. Key references for observational analytic studies: Higgins & Green, 2008; Wells, Shea, O'Connell, Peterson, et al., 2009.	**3.1. Are participants (organizations) recruited in a way that minimizes selection bias?** At recruitment stage: For cohort studies, e.g., consider whether the exposed (or with intervention) and non-exposed (or without intervention) groups are recruited from the same population. For case-control studies, e.g., consider whether same inclusion and exclusion criteria were applied to cases and controls, and whether recruitment was done independently of the intervention or exposure status. For cross-sectional analytic studies, e.g., consider whether the sample is representative of the population.
	3.2. Are measurements appropriate (clear origin, or validity known, or standard instrument; and absence of contamination between groups when appropriate) regarding the exposure/intervention and outcomes? At data collection stage: E.g., consider whether (a) the variables are clearly defined and accurately measured; (b) the measurements are justified and appropriate for answering the research question; and (c) the measurements reflect what they are supposed to measure. For non-randomized controlled trials, the intervention is assigned by researchers, and so consider whether there was absence/presence of a contamination. E.g., the control group may be indirectly exposed to the intervention through family or community relationships.
	3.3. In the groups being compared (exposed vs. non-exposed; with intervention vs. without; cases vs. controls), are the participants comparable, or do researchers take into account (control for) the difference between these groups? At data analysis stage: For cohort, case-control and cross-sectional, e.g., consider whether (a) the most important factors are taken into account in the analysis; (b) a table lists key demographic information comparing both groups, and there are no obvious dissimilarities between groups that may account for any differences in outcomes, or dissimilarities are taken into account in the analysis.
	3.4. Are there complete outcome data (80% or above), and, when applicable, an acceptable response rate (60% or above), or an acceptable follow-up rate for cohort studies (depending on the duration of follow-up)?

Types of mixed methods study components or primary studies	Methodological quality criteria
4. Quantitative descriptive studies Common types of design include single-group studies: A. Incidence or prevalence study without comparison group In a defined population at one particular time, what is happening in a population, e.g., frequencies of factors (importance of problems), is described (portrayed). B. Case series A collection of individuals with similar characteristics are used to describe an outcome. C. Case report An individual or a group with a unique/unusual outcome is described in details. Key references: Critical Appraisal Skills Programme, 2009; Draugalis, Coons & Plaza, 2008.	**4.1. Is the sampling strategy relevant to address the quantitative research question (quantitative aspect of the mixed methods question)?** E.g., consider whether (a) the source of sample is relevant to the population under study; (b) when appropriate, there is a standard procedure for sampling, and the sample size is justified (using power calculation for instance).
	4.2. Is the sample representative of the population understudy? E.g., consider whether (a) inclusion and exclusion criteria are explained; and (b) reasons why certain eligible individuals chose not to participate are explained.
	4.3. Are measurements appropriate (clear origin, or validity known, or standard instrument)? E.g., consider whether (a) the variables are clearly defined and accurately measured; (b) measurements are justified and appropriate for answering the research question; and (c) the measurements reflect what they are supposed to measure.
	4.4. Is there an acceptable response rate (60% or above)? The response rate is not pertinent for case series and case report. E.g., there is no expectation that a case series would include all patients in a similar situation.

Types of mixed methods study components or primary studies	Methodological quality criteria
5. Mixed methods Common types of design include: A. Sequential explanatory design The quantitative component is followed by the qualitative. The purpose is to explain quantitative results using qualitative findings. E.g., the quantitative results guide the selection of qualitative data sources and data collection, and the qualitative findings contribute to the interpretation of quantitative results. B. Sequential exploratory design The qualitative component is followed by the quantitative. The purpose is to explore, develop and test an instrument (or taxonomy), or a conceptual framework (or theoretical model). E.g., the qualitative findings inform the quantitative data collection, and the quantitative results allow a generalization of the qualitative findings. C. Triangulation design The qualitative and quantitative components are concomitant. The purpose is to examine the same phenomenon by interpreting qualitative and quantitative results (bringing data analysis together at the interpretation stage), or by integrating qualitative and quantitative datasets (e.g., data on same cases), or by transforming data (e.g., quantization of qualitative data). D. Embedded design The qualitative and quantitative components are concomitant. The purpose is to support a qualitative study with a quantitative sub-study (measures), or to better understand a specific issue of a quantitative study using a qualitative sub-study, e.g., the efficacy or the implementation of an intervention based on the views of participants. Key references: Creswell & Plano Clark, 2007; O'Cathain, 2010.	**5.1. Is the mixed methods research design relevant to address the qualitative and quantitative research questions (or objectives), or the qualitative and quantitative aspects of the mixed methods question (or objective)?** E.g., the rationale for integrating qualitative and quantitative methods to answer the research question is explained. **5.2. Is the integration of qualitative and quantitative data (or results) relevant to address the research question (objective)?** E.g., there is evidence that data gathered by both research methods was brought together to form a complete picture, and answer the research question; authors explain when integration occurred (during the data collection-analysis or/and during the interpretation of qualitative and quantitative results); they explain how integration occurred and who participated in this integration. **5.3. Is appropriate consideration given to the limitations associated with this integration, e.g., the divergence of qualitative and quantitative data (or results)?**

