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A Survey of the Delivery of Clinical Services in Independent Community Pharmacies in South Africa

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A SURVEY OF THE DELIVERY OF CLINICAL SERVICES IN INDEPENDENT COMMUNITY PHARMACIES IN SOUTH AFRICA

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Science in Medicine (Pharmacotherapy)

Johannesburg, 2024

DECLARATION

I, Tahir Ismail, declare that this research report is my own unaided work. It is being submitted for the Degree of Master of Science in Medicine (Pharmacotherapy) at the Department of Pharmacy and Pharmacology, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg. This work has not been submitted before for any degree or examination at any other University.



……

Tahir Ismail

Date 11 June 2024

DEDICATION

This research report is dedicated to my amazing parents for all their support, love, and inspiration. Their hard work made me the person I am today.

"The only way to do great work is to love what you do." - Steve Jobs.

ABSTRACT

Introduction

The community pharmacists' role has evolved from traditional medicine dispensing to patient-centred service provision. Community pharmacy clinical service provision is an integral component of public health intervention and contributes to universal health coverage. The extent of clinical services offered in community pharmacies in South Africa has yet to be studied. Assessing the extent of clinical service provision in community pharmacies provides insight into the willingness of South African pharmacists to deliver these services.

Aim

This study aimed to identify the clinical services offered in independent community pharmacies in South Africa and the extent to which these services are available. In addition, the willingness to provide clinical services and the barriers to service provision were also assessed.

Methodology

A quantitative, cross-sectional exploratory research design was used. Responsible pharmacists of the Independent Community Pharmacy Association member pharmacies were invited to participate in an anonymous electronic REDCap© survey from September 2022 to March 2023. Data was exported to Microsoft Excel® and analysed using descriptive statistics.

Results

Of the 156 responses received, most were located in urban areas (70%) and based in Gauteng (34.8%). The most frequently delivered clinical services were diabetes screening (88.9%), blood pressure measurement (80.8%) and Influenza vaccination (78.9%). Clinical services were primarily delivered by a pharmacist (39.5%), with most pharmacists (94.7%) willing to implement additional clinical services. However, lack of time and remunerations for services (57.1%) were identified as barriers to implementation. Most pharmacists also expressed an interest in additional training to improve clinical skills.

Conclusion

This study revealed the extent of clinical service delivery in independent community pharmacies in South Africa. Although community pharmacists are willing to provide clinical services, significant barriers limit these interventions. This study also informs service providers of training programmes that need to be developed to meet the specific needs of independent community pharmacists. Further research must address how the barriers identified may be mitigated to facilitate clinical service implementation in community pharmacies.

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LIST OF ABBREVIATIONS

ADR	Adverse Drug Reaction
AMS	Antimicrobial Stewardship
ART	Antiretroviral Therapy
BMI	Body Mass Index
BP	Blood Pressure
CAD	Coronary Artery Disease
CCM	Chronic Care Management
CE	Continuing Education
CMP	Clinical Management Plan
COPD	Chronic Obstructive Pulmonary Disease
COVID-19	Coronavirus Disease 2019
CPCS	Community Pharmacy Clinical Services
CPD	Continuing Professional Development
CRP	C-reactive Protein
CVD	Cardiovascular Disease
DRPs	Drug-related Problems
EPC	Emergency Postcoital Contraception
EPI	Expanded Programme on Immunization
FIP	International Pharmaceutical Federation
GAS	Group A streptococcus
GPP	Good Pharmacy Practice
HbA1c	Haemoglobin A1c
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
HMR	Home Medicines Review
ICPA	Independent Community Pharmacist Association
INR	International Normalized Ratio
MAS	Minor Ailments Services
MTM	Medicine Therapy Management
MUR	Medicines Use Review
NCD	Non-communicable Disease
NDoH	National Department of Health
NHI	National Health Insurance
NHS	British National Health Service
NICD	National Institute for Communicable Diseases
NMS	New Medicine Service
NRT	Nicotine Replacement Therapy
OTC	Over-the-counter
OUD	Opioid Use Disorder

PCDT	Primary Care Drug Therapy
PCNE	Pharmaceutical Care Network Europe
PHC	Primary Health Care
PIT	Pharmacist Initiated Therapy
PIMART	Pharmacist Initiated Management of ART
POC	Point-of-care
POCT	Point-of-care testing
PPS	Professional Pharmacy Service
RCT	Randomized Controlled Trial
RTI	Respiratory Tract Infection
SAPC	South African Pharmacy Council
SEP	Single Exit Price
STG	Standard Treatment Guidelines
STI	Sexually Transmitted Infection
TB	Tuberculosis
TPT	TB-Preventative Therapy
UHC	Universal Health Coverage
UNAIDS	Joint United Nations Programme on HIV/AIDS
VPD	Vaccine Preventable Disease
WHO	World Health Organization

Chapter 1: Introduction

This study aims to determine the extent of the delivery of clinical pharmacy services by independent community pharmacists in South Africa and to assess the barriers that limit the implementation of these clinical services.

1.1 Background

The pharmacy profession has evolved from the traditional role of supplying and dispensing medicines to a direct, patient-centred model of care. This development has led to pharmacists becoming integral to the multidisciplinary primary healthcare workforce (Wiedenmayer *et al*., 2006; Perraudin *et al*., 2016; Asayut *et al*., 2018). Progression into an outcome-oriented model of care involves providing value-added clinical pharmacy services that align with the concept of Pharmaceutical Care (Chukwu, 2020). Pharmaceutical care was defined by Hepler and Strand (1990) as "*The responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life*". It involves drug therapy that is appropriate, safe, effective, and convenient for the patient (Wiedenmayer *et al.*, 2006).

The philosophy of pharmaceutical care has seen the pharmacist's traditional role evolve from a product-oriented to a patient-oriented clinical service provider (Mossialos *et al*., 2015; Hindi *et al*., 2018). As their role expands and evolves, community pharmacists are providing more professional services (Melton and Lai, 2017). Pharmacies now offer screening services, point-of-care testing, promotion of public health, medicine therapy management, adherence-enhancing interventions, disease and lifestyle management programs, and immunisations (McMillan *et al*., 2014; 2016; Chukwu, 2020). Extending the scope of practice for pharmacists and collaboration with other healthcare team members has improved patient access to healthcare and also led to positive patient therapeutic outcomes (Nabhani-Gebara *et al*., 2020; Chiutsi *et al*., 2022).

The pharmacist's role in the healthcare system is dynamic and has evolved to meet the ever-changing and increasingly demanding public healthcare needs (Shen and Peterson, 2020). Pharmacists have continuously worked to adapt and re-evaluate current practice models. Re-professionalization is the term used to describe these efforts "*to upgrade and develop the status of pharmacy within changing healthcare environments*"(Bader *et al.*, 2017). Increased competition and patient expectations drive pharmacy re-professionalization (Vella *et al.*, 2015). Patients' expectations of community pharmacists' services have increased due to their enhanced perceptions of pharmacists' role in healthcare (Sabater-Galindo *et al.*, 2017).

Non-communicable diseases (NCDs) are chronic diseases that have a mortality rate of approximately 41 million people each year, 77% of which occur in low- and middle-income countries. Cardiovascular diseases (CVDs) such as coronary artery disease (CAD) and cerebrovascular diseases such as stroke are the most common types of NCDs, followed by diabetes mellitus, cancer and chronic respiratory diseases such as asthma (World Health Organization, 2023c). Key strategies to tackle the high incidence of and morbidity due to NCDs include detection, screening, monitoring, and treatment (Ayorinde *et al*., 2013). Reduction of risk factors such as tobacco use, physical inactivity, unhealthy diet, and alcohol abuse are other vital components in the management of NCDs (World Health Organization, 2023c, 2023a).

The geographical location of community pharmacies makes them a convenient setting for screening for NCDs in at-risk individuals and other primary care services such as health promotion (Akutey *et al.*, 2018; Yuan *et al.*, 2019). Systematic reviews have shown that screening for NCDs in community pharmacies is both feasible and acceptable to members of the public (Ayorinde *et al*., 2013). A study by Akutey *et al*. (2018) highlighted the missed opportunities for NCD screening, counselling, and detection of life-threatening illnesses in community pharmacies. Screening for NCDs can lead to early intervention in the management of chronic diseases and plays a significant role in reducing morbidity and mortality.

1.2 Community Pharmacy

Community pharmacy practice has broadened its approach to include a systematic patient care process. This extension involves community pharmacists focusing on medication use, from prescribing and initiating therapy to monitoring and adjusting after medication review (Bacci and Berenbrok, 2018). Community pharmacists are progressively being integrated into healthcare systems in countries including Australia, where various services are offered to manage chronic diseases and improve medicine therapy. Due to their accessibility and convenient location, community pharmacies are well-placed to provide extended pharmacy services and value-added healthcare services (Buss *et al.*, 2018). However, despite community pharmacies offering convenient healthcare access, these services are often underutilised due to a lack of patient awareness (Edwards *et al.*, 2018).

Community pharmacists are a valuable resource in the healthcare system as they are embedded in communities and are uniquely positioned to address the deficits in healthcare for underprivileged populations (Buss *et al.*, 2018; Daly *et al.*, 2021). Several studies have shown that patients perceive community pharmacists to be among the most accessible and trustworthy healthcare professionals (Kelling, 2015; Tseng *et al*., 2019; Chukwu, 2020).

Community pharmacists are often the first point of access in the healthcare system for many patients and are the most frequently visited healthcare destinations. The World Health Organization (WHO) has acknowledged that this accessibility has the potential to assist in addressing key public health initiatives (Brown *et al.*, 2016; Parker *et al.*, 2019; de Souza *et al.*, 2022).

Community pharmacists provide value through universal, accessible, collaborative, compassionate, and personalised healthcare for the communities they serve (International Pharmaceutical Federation, 2020b). Providing clinical services in community pharmacies could lower the cost of care and improve medication adherence (Daly *et al.*, 2021). Community pharmacies may be equipped with a primary health care clinic, where pharmacists may provide services, including immunisation, screening, and monitoring services for NCDs, child health, reproductive health services, smoking cessation, and on-site HIV resource centres (South African Pharmacy Council, 2017).

1.3 Clinical Role of Community Pharmacists and Clinical Services

The provision of clinical services has allowed community pharmacists to shift their focus from product to patient-orientated service models (Daly *et al.*, 2021). The array of clinical services is reasonably diverse, ranging from basic to intricate. They include over-the-counter pharmacist-initiated therapy to medication review and independent pharmacist prescribers. Providing clinical services in a community pharmacy aims to optimise medication therapeutic outcomes in patients (Campeau Calfat *et al.*, 2021). The benefits of delivering clinical or patient care services include superior health outcomes, increased adherence to medication therapy and improved quality of life. Offering clinical services also allows pharmacists to enhance public health and contribute to the development of the pharmacy profession (Vella *et al.*, 2015).

Clinical services are also known as patient care, expanded pharmacy, extended professional, and professional pharmacy services (PPS). Moullin *et al*. (2013) defined a professional pharmacy service as "*an action or set of actions undertaken in or organized by a pharmacy, delivered by a pharmacist or other healthcare practitioner, who applies their specialised health knowledge personally or via an intermediary with a patient/client, population or health professional, to optimise the process of care, with the aim to improve health outcomes and the value of healthcare*". Categories of patient care services include screening tests, disease state management, immunisation, medication therapy management, combination services and other novel services, including travel health clinics and common minor ailments services (Bacci *et al.*, 2019). A study by Costa *et al*. (2017) found that although clinical services such

as screening activities, patient counselling in a private area and medication review have been implemented across European pharmacies, the provision of these services remains limited. Patients have a favourable perception of community pharmacy clinical services. They approve of the advancement of community pharmacy and consider the management of chronic conditions, including hypertension and diabetes, to be especially important (Vella *et al.*, 2015).

Patient interest in a clinical pharmacy service is likely if there has been prior interaction with a pharmacist and they are satisfied with the service received. Other reasons for interest include medication therapy management and improved pharmacist-physician collaboration (Schumacher *et al.*, 2020). Patients would prefer community pharmacists to offer additional clinical services. However, this can be challenging due to limited time and resources. Hence, it is essential to identify the most essential services patients need (Tseng *et al*., 2019). Dispensing and consultation have been identified as the most needed community pharmacy services, including drug-drug interaction reviews, consultation on prescription medicines, and checking for drug-food interactions. Low patient awareness of community pharmacy services is widespread and often results in low utilisation of these services (Hindi *et al*., 2018).

South Africa is currently faced with a quadruple burden of diseases, including tuberculosis, HIV, and NCDs (NCOP - Health and Social Services Committee, 2016). NCDs in South Africa have caused an increasing trend in mortality. Over 20 years, deaths due to NCDS increased by 58.7%. In 2018, 164 205 deaths attributed to NCDs were registered in South Africa. Cardiovascular diseases accounted for half of all NCD-related deaths, with an increase from 12.9% in 2008 to 17.6% in 2018 (Statistics South Africa, 2023). The International Pharmacy Federation (FIP) has identified the advancement of integrated pharmacy services, such as NCD screening, as one of its developmental goals for the profession. This goal focuses on developing patient-centred and integrated healthcare across healthcare settings to achieve optimal therapeutic outcomes (International Pharmaceutical Federation, 2020b). Community pharmacist-led primary care interventions such as monitoring blood pressure and HbA1c have been found to be effective in managing diabetes and hypertension (Greer *et al*., 2016).

This clinical role of pharmacists has been further enhanced by the recognition of an additional qualification in Primary Care Drug Therapy (PCDT), which allows the pharmacist to perform additional services over and above the regular pharmacist-initiated therapy (PIT) in a controlled environment (South African Pharmacy Council, 2021b). The objective of PCDT supplementary training is to prepare pharmacists with clinical skills to apply the principles of pharmaceutical care and pharmacotherapy while providing PIT. It allows pharmacists to diagnose and treat specific primary healthcare conditions using a prescribed PCDT medicine

list (South African Pharmacy Council, 2023a). The PCDT pharmacist offers many expanded clinical services to the public in community pharmacies. However, the extent to which services are being offered in South Africa, both by community pharmacists and PCDT-accredited pharmacists, has yet to be determined.

1.4 Facilitators and Barriers to implementation of clinical services

Implementing expanded pharmacy services is a complex process in which numerous factors intermingle and influence the process and outcomes (Garcia-Cardenas *et al.*, 2018). Understanding these factors, barriers and facilitators, and how they interact is necessary for successful implementation. Several barriers to the implementation of clinical pharmacy services have been identified. These include time constraints, the lack of a transparent remuneration system, no professional fee for services, lack of resources, high workload, lack of commitment, inadequate skills, poor communication and marketing and lack of self-belief (Costa *et al*., 2017; Weidmann *et al*., 2022). Physical barriers, such as the absence of private consultation areas, mean a lack of privacy when discussing sensitive matters (Bauman and Manasse, 2019).

Factors that facilitate the implementation of clinical pharmacy services include the interprofessional collaboration between pharmacists and other healthcare professionals, appropriately trained and skilled staff, sufficient staff to cover the extra duties, coordinated teamwork, external guidance, appropriate funding, and a remuneration model for the service (Costa *et al.*, 2017; Doucette *et al.*, 2017; Buss *et al.*, 2018). Organising work and delegating duties are essential facilitators in the shift to a clinical service-orientated pharmacy (Campeau Calfat *et al.*, 2021). Having an appropriately designated area in the pharmacy for private patient counselling is central to the delivery of clinical pharmacy services (Vella *et al.*, 2015). Facilitators and barriers can also affect a patient's preference for using clinical services from a particular community pharmacy.

Patient attitudes towards clinical pharmacy services are influenced by their perceptions of community pharmacy and their perceived impact or benefit from these services. Patients often cite the accessibility and convenience of community pharmacies as the main reason for using pharmacy services (Hindi *et al*., 2018). It would benefit the public to offer more services in a community pharmacy; however, this is only occasionally feasible due to limited resources (Tseng *et al*., 2019).