References

- Caelli, K., Ray, L., & Mill, J. (2003). 'Clear as Mud': Toward greater clarity in generic qualitative research. *International Journal of Qualitative Methods, 2(*2), 1-23.
- Creswell, J., & Plano Clark, V. (2007). *Designing and conducting mixed methods research*. London: Sage.
- Creswell, J. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Thousand Oaks: Sage.
- Critical Appraisal Skills Programme (2009). CASP appraisal tools. Retrieved on August 26, 2009 from: *www.phru.nhs.uk/pages/PHD/resources.htm*
- Draugalis, J.R., Coons, S.J., & Plaza, C.M. (2008). Best practices for survey research reports: a synopsis for authors and reviewers. *American Journal of Pharmaceutical Education, 72(1),* e11.
- Higgins, J.P.T. & Green, S. (2008). *Cochrane Handbook for Systematic Reviews of Interventions* - Version 5.0.1 [updated September 2008]. The Cochrane Collaboration. Retrieved on August 26, 2009 from www.cochrane-handbook.org
- Mays, N., & Pope, C. (1995). Qualitative Research: Rigour and qualitative research. *British Medical Journal, 311(6997),* 109-112.
- O'Cathain, A., Murphy, E. & Nicholl, J. (2008). The quality of mixed methods studies in health services research. *Journal of Health Services Research and Policy, 13(2),* 92-98.
- O'Cathain, A. (2010). Assessing the quality of mixed methods research: Towards a comprehensive framework. In A. Tashakkori & C. Teddlie (Eds.), *Handbook of mixed methods in social and behavioral research (2nd edition)* (pp. 531-555). Thousand Oaks: Sage.
- Pace, R., Pluye, P., Bartlett, G., Macaulay, A., Salsberg, J., Jagosh, J., & Seller, R. (2010). *Reliability of a tool for concomitantly appraising the methodological quality of qualitative, quantitative and mixed methods research: a pilot study*. 38th Annual Meeting of the North American Primary Care Research Group (NAPCRG), Seattle, USA.
- Pluye, P., Gagnon, M.P., Griffiths, F. & Johnson-Lafleur, J. (2009). A scoring system for appraising mixed methods research, and concomitantly appraising qualitative, quantitative and mixed methods primary studies in Mixed Studies Reviews. *International Journal of Nursing Studies, 46(4),* 529-46.
- Oxford Center for Evidence Based Medicine (2009). Levels of evidence. Retrieved on July 7, 2009 from www.cebm.net/levels_of_evidence.asp
- Porta, M. (2008). *A Dictionary of Epidemiology*. New York: Oxford University Press.
- Sandelowski, M. (2010). What's in a name? Qualitative description revisited. *Research in Nursing and Health, 33*(1), 77-84.
- Schwandt, T. (2001). *Dictionary of qualitive inquiry*. Thousand Oaks: Sage.
- Wells, G.A., Shea, B., O'Connell, D., Peterson, J., Welch, V., Losos, M., & Tugwell, P. (2009). *The Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomised studies in meta-analyses*. The Cochrane Non-Randomized Studies Method Group. Retrieved on July 7, 2009 from www.ohri.ca/programs/clinical_epidemiology/oxford.htm

Appendix 5A: Sample interview protocol

Interview Protocol Project: A Study of the Development of Pharmacist Prescribing Frameworks in Qatar

Time of interview: **Date:**

Place:

Interviewer: **Interviewee:**

Position of interviewee:

Brief description of the project:

Welcome to the "A Study of the Development of Pharmacist Prescribing Frameworks in Qatar" project. The objective is to explore patients, physicians, nurses, pharmacists, hospital administrators and regulatory bodies' representatives' views on implementing pharmacist prescribing in Qatar.