1.5 Rationale and Problem Statement

Community pharmacies are accessible care settings with unique traits that allow them to provide clinical services to patients (Bacci and Berenbrok, 2018). Limited research exists on the extent to which clinical pharmacy services are provided to patients in independent community pharmacies in South Africa. Although it is within the scope of practice of community pharmacists to promote public health and offer screening, monitoring, and primary care services (South African Pharmacy Council, 2000), many community pharmacies still need to take the opportunity to offer these expanded services. Pharmacists have also yet to utilise these new roles to their full potential (McMillan *et al.*, 2014).

Only some of the clinical services that could be offered at a pharmacy are recognised by the South African Pharmacy Council (SAPC) as those for which a pharmacist may levy a fee (South African Pharmacy Council, 2021c). To support universal health coverage, pharmacists must offer integrated clinical community pharmacy services that meet the needs of the local population and facilitate the seamless transition of patients to the next level of care (International Pharmaceutical Federation, 2020a). By providing clinical services, community pharmacists can positively impact public health. They can also address the needs of the communities where primary healthcare provider shortages are common (Eades *et al*., 2011; Shen and Peterson, 2020).

Pharmacists must also possess the necessary clinical skills and competencies to offer these services. Continuing Professional Development (CPD) is a requirement for all pharmacists to maintain their professional knowledge. The CPD process follows a structured approach that includes reflecting on learning needs, planning activities, implementing actions, and evaluating outcomes. For compliance, pharmacists must submit six CPD entries annually (South African Pharmacy Council, 2020). The SAPC provides a list of accredited providers and short courses that can be used for CPD activities, including immunisation techniques, Pharmacotherapy, and Applied Pharmacotherapy (South African Pharmacy Council, 2024). Continuing Education (CE) Programmes can enhance therapeutic knowledge and play a vital role in strengthening the provision of quality community pharmacy clinical services (Roque Obreli-Neto *et al.*, 2016).

Deficits in education and training can be a barrier to implementing clinical pharmacy services (Gubbins *et al*., 2014). If pharmacists are well-trained and supported, they can increase their confidence in offering a multitude of clinical pharmacy services (Eades *et al*., 2011). The range of clinical services provided varies from one pharmacy to another, and the extent to which expanded pharmacy services are delivered differs from one country to another (Vella *et al*., 2015; Tseng *et al*., 2019; Campeau Calfat *et al*., 2021). There is, however, a need for more

information on the delivery of expanded clinical services in independent community pharmacies in South Africa. Further research is required on the factors associated with clinical service delivery. This includes the implementation and feasibility of such services and how they are delivered to the communities that need them the most (Doucette *et al.*, 2017; Daly *et al.*, 2021).

Implementing clinical pharmacy services in community settings has been slow (Bauman and Manasse, 2019). Barriers to the implementation of clinical pharmacy services may include professional experience and skills, resources and financing, support, role definition, workplace time constraints, human resources, appropriate facilities, and resistance from other healthcare providers (Grindrod *et al.*, 2010; Jahangard-Rafsanjani *et al.*, 2014; Jorgenson *et al.*, 2014; Campeau Calfat *et al.*, 2021). The lack of a suitable compensatory mechanism or remuneration system and the need for a sustainable income revenue are other factors that act as barriers (Chan *et al*., 2008; Weidmann *et al*., 2022). Understanding the barriers to delivering clinical pharmacy services in the South African context may allow for assisting community pharmacists to implement these services in the future.

As the community pharmacist's role expands and develops, it is essential to identify and document the extensive array of services provided (Moullin *et al.*, 2013). It is, therefore, necessary to evaluate the type, frequency, and quality of clinical services, as well as the potential barriers that may exist in providing these services. This will allow a better understanding of the types of pharmaceutical services offered, how to improve them and how to overcome the barriers to delivering them (El-Dahiyat *et al*., 2019). This study will provide information on clinical service delivery in independent community pharmacies in South Africa.

1.6 Aim of the study

This study aims to identify the clinical services offered in independent community pharmacies in South Africa and the extent to which these services are available.

1.7 Objectives

1.7.1 To determine the type and frequency of clinical services offered in independent community pharmacies in South Africa

1.7.2 To determine the willingness to offer expanded clinical services in independent community pharmacies in South Africa

1.7.3 To identify the perceived barriers to offering clinical services in independent community pharmacies in South Africa

Chapter 2: Literature Review

2.1 Introduction

This literature review extensively examines the concept of pharmaceutical care, its definitions and how it serves as the driving force for the delivery of clinical services. The practice of community pharmacy and the benefits of providing access to healthcare for the public will be discussed. The clinical role of community pharmacists and their role in public health and primary health care will be explored. Further discussions will include the definitions of clinical pharmacy and the types of clinical pharmacy services that may be offered at the community pharmacy level. Lastly, the barriers to providing clinical pharmacy services and the facilitators that may assist with implementing these services are elucidated.

2.2 Pharmaceutical Care

Pharmaceutical care was proposed to address medication-related problems and improve health outcomes via a patient-focused approach to services (Costa *et al.*, 2017). The concept of pharmaceutical care has undergone several refinements since its introduction. Hepler and Strand's (1990) original definition of pharmaceutical care stated that drug therapy should achieve definite outcomes that improve a patient's quality of life. These outcomes include disease prevention and cure, reduction of a patient's symptomatology and slowing down a disease process (Moltó-Puigmartí *et al.*, 2018).

Blackburn *et al*. (2012) suggested that pharmaceutical care definitions should be expanded to target high-risk patients consistently. This places the responsibility of pharmacists to ensure the safety of populations at a higher risk of experiencing medication or disease-induced harm. The Pharmaceutical Care Network Europe (PCNE) also provides a harmonised definition of pharmaceutical care, stating that it "*is the pharmacist's contribution to the care of individuals to optimise medicines use and improve health outcomes*" (Costa *et al.*, 2017). Experts have agreed that the current definitions of pharmaceutical care are restrictive and need to be updated to meet the specific needs of patients (Morillo-Verdugo *et al*., 2019). Pharmaceutical care involves a pharmacist taking responsibility for improving and maintaining a patient's quality of life by addressing their drug-related needs. This includes alleviating drug-linked iatrogenic illness and drug-related problems (DRPs) (Ruiz-Ramos *et al.*, 2021).

DRPs include suboptimal treatment, increased frequency of adverse effects, and increased costs of healthcare (Mehralian *et al.*, 2015). Categories of DRPs include improper drug selection, untreated indications, overdosage, subtherapeutic dosage, drug interactions, adverse drug reactions, and drug usage without indication (Hepler and Strand, 1990).

Pharmacists' interventions facilitate safe and effective medicine therapy by identifying, resolving, and preventing DRPs. These interventions are a crucial component of effective pharmaceutical care and need to be documented in a structured manner, the outcomes of which must be evaluated (Maes *et al.*, 2017).

The patient-centred approach to pharmaceutical care helps address drug-induced morbidity and poor therapeutic outcomes related to medicine use (Blackburn *et al.*, 2012). Pharmaceutical care programmes have been shown to optimise treatment by detecting and alleviating potential DRPs (Ruiz-Ramos *et al.*, 2021). They also increase the patient's quality of life, enhance public health, and benefit health system outcomes. Another benefit is that pharmaceutical care facilitates the cooperation between pharmacists, patients and prescribers throughout the medication use process (Mehralian *et al.*, 2015). Pharmaceutical care patient-centred services can help overcome poor adherence to treatment and inadequate access to primary healthcare services (Rajan, Pawar and Dantkale, 2020). These services are also vital for the development of the pharmacy profession as patients desire comprehensive care from their pharmacists (Mukattash *et al.*, 2018).

The provision of pharmaceutical care in community pharmacies still needs to be improved, with services being implemented to varying degrees in different countries due to differences in pharmacy cultures and healthcare systems (Hughes *et al.*, 2010; Costa *et al.*, 2017). For pharmaceutical care to be effectively implemented in community pharmacies, extensive structural and organisational changes are often necessary, including training and new practice standards. Pharmacists frequently cite a lack of understanding of their new role as a barrier to implementing pharmaceutical care (Mohamed *et al*., 2015). Additional barriers identified include inadequate clinical training or lack of clinical knowledge. Addressing the barriers to implementing pharmaceutical care services will be essential for their successful implementation at a community pharmacy level (Mehralian *et al.*, 2015; Boura *et al.*, 2022).

Pharmaceutical care continues evolving as pharmacists offer new services and perform novel functions (Hughes *et al.*, 2010). Pharmaceutical care interventions have enhanced drug therapy for patients with asthma, dyslipidaemia, and diabetes (Shao *et al*., 2017; Khdour *et al*., 2020; Xu *et al*., 2021). Interventions have also led to improved outcomes, including glycaemic and blood pressure (BP) control and decreased cardiovascular (CV) risk (De Souza Cazarim *et al*., 2016; Babar *et al*., 2019). Pharmaceutical care has also been shown to have an impact on treatment adherence and outcomes in patients with HIV, pulmonary tuberculosis, acute coronary syndrome, and those receiving adjuvant endocrine therapy for breast cancer (Kang *et al*., 2018; Tang *et al*., 2018; Al Tall *et al*., 2020; En-nasery - de Heer *et al*., 2022).

A component of pharmaceutical care is pharmacist interventions to address DRPs (Maes *et al.*, 2017). Pharmaceutical care has undoubtedly developed with the increasing focus on patient-centred care and the expanding responsibilities of pharmacists. (Mohamed *et al*., 2015). The COVID-19 pandemic also highlighted the need for adequate provision of clinical pharmaceutical care (Hua *et al.*, 2020; Zheng *et al.*, 2021). The pandemic did, however, considerably impact the provision of pharmaceutical care in community pharmacies, especially regarding patient counselling and education (Koster *et al*., 2021).

2.3 Community Pharmacy

The definition of community pharmacy differs in every country. Still, it is defined as "*the most common type of pharmacy that allows the public access to their medications and advice about their health*" (Smith, 2019). Community Pharmacies include retail pharmacies and outpatient pharmacies in primary care clinics (Zheng *et al.*, 2021). Community pharmacists are considered to be the most accessible healthcare professionals whom patients trust and communicate with (Kelling, 2015; Parker *et al.*, 2019; Chukwu, 2020). The friendly disposition and knowledge of pharmacists, coupled with the geographical location and proximity to other healthcare professionals, positively influence patients' use of pharmacy services (Edwards *et al.*, 2018).

Community pharmacies provide access to medication for the public, advice on health matters and pharmacy professional services (Mukattash *et al.*, 2018). Services include preventative services, health information resources and chronic disease management programs (Parker *et al.*, 2019). Community pharmacists' responsibilities include dispensing prescriptions, counselling on medication use and ensuring medication safety by preventing prescribing errors (Oseni and Erhun, 2021; Jairoun *et al.*, 2022). They also assess patients, monitor drug therapy, interpret laboratory tests, develop and coordinate care plans, and conduct treatment follow-ups (Bacci and Berenbrok, 2018).

Community pharmacists comprise a substantial proportion of the primary healthcare system and play a considerable role in promoting public health (Tesfaye and Yismaw, 2020; Berenbrok *et al.*, 2022). Accessibility and convenience are key to the evolution of community pharmacists' role in public health. Patients often do not require appointments for consultation and have access to a wide variety of healthcare services, such as screening for NCDs (Akutey *et al.*, 2018; Mukattash *et al.*, 2018). Patients consider community pharmacists to be dependable, and they are often the first point of contact for healthcare information (Melton and Lai, 2017).

Community pharmacies are the most visited healthcare locations for medical advice and treatment due to this accessibility (Mohamed *et al*., 2015; Parker *et al*., 2019; Jairoun *et al*., 2022). They can be classified as independent, franchise or corporate pharmacies (Duckett, 2015). An independent pharmacy is "*a pharmacy or group of pharmacies owned by an individual or group that is not directly affiliated with any chains of pharmacies*" (Bacci *et al.*, 2019). Independent pharmacies are predominantly sole proprietors or part of a group with less than five retail outlets (Duckett, 2015). In rural areas, independent pharmacies or small local franchises tend to provide the majority of community pharmacy access and are responsible for delivering clinical services in these areas (Berenbrok *et al.*, 2022).

Comparative studies between rural and urban independent community pharmacies are limited. However, a review by Howarth *et al*. (2020) found that rural pharmacists tend to provide more professional services and clinical advice. This higher level of pharmaceutical care predominantly occurred in independent pharmacies. Rural pharmacists also tend to have a good rapport with patients and physicians as they communicate more often with their customers than their urban counterparts. They are also keener to take on new roles (Howarth *et al*., 2020). The viability of both rural and urban independent pharmacies is an important determinant of patient access to pharmacy services and healthcare in general (Berenbrok *et al.*, 2022).

The traditional role of the community pharmacist was to supply medicine and treat minor ailments, but they are now directly involved in patient care and part of multidisciplinary teams (Yuan *et al.*, 2019; Nabhani-Gebara *et al.*, 2020). The shift from technical compounding and dispensing roles into a cognitive and patient-centred role can improve the health and wellness of the communities (Duckett, 2015; Berenbrok *et al*., 2022). This change is driven by growing professional dissatisfaction, increased financial pressures, and competition (Freeman *et al.*, 2014).

As community pharmacists have become more involved in disease management through extended clinical roles and services, community pharmacies have become health hubs for patients with chronic diseases (Buss *et al.*, 2018; Carter *et al.*, 2022). Community pharmacists can help improve a patient's overall health by promoting better medication adherence and decreasing drug-related adverse events. This, in turn, decreases unnecessary visits to the prescriber and lessens the number of hospitalisations and readmissions (Mossialos *et al.*, 2015). Community pharmacists can leverage their skills and expertise by offering health

screening programs that enable the early detection of chronic diseases and the identification of related risk factors (Waszyk-Nowaczyk *et al.*, 2020).

This expanding role of the pharmacist has increased expectations about the level of services a pharmacist may offer patients (Sabater-Galindo *et al.*, 2017). An ongoing therapeutic relationship between community pharmacists and patients, referred to as continuity of care, may improve medication adherence and the safe use of medications, leading to better health outcomes (Choi and Lee, 2022). Patient perception of clinical services is often influenced by the frequency of use and the perceived value derived from these services. Furthermore, a well-established pharmacist-patient relationship is a key facilitator for the delivery of community pharmacy clinical services (Hindi *et al*., 2018).

Community pharmacists should actively promote their ability to competently deliver clinical services by engaging and educating consumers (Vella *et al.*, 2015; Bacci *et al.*, 2019). Despite evidence of positive outcomes and patients' perceptions of clinical services, uptake and awareness of community pharmacy services have been limited. The design of effective community pharmacy services should, therefore, include identifying the barriers to the provision of these services as well as taking patients' preferences into account (Hindi *et al*., 2018). It also requires a redefinition of current roles and better utilisation of community pharmacists' skills by delegating tasks and allocating responsibilities to release time for clinical service provision (Davies *et al*., 2014).

2.4 Community Pharmacy in South Africa

In South Africa, Community pharmacies are predominantly located in urban and well-resourced metropolitan areas (Gilbert, 1999; Moodley and Suleman, 2020). In 2023, 3,876 community pharmacies were registered with the South African Pharmacy Council (SAPC) (South African Pharmacy Council, 2023e). Most South African pharmacists work in community pharmacies (Gray *et al*., 2016). Community pharmacies account for over 70% of all pharmacies registered with the SAPC and are classified as corporate/chain or independent (pharmacist-owned) (Ward *et al*., 2014; South African Pharmacy Council, 2023e). Approximately 1250 of these independent pharmacies are represented by the Independent Community Pharmacy Association (ICPA). The ICPA also represents over 2500 pharmacists (Independent Community Pharmacy Association (ICPA), 2020).

Independent ownership previously dominated the community pharmacy landscape; however, chain pharmacies have increased in recent years (Hill and Dowse, 2010). Experts have cited the inability to finance an independent pharmacy and the lack of legislative support as barriers

to growth in the sector. Moreover, independent pharmacies need help competing with corporates with reduced operational costs and more efficient supply chain systems (Ward *et al.*, 2014). Due to financial constraints, many independent pharmacies have closed down or been taken over by corporates in recent years (Gilbert, 2016). The introduction of the single exit price (SEP) pricing system has also resulted in reduced profit margins and pharmacists having to seek alternate revenue streams (Hill and Dowse, 2010).