This is part of a PhD thesis done by Robert Gordon University in United Kingdom in collaboration with Hamad Medical Corporation and Qatar University.

The results of this interview can be used to guide the implementation of new regulations to improve health care delivery in Qatar.

As a major health stakeholder in the country, your opinion matters. Thus, we kindly ask you to spend 1 hour to discuss this topic.

There are no harms or risks associated with joining this study. Your participation is voluntary and anonymous. You can refuse or withdraw your consent to participate at any time without any penalty.

Additional remarks made by participant:

_____

Appendix 5B: Information sheet

Information sheet

Information to participants

1. You are free to ask as many questions as you like before, during or after this session, should you decide to consent to participate in this research study.
2. The information in this form is only meant to better inform you of all possible risks or benefits. Your participation in this study is entirely voluntary.
3. You are entitled to participate in this study if you satisfy certain eligibility criteria
4. You do not have to take part in this study, and your refusal to participate will involve no penalty or loss of rights to which you are entitled.
5. You may decide not to participate in this study at any time without penalty or any loss of rights or other benefits to which you are otherwise entitled.

Project Title: A Study of the Development of Pharmacist Prescribing Frameworks in Qatar

Name of Investigators:

[1]Tesnime Jebara, [1]Prof Derek Stewart, [1]Dr Scott Cunningham, [1]Dr Katie MacLure, [2]Dr. Ahmed Awaisu, [3]Dr Moza Al Hail, [3]Dr P V Abdulrouf

[1]School of Pharmacy and Life Sciences, Robert Gordon University, UK
[2]College of Pharmacy, Qatar University, Qatar
[3]Women's Hospital, Hamad Medical Corporation, Qatar

Contact address and phone number:

Dr. ABDUL ROUF, BPharm, MPharm, MSc (Clinical Pharmacology), PhD, UK
Assistant Director, Pharmacy Department, Women's Hospital-HMC
Phone: 00974-44393154
Cell: 00974-70406657
Email: pabdulrouf@hmc.org.qa

1. Introduction:

Pharmacist prescribing (PP) can have positive impact on patient care especially in ensuring rational drug use, improving access to health services as well as deceasing cost of treatment. That is why, Robert Gordon University in collaboration with Hamad Medical Corporation and Qatar University are conducting a study to assess the perspectives of key stakeholders in Qatar towards implementing pharmacist prescribing in the country. The study will involve performing interviews that last 1 hour.

There is no cost associated with participating in the study.

You have been selected as a participant in this project as you are either a patient, physician, nurses, pharmacist, hospital administrator or a regulatory bodies' representative.

2. Purpose of the research study:

This study aims to answer the following research questions:

1. What are stakeholders' views and perceptions of clinical roles of pharmacists in Qatar?
2. What are stakeholders' views and perceptions of expanding the remit of pharmacists in Qatar to include prescribing?
3. What are the stakeholders' views and perceptions of facilitators, barriers and solutions to the development and implementation of pharmacist prescribing in Qatar?

3. Description of the procedures that will be followed during the research:

If you accept to participate in the study, you will be asked to express your opinion on legalising pharmacist prescribing in Qatar as well as to discuss possible barriers to implement it in this country.

Answers will be audio-recorded then transcribed later in order to examine and analyse responses. Your data will be stored on password protected computers that can only be accessed by the study investigators. All information will be handled in a confidential manner. No personal identifiers such as your name or contact details will be disclosed.

4. Description of any foreseeable risks or discomforts to the participants:

There are no physiological, psychological or social risks associated with participation in this project.

5. Description of any benefits to the participant or to others which might be reasonably expected from the research:

By participating in this study, you will be part of the first study to explore the concept of pharmacist prescribing in the Middle East. Moreover, this study has the ability to create a research infrastructure which will trigger more studies in this area, instigate public discussions as well as guide pharmacy practice initiatives. Furthermore, the proposed project will enrich the current available literature about pharmacy practice in Qatar and promote excellence in scientific research and clinical practice in the country.