South Africa has historical imbalances in healthcare access and delivery (Dookie and Singh, 2012). Inequalities in South African society are mirrored in the healthcare sector, with many environmental and socio-economic factors affecting the health status of the community (Gilbert, 1998). The fragmented health system shows many design features of the past. The state-funded public health sector aims to meet the needs of around 85% of the population, with the rest accessing the parallel private healthcare sector (Gray *et al.,* 2016). Community pharmacists almost exclusively serve the private sector (Hill and Dowse, 2010). They supply medicines and provide primary healthcare services to patients with medical aid insurance or those who can pay for them as an out-of-pocket expense (Malangu, 2014; Gilbert, 2016). The unequal distribution of community pharmacies in South Africa does raise concerns about their accessibility and suitability as a means for the delivery of primary healthcare services (Gilbert, 1998). Community pharmacy density is almost eight times higher in urban and metropolitan areas than in underprivileged areas (Ward *et al.*, 2014).

Although there have been significant improvements to healthcare access in South Africa, several significant inequalities still exist in health coverage due to socio-economic factors and geographical accessibility (Tanser *et al*., 2006). The quadruple burden of disease, which includes NCDs and HIV, places further strain on the already embattled public health system (Dookie and Singh, 2012). Steps have been taken to address these challenges by implementing the National Health Insurance (NHI) and re-engineering primary health care (PHC) for a more equitable healthcare system (Bobbins *et al*., 2020).

The core principles of PHC include equity, efficiency, effectiveness, and affordability. Health systems can be strengthened and patient care enhanced by aligning them with these principles (Bobbins *et al*., 2020). Some challenges facing PHC implementation include the lack of financial commitments, inadequate human resources, and inefficient use of available resources (Dookie and Singh, 2012). South African community pharmacists represent an untapped, highly trained resource that is readily available to assist with overcoming these challenges (Gilbert, 1998). Enhancing the role of community pharmacists in public health

would involve further education and upliftment of skills as well as adequate remuneration for their services (Agomo and Ogunleye, 2014).

Expanding the pharmacist's clinical role has led to enhanced services, such as PHC, being delivered in community pharmacies (Silvaggi *et al*., 2017; Schindel *et al*., 2022). Therefore, pharmaceutical care and clinical services will be central to treatment outcomes in both PHC and the NHI (Bobbins *et al*., 2020). Expanded PHC services that pharmacists can provide include screening for NCDs, smoking cessation, treatment of minor ailments, HIV testing and counselling services, health promotion and lifestyle advice (Silvaggi *et al*., 2017; Akutey *et al*., 2018; Tesfaye and Yismaw, 2020; Oseni and Erhun, 2021). Administering immunisations for various vaccine-preventable diseases (VPDs) and providing information on the importance of immunisation are well-utilised services in community pharmacies (Bacci and Berenbrok, 2018; Shen and Peterson, 2020).

The move towards universal health coverage (UHC) through the NHI intends to address the imbalances in the current two-tiered healthcare system (Gray *et al*., 2016). The NHI was conceived to deliver the constitutional right to healthcare for citizens in South Africa. It will provide equity and improve access to services for most citizens by merging risk, funds, and resources (National Department of Health, 2020). The NHI system also intends to protect low-income earners from healthcare-related financial risks (Ward *et al.*, 2014). Pharmacists will play a vital role in the development, operation, and management of the NHI system. They can ensure equitable access to healthcare and medicines for patients across all sectors (Gray *et al*., 2016). The established role of the community pharmacist in South Africa is set to evolve with enhanced services such as the New Medicine Service (NMS) being offered. NMS intends to support patients with newly prescribed medicines to ensure that they start therapy, ensure compliance and that no problems occur with treatment regimens (Naidoo *et al.*, 2023).

2.5 Pharmacist Prescribing and PCDT

Pharmacist prescribing is seen as a significant change from the traditional dispensing role and has been implemented in various countries and across different care settings, including community pharmacies (Adams and Weaver, 2016). It further extends the role of pharmacists by involving them in the prescription decision-making process (Dawoud *et al.*, 2011). The rationale for extending prescribing to pharmacists is to improve access to healthcare services and medicine for the public. It also creates a collaborative approach to care and optimises pharmacists' patient care skills and knowledge (Malangu, 2014). Additional benefits may include improved pharmacist job satisfaction and reduced clinician workloads (Jebara *et al.*, 2018). Patients generally have a favourable view of pharmacist prescribing as they benefit

from increased access to medication and improved relationships with their pharmacists (Famiyeh and McCarthy, 2017). The main barriers to pharmacist prescribing are insufficient support, lack of reimbursement, and inadequate training (Zhou *et al.*, 2019). Concerns have also been raised regarding the competency of pharmacists' diagnostic skills and the safety of pharmacist prescribing (Jebara *et al.*, 2018).

Various pharmacist prescribing models exist, each of which differs in the degree of responsibility assigned to the pharmacist. These include collaborative, dependent and independent prescribing (Famiyeh and McCarthy, 2017; Zhou *et al*., 2019). Collaborative prescribing, also known as collaborative drug therapy management, involves an understanding between a pharmacist and a doctor regarding which patients the pharmacist can assess and what drugs they may prescribe (Tsuyuki and Watson, 2020). In collaborative prescribing, pharmacists select, monitor, and adjust therapy if necessary. This occurs after an initial diagnosis and treatment plan is formulated by a clinician (Gray *et al*., 2016).

The dependent prescribing model is the most common and involves patient follow-up being delegated to the pharmacist. It can include prescribing according to a formulary and protocols, as well as repeat prescribing (Dawoud *et al.*, 2011). In the UK, a form of dependent prescribing called supplementary prescribing was implemented in 2003. It is defined as a "*voluntary agreement between an independent prescriber such as a medical doctor and the dependent prescriber (pharmacist) to implement an agreed patient-specific clinical management plan (CMP)"* (Jebara *et al.*, 2018). Independent prescribing is the most autonomous model in which a pharmacist assumes responsibility for assessing a patient, initiating therapy, and managing clinical outcomes (Famiyeh and McCarthy, 2017). The fundamental feature of independent prescribing is that pharmacists can make prescribing decisions without requiring prior approval from a doctor or authorised prescriber (Tsuyuki and Watson, 2020). Independent prescribing is not entirely uncoordinated, as pharmacists must comply with specific parameters, such as prescribing certain medications for particular diseases while keeping the patient's doctor informed and consulting with them if required (Adams and Weaver, 2016).

PCDT is considered to be a form of independent prescribing. It is an additional service that allows community pharmacists in South Africa to deliver expanded primary healthcare services to the public (Ward *et al*., 2014; Tromp *et al*., 2023). Pharmacists require additional postgraduate training to provide PCDT services (Malangu, 2014). After completing supplementary training, PCDT pharmacists must register their qualifications with the SAPC. Subsequently, they are issued with a permit in terms of Section 22A (15) of the Medicines and Related Substances Act (Act 101 of 1965) as amended (Mostert, 2020). The conditions a

pharmacist may autonomously diagnose and the medicines they may prescribe and dispense to treat these conditions are derived from the Primary Health Care Level Standard Treatment Guidelines (PHC STG) and Essential Medicines List. The permit can only be used at specific pharmacy premises that have been approved by the SAPC (Tromp *et al*., 2023).

The PCDT qualification enhances a pharmacist's core clinical and pharmaceutical knowledge and skills, expanding the scope of service to treat minor ailments and manage chronic diseases (Malangu, 2014). As the NHI approaches, community pharmacists will be able to contribute to the system's success. They will also be essential to the PHC system as providers of affordable clinical pharmacy services, such as PCDT (Mostert, 2020).

2.6 Clinical Role of the Pharmacist and Community Pharmacy Clinical Services

The pharmacist's role in community pharmacy practice traditionally involves dispensing prescription and over-the-counter (OTC) medications (Beney *et al*., 2010). However, this has constrained the room to develop clinical skills, leading to deskilling and significant professional discontent (Bissell *et al.*, 2008). Community pharmacy has progressed beyond the mere compounding and distribution of medications to encompass the provision of pharmaceutical care and various healthcare services (Roberts *et al*., 2008; El-Dahiyat *et al*., 2019). Community pharmacists are now able to do more than dispense medication. Their scope of practice has shifted from primarily commercial and product-focused to patient-orientated and promoting health outcomes (Asayut *et al.*, 2018; Bacci *et al.*, 2019; de Souza *et al.*, 2022).

Pharmacists are expanding their practice settings with new roles and professional services emerging. Ongoing expansion and differentiation of the role of pharmacists, as well as changes in community pharmacy practices, are necessary for professional growth and for the survival of community pharmacies (Moullin *et al.*, 2013). The role of community pharmacists has evolved due to various factors. Independent pharmacies have to compete with chain pharmacies to retain customer loyalty. Additionally, decreased income from dispensing has prompted pharmacists to explore other sources of revenue, including offering clinical services (Doucette *et al.*, 2017).

New policies encourage pharmacists to take a patient-centred approach and collaborate with other healthcare providers to provide coordinated care, allowing pharmacists to fully use their clinical potential (Mossialos *et al.*, 2015). Pharmacists have also taken on different roles in patient care, including assessing and managing a patient’s drug therapy needs, promoting medication adherence and collaborating with other healthcare workers (Schindel *et al.*, 2017; de Souza *et al.*, 2022). These changes have also enabled pharmacists to promote and support

the safe, effective, and rational use of medicines while playing a more substantial role in primary care and public health (Sabater-Galindo *et al.*, 2017). Pharmacists have begun to provide patient-centred services such as point-of-care testing, vaccinations, and chronic disease management (Berenbrok *et al.*, 2022). Pharmacist-initiated management of Antiretroviral therapy (PIMART) is a newly proposed service that pharmacists can offer to help prevent and treat HIV/AIDS. PIMART is a form of PIT where pharmacists can administer first-line Antiretroviral treatment (ART) and refer patients with discordant results for further management by a clinician (South African Pharmacy Council, 2023d).

Implementing clinical services has had significant social, economic and policy implications. It encourages pharmacist independence but requires policy and legislative changes (Campeau Calfat *et al.*, 2021). This development is in line with the principles of pharmaceutical care, which has been promoted by the WHO and the International Pharmaceutical Federation (FIP) to improve patient care (Schindel *et al.*, 2017). The role that pharmacists play in the healthcare system continues to evolve. Healthcare is becoming more focused on providing quality care at a lower cost while prioritising positive patient outcomes. This affords community pharmacists, who were already highly accessible, an opportunity to take on these extended roles (Melton and Lai, 2017).

Community pharmacists are in an ideal position to positively impact patients' health by providing referrals to community resources (Melton and Lai, 2017; Miller *et al.*, 2019). Community pharmacists have also contributed to the management of chronic diseases through chronic care management (CCM). CCM involves a comprehensive care plan in which a patient's medical needs are assessed, followed by a review of their medication adherence and potential drug interactions. Collaboration with doctors and primary care clinics in CCM has enhanced clinical outcomes, such as improved blood pressure control (Hoehns *et al.*, 2020).

Providing medication therapy management (MTM) services is a novel concept that differs significantly from traditional community pharmacists' roles, such as dispensing. It involves using established relationships with patients to make recommendations about pharmacotherapy (Bissell *et al.*, 2008; Adeoye *et al.*, 2019). MTM comprises medication reviews by pharmacists and aims to improve medication use in patients with chronic conditions who are on multiple medications. MTM is an example of efforts to expand the scope of practice of community pharmacists and augment their role within the health system (Patton *et al.*, 2018).

Community pharmacists significantly contributed to the primary healthcare response to the COVID-19 pandemic by ensuring that pharmaceutical service delivery continued. This evolved into various public health roles, such as screening COVID-19 cases and testing, educating the public about prevention, and providing and administering COVID-19 vaccinations (Durand *et al.*, 2022). The pandemic led to the expansion of professional roles and responsibilities across the globe, such as renewing chronic treatment prescriptions and dispensing emergency prescriptions (Weidmann *et al*., 2022). It also led to the recognition of community pharmacists as being essential to public health responses (Hayden and Parkin, 2020).

It is worth noting that despite the movement towards clinical expansion and the potential opportunities for community pharmacists in public health, several barriers still need to be addressed. Many community pharmacists operate at a basic level and are satisfied with their current roles. Some are reluctant to give up their dispensing and drug distribution responsibilities as they believe that the additional training would be time-consuming or too daunting (Braund *et al.*, 2012; Agomo and Ogunleye, 2014; Schindel *et al.*, 2017). Most community pharmacists are not involved in patient-orientated services; as a result, the depth and impact of clinical services are often limited (Albabtain *et al.*, 2021). A significant barrier to implementing patient-orientated services is the need for a suitable remuneration model, as pharmacists are primarily compensated for the sale of a product rather than service provision (Mossialos *et al*., 2015; Weidmann *et al*., 2022).

Pharmacists vary in their readiness to assume novel roles and responsibilities, and they hold different perspectives regarding the definition of these roles. This uncertainty surrounding the pharmacist's role has affected the expectations of patients and other healthcare providers and impacted how pharmacists comprehend and execute these roles (Schindel *et al.*, 2017). The lack of role clarity and improperly planned integration of pharmacists into the healthcare team can lead to difficulty, instability, and professional tensions between pharmacists and other healthcare professionals (Nabhani-Gebara *et al.*, 2020). The lack of clinical service delivery stems from the historical role of pharmacists. Clinicians and patients associate pharmacists with their traditional roles of drug distribution and often see their extended roles as peripheral to clinical services (Campeau Calfat *et al.*, 2021).

Clinicians have expressed concerns about the legality and competency of pharmacists performing expanded clinical roles, such as prescribing for minor ailments (Patton *et al.*, 2018). Patients also tend to be ambivalent towards pharmacists taking a significant role in chronic disease management (Bissell *et al.*, 2008). They often associate community pharmacists with a dispenser role and do not necessarily attribute the service provider role to them. Patients

recognise the medication expertise of pharmacists and rate traditional roles, such as advice on medicine usage and side effects, over roles in public health issues (Hindi *et al*., 2018). For patients to distinguish between these roles, pharmacists need to improve patient awareness and clarify their expanded clinical role by promoting the types of professional and clinical services they offer (Sabater-Galindo *et al.*, 2017). Clinical services, such as medicine reviews, are impacted by patient expectations regarding the pharmacist's role and their ability to provide relevant information (Patton *et al.*, 2018).

A better understanding of their role in patient care will help community pharmacists accept greater responsibility in clinical service delivery (Schindel *et al.*, 2017). Patients and clinicians also need a better understanding of pharmacists' services to appreciate their role in healthcare. Increased knowledge of pharmacists' skills will foster interprofessional collaboration, thereby enhancing clinical service delivery (Campeau Calfat *et al.*, 2021). Involvement with Interprofessional teams has been associated with superior clinical service delivery in community pharmacies (Doucette *et al.*, 2017). Promoting clinical services and the pharmacy as a setting for healthcare delivery will assist in combating the lack of awareness of the pharmacist's clinical role (Hindi *et al*., 2018).

2.7 Types of Community Pharmacy Clinical Services

The role of community pharmacists has evolved to encompass a range of clinical services prioritising patient care over product sales. Clinical services, often referred to as community pharmacy services, cover the entire spectrum of pharmaceutical care and health promotion activities (Campeau Calfat *et al.*, 2021). The extension of community pharmacists has subsequently led to an improvement in the quality of patient care and optimisation of drug therapy through the provision of clinical services (Albabtain *et al.*, 2021). Community pharmacists deliver effective clinical services that have yielded positive outcomes in diabetes, cardiovascular disease (CVD), asthma, smoking cessation, weight reduction and addiction support (Buss *et al.*, 2018). Measurable clinical outcomes of clinical services include improvements in blood pressure, blood glucose and medication adherence (Sabater-Hernández *et al.*, 2016; Asayut *et al.*, 2018).