There are no financial re-numeration to be given for your participation.

The study results will be published nationally and internationally and you will have the chance to look at the results at the end of the study if you are interested.

6. Confidentiality:

The study will take place in a private area in Hamad Medical Corporation that is secluded enough to ensure adequate confidentiality. All your data will be stored on password protected computers that can only be accessed by the study investigators. The study data will be handled in a confidential manner. No information regarding your name or contact information will be disclosed. All related study documentation (contact information etc) will be retained in a locked cabinet.

I, ---------- have fully explained to Mr. / Mrs. ---------- the nature and purposes of the above describe research project. I believe that he/ she understands the nature, purpose and risks of the study. I have also offered to answer any questions relating to this study that he/she might have and I declare hereby that I have completely and fully answered all such queries.

Signature of the person obtaining the consent:

Name of the person obtaining the consent: **Date:**

Appendix 5C: Informed consent

Signature Page for Capable Adult	صفحة التوقيع للمشارك البالغ العاقل
Volunteer	المشارك
I voluntarily agree to join the research described in this form.	أوافق طوعاً على الانضمام الى البحث المشروح في هذا النموذج
Printed Name of Volunteer	الاسم الكامل للمشارك بالبحث
Signature of Volunteer Date	التوقيع التاريخ
Person Obtaining Consent	الشخص الحاصل على الموافقة
I document that: • *I (or another member of the research team) have fully explained this research to the volunteer.* • *I have personally evaluated the volunteer's understanding of the research and obtained their voluntary agreement.*	أشهد أني: • أنا (أو أحد أعضاء فريق البحث) قمنا بشرح البحث بشكل وافي للمشارك بالبحث • قمت شخصياً بتقييم فهم المشارك بالبحث والحصول على موافقته/ها الطوعية.
Printed Name of Person Obtaining Consent	الاسم الكامل الشخص الحاصل على الموافقة
Signature of Person Obtaining Consent Date	التوقيع التاريخ

Appendix 5D: Robert Gordon University's ethical approval letter

SCHOOL OF PHARMACY & LIFE SCIENCES
Robert Gordon University
Sir Ian Wood Building
Garthdee Road
Aberdeen
AB10 7GJ
United Kingdom
Tel: 01224 262500/2800
www.rgu.ac.uk

Ref: S64

Dear Tesnime,

Re.: A study of the development of pharmacist prescribing frameworks in Qatar.

The School Research Ethics Committee has assessed your application and the overall decision is that there are no ethical issues with your project. However, they have provided some comments that you may find useful going forward.

I can now confirm that you are able to proceed with your research and any further ethics applications.

Should there be any amendments to this project during the research we would advise you to consult with the convener of the ethics committee as to whether a further ethical review would be required.

Please use the reference number above in any future correspondence.

We wish you success with your project.

Regards

Convener of the School Ethics Review Panel

Appendix 5E: Ministry of Public Health's support letter

Date: April 9th, 2017

To: Prof. Ibrahim Al Janahi
Executive Director of Research, Medical Research Center, Hamad Medical Corporation

From: Dr. Eman Sadoun
Executive Manager, Research Division, Ministry of Public Health

Subject: Support letter

This letter is in reference to the research project titled **"A study of the development of pharmacist prescribing frameworks in Qatar"**. The Research Department at MoPH does not object the conduct of this research project. The project needs to be reviewed by HMC-IRB committee. It is the responsibility of the Principle Investigator in the project to follow HMC institutional procedures and national ethical standards.

This support letter does not stress the MoPH in providing any unpublished data.

Sincerely yours,

Dr. Eman Sadoun
dresadoun@moph.gov.qa
Executive Manager, Research Division
Ministry of Public Health
T: 4407-0363

Appendix 5F: Qatar University's ethical approval letter

جامعة قطر
QATAR UNIVERSITY

Qatar University Institutional Review Board
QU-IRB

April 17, 2017

Dr. Ahmed Awaisu
College of Pharmacy
Qatar University
Tel.: 4403-5596 / 66621268
Email: aawaisu@qu.edu.qa

Dear Dr. Ahmed Awaisu,

Sub.: **Research Ethics Review Exemption**
Ref.: **Project titled, "A study of the Development of Pharmacist Prescribing Frameworks in Qatar"**

We would like to inform you that your application along with the supporting documents provided for the above proposal, is reviewed and having met all the requirements, has been exempted from the full ethics review.

Please note that any changes/modification or additions to the original submitted protocol should be reported to the committee to seek approval prior to continuation.

Your Research Ethics Approval No. is: **QU-IRB 772-E/17**

Kindly refer to this number in all your future correspondence pertaining to this project.

Best wishes,

K. Alali

Dr. Khalid Al-Ali
Chairperson, QU-IRB

جامعة قطر
QATAR UNIVERSITY
Institutional Review Board
(IRB)
Office Of Academic Research

Appendix 5G: Hamad Medical Corporation's ethical approval letter

مؤسسة حمد الطبية
Hamad Medical Corporation
HEALTH - EDUCATION - RESEARCH صحة - تعليم - بحوث

مركز البحوث الطبية
Medical Research Center

Ref No: MRC0449/2017
Date: 26th April 2017

Dr. P. V. Abdulrouf,
Asst. Director of Pharmacy,
Womens Hospital

Dear Dr. Abdulrouf

Research Protocol #17098/17: "A study of the development of pharmacist prescribing framework in Qatar"

The above titled Research Protocol submitted to the Medical Research Center has been reviewed and classified as **'Exempt'** under SCH guidelines under ***"Category 2: Research involving the use of: Survey and/ or interview procedures in adults only"*** and approval is granted from **26th April 2017**.

This research study should be conducted in full accordance with all the applicable sections of the rules and regulations for research at HMC and you should notify the Medical Research Center immediately of any proposed protocol changes that may affect the 'Exempt' status of your research proposal. It is the Principal Investigator's responsibility to obtain review and continued approval of the proposal if there is any modification to the approved protocol.

Documents reviewed by the Research Center:

- Research Proposal Initial application submitted on 9th April 2017 and Protocol submitted on 20th April 2017

A study progress report should be submitted annually and a final report upon study's completion.

We wish you all success and await the results in due course.

Yours sincerely,

Prof. Ibrahim Janahi,
Executive Director of Research
Medical Research Center

Cc:

1. Dr. Scott Cunningham, Co-Investigator, Group Leader – Clinical Pharmacy Practice, Pharmacy and Life Sciences, Robert Gordon University
2. Tesnime Jebara, Co-Investigator, Pharmacy Practice, Robert Gordon University
3. Dr. Ahmed Awaisu, Co-Investigator, Associate Professor, College of Pharmacy, Qatar University
4. Prof. Derek Stewart, Co-Investigator, Professor, School of Pharmacy and Life Sciences, Robert Gordon University
5. Dr. Moza Alhail, Co-Investigator, Executive Director, Pharmacy Department, HMC
6. Dr. Katie Mclure, Co-Investigator, School of Pharmacy and Life Sciences, Robert Gordon University

JLJ

Tel: (+974) 4439 2440
Fax: (+974) 44395402
research@hmc.org.qa

P.O. Box 3050
Doha, Qatar
www.hmc.org.qa

Appendix 5H: Interview invitation email

On behalf of Dr. Moza Al Hail – Executive Director of Pharmacy, HMC;

Dears,

The Pharmacy Department at Hamad Medical Corporation (Qatar) in collaboration with Robert Gordon University (UK) and Qatar University (Qatar) are investigating key stakeholders' views and perceptions on implementing pharmacist prescribing in Qatar.

As a major health stakeholder in the country, your opinion matters. Thus, we kindly ask you to participate in this research. You will be expected to spend 30-45 minutes discussing this topic with one of our research members.

There are no harms or risks associated with joining this study. Your participation is voluntary and anonymous. You can refuse or withdraw your consent to participate at any time without any penalty.

If you have any questions or enquiries, you can contact the research team anytime.

If, however, you are willing to take part in this research, please reply to this email and we will be in touch with you to schedule a suitable time and place to conduct the interviews.