Additionally, clinical services in community pharmacies, such as pharmacotherapy review and health education, contribute to the public health system and improve patient health and well-being (de Souza *et al.*, 2022). The implementation of community pharmacy services could be enhanced by coordinating them with patient care provided by other health professionals (Buss *et al.*, 2018). Studies have shown that working in an interprofessional team improves communication between community pharmacists and other healthcare providers, leading to

more efficient clinical service delivery. This collective approach helps ensure that patients receive the best possible care, as healthcare professionals from various disciplines can share their expertise and collaborate to formulate comprehensive treatment plans (Doucette *et al.*, 2017). Table 1 summarises the extensive clinical services from the literature offered by community pharmacists outside of South Africa.

Table 1: Summary of community pharmacy clinical services offered outside South Africa

Clinical Pharmacy Service	Service details and notes	Countries where services are provided	References
Anticoagulation management and monitoring services	• The aim is to stabilise the International Normalized ratio (INR) within the target ratio • Counsel patients on warfarin use including side effects and drug-drug interactions	• Canada • New Zealand • United Kingdom (UK)	(Harrison *et al*., 2015; Chartrand *et al*., 2018; Ingram *et al*., 2018)
Antimicrobial Stewardship	• Promote the rational use of antimicrobials • Provide educational resources and awareness campaigns for patients • Consult on the duration of antibiotic therapy and the use of unnecessary antibiotics	• UK • USA • Brazil • Australia • United Arab Emirates (UAE) • Saudi Arabia • Pakistan	(Jones *et al.*, 2018; Bishop *et al.*, 2019; Akbar *et al.*, 2021; de Souza *et al.*, 2022; Haseeb *et al.*, 2022; Hashmi *et al.*, 2023; Lim *et al.*, 2023)
Asthma, COPD and Pulmonary related services	• Asthma and COPD management, screening and support • Educational interventions • Medication adherence and improvement of drug therapy • Provision of spirometry • Pharmacy referral service for lung cancer symptoms	• Australia • Iran • Spain • UK • China • USA • Netherlands • Italy	(Bereznicki *et al.*, 2013; Wright *et al.*, 2015; Garcia-Cardenas *et al.*, 2016; Senna *et al.*, 2017; Deeks *et al.*, 2018; Hu *et al.*, 2020; Holland-Hart *et al.*, 2021; Mahdavi and Esmaily, 2021; Valentino *et al.*, 2021)
Cardiovascular Health Screening services	• Blood pressure monitoring • Medication management of anti-hypertensives • Cardiovascular disease risk assessment and screening – uncontrolled hypertension, dyslipidaemia, smoking, obesity • Lifestyle interventions for CVD • CVD prevention and management	• UK • Iran • Australia • Japan • USA • Canada	(Willis *et al.*, 2014; Tsuyuki *et al.*, 2016; Jahangard-Rafsanjani *et al.*, 2017; Mc Namara *et al.*, 2017; Okada *et al.*, 2017; Barrett and Hodgkinson, 2019; Vordenberg *et al.*, 2019; Hoehns *et al.*, 2020)
Covid-19 pharmacy services and pharmacist interventions	• Pharmaceutical care – medication management and medication adherence • Patient education and information • Supply of masks and hand sanitizers • Point-of-care (POC) testing – Antigen testing • Referral of patients with symptoms	• Western Europe – Norway, Germany, Switzerland, Ireland, Portugal • UK • USA	(Khojah, 2020; Falconer *et al*., 2021; Ghibu *et al*., 2021; Kretchy *et al*., 2021; Maidment *et al*., 2021; Paudyal *et al*., 2021; Risanger *et al*., 2021; Thomas *et al*., 2021;

Clinical Pharmacy Service	Service details and notes	Countries where services are provided	References
	• Prescription repeats and emergency supply of medications • Telemedicine/Telepharmacy • Vaccination • Drive-through services	• Australia • Saudi Arabia • Ghana • Norway • China • Romania • Qatar • Turkey • Czech Republic	Zheng *et al*., 2021; Costa *et al*., 2022)
Diabetes screening and prevention	• Pharmaceutical care consultations and educational interventions • Medication management, review and follow up – counselling on safe use of medication and medication adherence • Collaborative care with clinicians • Glycaemic control - Measurement of Blood glucose and HbA1c • CVD risk assessment in Diabetic patients • Diabetes screening and prevention	• Australia • USA • Norway • UK • Jordan • Brazil • Canada	(Jarab *et al.*, 2012; Kjeldsen *et al.*, 2015; Roque Obreli-Neto *et al.*, 2015; Al Hamarneh *et al.*, 2017; Aguiar *et al.*, 2018; Risøy *et al.*, 2018; Katangwe *et al.*, 2020; Roszak and Ferreri, 2020; Siu *et al.*, 2021)
HIV/AIDS testing and Management	• HIV rapid, POC testing and screening • PrEP and PEP • Pre-and Post-test counselling • Management of co-morbidities and prevention of opportunistic infections • Counselling on ART regimens: drug-drug interactions, adherence, adverse effects, changes to regimens • MTM services • HIV/AIDS resource centres	• USA • Nigeria • South Africa	(Kauffman *et al*., 2012; Weidle *et al*., 2014; Gilbert and Gerzenshtein, 2016; Tung *et al*., 2018; Lopez *et al*., 2020; Kherghehpoush and McKeirnan, 2021; Oseni and Erhun, 2021; Duong *et al*., 2022)
Infectious Diseases (ID): point-of-care (POC) testing and treatment	• Screen for communicable diseases of public health interest • Aid in the rapid identification and diagnosis of treatable infectious diseases • POC tests include: Influenza, Hepatitis C (HCV), Hepatitis B (HBV), Group A streptococcus (GAS),	• USA • UK	(Gubbins *et al*., 2014, 2017; Akinwale *et al*., 2015; Gilbert and Gerzenshtein, 2016; Dong *et al*., 2017; Klepser *et al*., 2019; Risanger *et al*., 2021; Duong *et al*., 2022; Ghazzawi *et al*., 2023;

Clinical Pharmacy Service	Service details and notes	Countries where services are provided	References
	HIV, Infectious mononucleosis antibodies, COVID-19		Kherghehpoush and McKeirnan, 2023; Koski *et al*., 2023)
Immunisation and Vaccination	• Community pharmacies act as vaccination sites • Participate in public health campaigns to improve vaccination rates • Educate patients and the public about the benefits of vaccination • Vaccinations and immunisations include: Influenza, COVID-19, Pneumococcal, hepatitis B, measles, mumps, rubella, polio, herpes zoster, meningococcal and tetanus	• UK • USA • Australia • Taiwan	(Anderson and Thornley, 2016; Burson *et al*., 2016; McConeghy and Wing, 2016; Rhodes *et al*., 2017; Tseng *et al*., 2019; Lee *et al*., 2020; Shen and Peterson, 2020; Durand *et al*., 2022)
Medication management services, Medication Therapy Management (MTM) and Medication reviews. Also includes Medicine Use reviews (MUR) and new medicine services (NMS)	• Review of a patients drug therapy regimen • Pharmacist interventions which aim to improve drug knowledge and to identify and resolve drug related problems (DRPs) • Medication reviews optimise drug use and improve health outcomes for patients. • Prevent adverse drug events and improve adherence • Pharmacist-led and in collaboration with other healthcare professionals and the patient	• USA • UK • New Zealand • Spain • Malaysia • Ghana • Canada • Brazil	(Pestka *et al*., 2016; Jokanovic et al., 2017; Edwards *et al*., 2018; Adeoye *et al*., 2019; De Oliveira Santos Silva *et al*., 2019; Brandt *et al*., 2020; Hikaka *et al*., 2020; Varas-Doval *et al*., 2020; Kretchy *et al*., 2021; Thomas *et al*., 2021; Mustafa *et al*., 2023)
Mother and child services	• Counselling and providing services to pregnant and breast-feeding women on medication use and recommend safe OTC medicines • Provide healthcare information • Recommending vitamins and food supplements • Immunisations for mother and child • MUR and NMS for children • Minor ailment management for mother and child	• Ethiopia, Nigeria, • Kuwait • Australia • UK (England) • France, • Thailand, • USA	(Sim *et al*., 2017; Albassam and Awad, 2018; Aston *et al*., 2018; Ayele *et al*., 2021; Rashed *et al*., 2022)
Pharmacist Minor Ailment Services (PMAS)	• PMAS facilitate the treatment and management of self-limiting or uncomplicated ailments in a structured manner. Examples include: Headache, coughs and colds, diarrhoea lice and scabies, allergies and back pain • Provision of OTC medication	• UK • Canada • Qatar • New Zealand • Australia • Costa Rica	Nazar and Nazar, 2019; Gilson *et al*., 2021; Yusuff *et al*., 2021; Hikaka *et al*., 2023; Makhlouf *et al*., 2023; Zavaleta-Monestel *et al*., 2023)