Regards,

Prof Moza Al Hail

Executive Director- Pharmacy Department

Hamad Medical Corporation

Appendix 6A: Robert Gordon University's ethical approval letter

SCHOOL OF PHARMACY & LIFE SCIENCES
Robert Gordon University
Sir Ian Wood Building
Garthdee Road
Aberdeen
AB10 7GJ
United Kingdom
Tel: 01224 262500/2800
www.rgu.ac.uk

S104

29 November 2017

Dear Tesnime

Re.: A Delphi study to determine the level of agreement relating to the development of pharmacist prescribing frameworks in Qatar

The School Research Ethics Committee has assessed your application and the overall decision is that there are no ethical issues with your project.

I can now confirm that you are able to proceed with your research and any further ethics applications.

Should there be any amendments to this project during the research we would advise you to consult with the convener of the ethics committee as to whether a further ethical review would be required.

We wish you success with your project.

Regards

Dr Colin Thompson
Convener of the School Ethics Review Panel

Appendix 6B: Qatar University's ethical approval letter

جامعة قطر
QATAR UNIVERSITY

Qatar University Institutional Review Board
QU-IRB

November 29, 2017

Dr. Ahmed Awaisu
College of Pharmacy
Qatar University
Tel.: +974 4403-5596 / +974 66621268
Email: aawaisu@qu.edu.qa

Dear Dr. Ahmed Awaisu,

Sub.: **Research Ethics Review Exemption**
Ref.: **Project titled, "A Delphi study to determine the level of agreement relating to the development of pharmacist prescribing frameworks in Qatar"**

We would like to inform you that your application along with the supporting documents provided for the above proposal, is reviewed and having met all the requirements, has been exempted from the full ethics review.

Please note that any changes/modification or additions to the original submitted protocol should be reported to the committee to seek approval prior to continuation.

Your Research Ethics Approval No. is: **QU-IRB 865-E/17**

Kindly refer to this number in all your future correspondence pertaining to this project.

Best wishes,

K. Alali

Dr. Khalid Al-Ali
Chairperson, QU-IRB

جامعة قطر
QATAR UNIVERSITY
Institutional Review Board
(IRB)
Office Of Academic Research

Appendix 6C: Hamad Medical Corporation's ethical approval letter

2/20/2018

مؤسسة حمد الطبية
Hamad Medical Corporation

INSTITUTIONAL APPROVAL LETTER
MEDICAL RESEARCH CENTER
HMC, DOHA-QATAR

Ms. Tesnime Jebara **Date: 19th February 2018** **Pharmacy Postgraduate Research Student** Department of Pharmacy Robert Gordon University	
Protocol No.	MRC-01-17-115
Study Title	A Delphi study to determine the level of agreement relating to the development of pharmacist prescribing frameworks in Qatar
Study Type:	Social, Public and Behavioural Surveys
Hospitals/ Facilities Approved:	HGH, RH, HH, AWH, NCCCR, AKH, CH, QRI,WH,MHS,CDC, DIAH & HMC Corporate
Team Member List:	**Dr. Moza Sulaiman H Al Hail ,Mr. Palli Valappila Abdul Rouf** ,Dr. Ahmed Awaisu , Dr. Katie MacLure , Dr. Scott Cunningham , Ms. Tesnime Jebara , Prof. Derek Stewart
IRB Approval Type:	**'Exempt'** under SCH guidelines **"*Category* (2) Research involving the use of:** Survey and/or interview procedures in adults only **UNLESS**: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; **AND**(ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability **OR** be damaging to the subjects' financial standing, employability, or reputation.**"**

This research study should be conducted in full accordance with all the applicable sections of the rules and regulations for research at HMC and you should notify the Medical Research Center immediately of any proposed changes.

The investigator/ Research team must ensure the study progress is updated in the MRC online system 'ABHATH'.

We wish you all success and await the results in due course.

Thank you,

Prof. Ibrahim A.Janahi
Executive Director of Research
Medical Research Center

Date: 19th February 2018

Appendix 6D: Research information sheet

RESEARCH INFORMATION SHEET

Dear Participant:

You are invited to participate in Project entitled: "A Delphi study to determine the level of agreement relating to the development of pharmacist prescribing frameworks in Qatar**".**

Name of Principal Investigator:

Tesnime Jebara,

Pharmacy Postgraduate Research Student

Robert Gordon University

Robert Gordon University (UK) in collaboration with Hamad Medical Corporation and Qatar University are conducting this research. As an expert in health practice in Qatar, we are inviting you to join because we would like your input in developing a framework for pharmacist prescribing in Qatar.

The research will involve approximately 35 different major health stakeholders in Qatar who are experts in terms of their knowledge and policy influence. Key individuals representing the different professions (medicine, pharmacy and nursing), hospital administrators as well as the Ministry of Public Health will be involved. In addition, there will be representation of those with expertise in patient safety.

If you accept to participate in the study, you will be asked to rate and express your opinion on certain statements related to legalising pharmacist prescribing in Qatar according to a 6-point Likert scale (strongly disagree-

disagree-somewhat disagree- somewhat agree-agree-strongly agree). Answers will be collected via Survey Monkey® anonymously.

You will be sent the survey three times. For the first round, you will be sent a set of statements related to pharmacist prescribing legalisation in Qatar. During the subsequent rounds, you will be only provided with the statements where consensus was not reached and asked to rate them again after reviewing other stakeholders' comments.

Your participation in this study is completely voluntary. You can stop participating at any time and we will not hold it against you.

There is no risk with participating in this study. Your choice to participate or not will not affect your employment status; and your immediate supervisors/managers will not know your participation answers.

There are no direct benefits to you by taking part in the research. However, possible benefits to others include helping in building pharmacists' capacities in Qatar, creating a research infrastructure which will trigger more studies in this area, instigating public discussions as well as guiding pharmacy practice initiatives.

There are no financial compensation for your participation

This research is part of a self-funded PhD project.

Your participation is anonymous, and all information will be kept confidential.

You have the right of knowing the results of this study at the end of it.

If you have questions or concerns, or if you think the research has hurt you, please contact the research team.

Appendix 6E: Delphi invitation email and informed consent

On behalf of Dr. Moza Al Hail – Executive Director of Pharmacy, HMC;

Dears,

You are being invited to participate in a research project which forms part of a PhD at Robert Gordon University (UK) and is in collaboration with Hamad Medical Corporation and Qatar University. The overall aim of the study is to explore the development of a framework for pharmacist prescribing in Qatar.

You have been identified as a major stakeholder in healthcare in Qatar hence your participation will be highly valuable. All study information is provided in the attached leaflet. This study will employ a three-round modified-Delphi technique to determine the level of agreement among key stakeholders on aspects of pharmacist prescribing, specifically: models and scope of pharmacist prescribing; education and training; and prescribing practice and governance.

Participation involves completion of a series of questionnaires (maximum of 3) rating the extent to which you agree or disagree with a series of statements. Each should take no longer than 20 minutes.

If you agree to participate, please read the attached Participant Information Sheet and complete and return via email the form at the end of this email.

_____

Please place your initials alongside each statement if you agree to the following:

I confirm that I have read and understood the participant information sheet sent and been provided with adequate opportunity to ask any questions.	_____
I understand that my participation is voluntary and that I am free to withdraw at any point during the study.	_____
I understand that the data collected during this study will be used for research purposes including publication of anonymised findings. I grant permission to do so on the basis that my confidentiality will be protected.	_____

I agree to take part in round 1 of this study. _____

I agree to take part in round 2 of this study. _____

I agree to take part in round 3 of this study. _____

Name: Date:

Preferred email address

Regards,

Dr Moza Al Hail

Executive Director, Pharmacy Department - Hamad Medical Corporation

Appendix 6F: Screenshot of Survey Monkey®

ROBERT GORDON UNIVERSITY ABERDEEN

كلية الصيدلة College of Pharmacy QATAR UNIVERSITY جامعة قطر

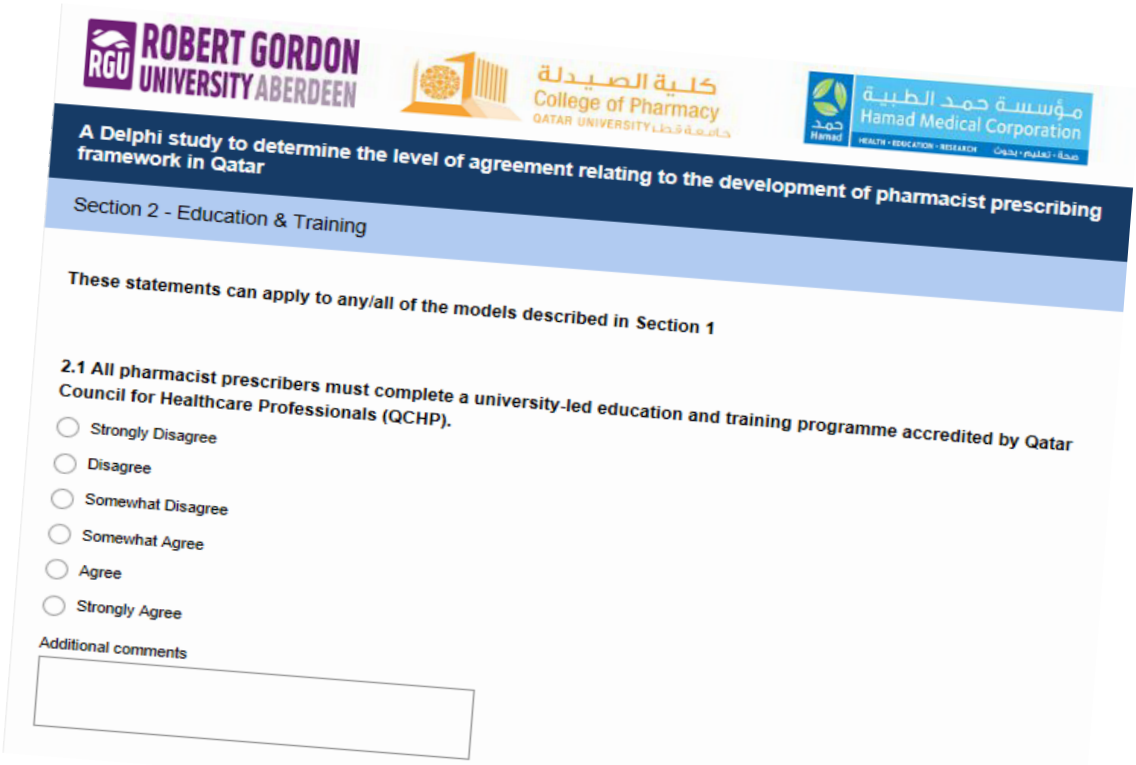
مؤسسة حمد الطبية Hamad Medical Corporation HEALTH · EDUCATION · RESEARCH صحة · تعليم · بحوث

A Delphi study to determine the level of agreement relating to the development of pharmacist prescribing framework in Qatar

Thank you for agreeing to take part in this Delphi study. The aim of this project is to determine the levels of agreement amongst key stakeholders in Qatar around the development of pharmacist prescribing framework. The stakeholders include directors of medicine, pharmacy, nursing, healthcare policy makers, and academic leaders as well as patient safety and quality improvement directors.

This study involves a list of statements in relation to potential pharmacist prescribing frameworks to implement in Qatar. The scope of the framework includes: definitions, models and scope of prescribing; education and training; in addition to prescribing practice and governance. These statements have been developed following analysis of qualitative interviews with 37 individuals in positions of importance in Qatar. In addition, reference has been made to the Consolidated Framework of Implementation Research, the peer reviewed literature and prescribing frameworks in other countries.

As a major healthcare stakeholder in Qatar, you are kindly asked to rate these statements according to a 6-point scale (strongly disagree—disagree—somewhat disagree-somewhat agree—agree—strongly agree). You are also encourage to provide any comments or feedback on any of the statements.



ROBERT GORDON UNIVERSITY ABERDEEN

كلية الصيدلة College of Pharmacy QATAR UNIVERSITY جامعة قطر

مؤسسة حمد الطبية Hamad Medical Corporation HEALTH · EDUCATION · RESEARCH صحة · تعليم · بحوث

A Delphi study to determine the level of agreement relating to the development of pharmacist prescribing framework in Qatar

Section 2 - Education & Training

These statements can apply to any/all of the models described in Section 1

2.1 All pharmacist prescribers must complete a university-led education and training programme accredited by Qatar Council for Healthcare Professionals (QCHP).

- ○ Strongly Disagree
- ○ Disagree
- ○ Somewhat Disagree
- ○ Somewhat Agree
- ○ Agree
- ○ Strongly Agree

Additional comments