Clinical Pharmacy Service	Service details and notes	Countries where services are provided	References
	• In developing countries - PMAS is unstructured and not guided by a specific protocol		
Sexual and reproductive health services (SRHS)	• Emergency contraception • Chlamydia screening • Provision of condoms • Oral contraception • Administration of contraception injection • Screening and treatment of Sexually transmitted infections (STIs) – self-sampling kits • Family planning and preconception care	• USA • UK • Belgium and Netherlands • Thailand • Jamaica • Latin America	(Greene *et al.*, 2006; Heller and Cameron, 2016; Michie *et al.*, 2016; Gonsalves and Hindin, 2017; Bright and DiPietro Mager, 2019; Cameron *et al.*, 2020; Gauly *et al.*, 2021; Ceulemans *et al.*, 2022)
• Wellness Coaching • Smoking cessation • Alcohol reduction • Weight management	• Smoking cessation interventions include nicotine replacement therapy (NRT) and providing advice on behaviour change strategies • Alcohol reduction interventions - advice on reduced consumption and avoid excessive drinking • Weight management interventions – Advice on diet, exercise and behaviour change • Wellness coaching leads to improvements in CVD risk factors	• UK (England and Scotland) • USA • Australia • South-east Asia - (Thailand, Malaysia and Indonesia • United Arab Emirates and Qatar • Italy and Spain	(Krska and Morecroft, 2010; DiDonato *et al*., 2013; Fitzgerald *et al*., 2015; Brown *et al*., 2016; Fakih, Marriott and Hussainy, 2016; Hermansyah *et al*., 2016; Sohanpal *et al*., 2016; Buss *et al*., 2018; Rosenthal *et al*., 2018; Alzubaidi *et al*., 2022; Appalasamy *et al*., 2022; Gómez Martínez *et al*., 2024)
Addiction support services	• Needle and syringe programmes – Supply of sterile syringes and safe disposal to reduce risk of transmission of HCV and HIV • Opioid substitution programme – Provision of a substitute drugs to reduce opioid overdose death - Dispensing of naloxone or methadone. Provision of non-opioid analgesics • Screening tools to identify patients at risk for opioid misuse • Refer patients for rehabilitation	• USA • UK • Ireland • Australia • Estonia • Malaysia	(McVeigh *et al*., 2017; Sawangjit *et al*.,, 2017; Buss *et al*., 2018; Look *et al*., 2019; Amador-Fernández *et al*., 2023; Banawis *et al*., 2023; Nichols *et al*., 2023; Rawal *et al*., 2023)

2.7.1 Clinical Service Terminology

Several terms define service provision by community pharmacists; however, none truly incorporate the extensive array of professional services offered by a community pharmacist. Most pharmacy service definitions prioritise pharmaceutical care concepts such as drug safety and effectiveness. This inadvertently limits the role of community pharmacists and excludes other activities, services, and programs they offer (Moullin *et al.*, 2013). These definitions encompass community pharmacy (clinical) services, extended pharmacy services, non-dispensing services, cognitive pharmaceutical services, professional pharmacy/health services, patient-orientated services, and advanced pharmacy services (Grindrod *et al.*, 2010; Malet-Larrea *et al.*, 2016; Rosenthal *et al.*, 2016; Tesfaye and Yismaw, 2020; Campeau Calfat *et al.*, 2021).

Recognising the need for a comprehensive term for community pharmacy services, Moullin *et al.* (2013) proposed the term professional pharmacy services (PPS). PPS can be seen as any activity that uses a pharmacist's specialised healthcare knowledge to improve patient care via an evidence-based approach. Services can be conducted in a pharmacy setting, organised off-site by a pharmacy using its resources or even by other health professionals within a pharmacy. The objective of PPS is to advance health outcomes and increase healthcare value (Moullin *et al.*, 2013). Pharmacists also conduct PPS to optimise pharmacotherapy and disease management by interacting with the patient, the public or another healthcare provider (Malet-Larrea *et al*., 2016; Perraudin *et al*., 2016). This study will use the terms community pharmacy clinical services (CPCS) or clinical services. Whenever a pharmacy is mentioned, it refers to a community pharmacy.

A systematic review of clinical services provided by community pharmacies found that most services are related to pharmaceutical care, public health initiatives, lifestyle modification and screening for the risk of chronic diseases (Asayut *et al.*, 2018). The range of clinical services delivered varies from pharmacy to pharmacy. It includes medicine management and review, vaccinations, point-of-care testing, vital signs assessment, and physical examination. Other services include treatment of minor ailments, screening and monitoring programs, and disease state management for chronic conditions (Jacobs *et al*., 2011; Perraudin *et al*., 2016; Doucette *et al*., 2017; Siu *et al*., 2021).

Public health services may include family planning and emergency contraception; promotion of cardiovascular health; influenza and pneumococcal immunisations, substance misuse, infection prevention and control; and osteoporosis screening (Agomo and Ogunleye, 2014; Asayut *et al*., 2018; Hindi *et al*., 2018). Community pharmacists also provide patient education;

they initiate, monitor and adjust drug therapy; order and interpret laboratory tests; conduct adherence assessments; and develop and follow up on care plans (Bacci *et al.*, 2019; Yuan *et al.*, 2019). Health promotion activities include health screenings and referrals, smoking cessation services, lifestyle advice such as healthy eating and exercise information, as well as alcohol reduction and weight management interventions (Kelling, 2015; Brown *et al.*, 2016; Parker *et al.*, 2019; Tesfaye and Yismaw, 2020).

2.7.2 Medication Reviews and Medication Therapy Management (MTM)

Medication or pharmacotherapy review, medication reconciliation, and pharmacotherapeutic monitoring are newer examples of clinical interventions offered by community pharmacists (de Souza *et al.*, 2022). Medication reviews are structured assessments of patients' pharmacotherapy to optimise drug use and improve health outcomes" (De Oliveira Santos Silva *et al.*, 2019). Pharmacists usually conduct medication reviews through a systematic and critical evaluation of a patient's medication history and pharmacotherapy in the context of their current disease state and health objectives. They are conducted closely with the patient and prescriber to identify and alleviate medication therapy problems (Jokanovic *et al*., 2017; Brandt *et al*., 2020; Mustafa *et al*., 2023). Pharmacist-led medicine reviews have been shown to reduce medicine-related harm, such as inappropriate prescribing and adverse drug events (ADEs) (Hikaka *et al.*, 2020).

The benefits of medication reviews include reduced DRPs, improved medication adherence, and clinical outcomes (Melton and Lai, 2017). Medication therapy management (MTM) is a medicine review service that aims to optimise medication regimens and enhance therapeutic outcomes for individual patients with various diseases (Albabtain *et al.*, 2021). Pharmacists are integral to primary care teams and often carry out medicine reviews. They provide valuable drug information and educate other healthcare professionals and patients about medication management. This increases the chances of detecting DRPs and reducing adverse outcomes (Varas-Doval *et al.*, 2020). It also leads to improvements in disease markers and therapeutic outcomes (Jorgenson *et al.*, 2014).

It should be noted that while pharmacists in the UK, USA and Australia are remunerated for medication reviews, this is not the case in many other countries (Jokanovic *et al.*, 2017). Remuneration for any service is essential; a lack thereof can impede its implementation (Varas-Doval *et al.*, 2020). Successful implementation involves addressing barriers such as remuneration, lack of personnel and financial constraints (Mustafa *et al*., 2023).

2.7.3 Chronic Disease Management and NCDs

Pharmacist chronic disease management has primarily focused on NCDs such as asthma, hypertension, cardiovascular disease (CVD), and diabetes mellitus (Buss *et al.*, 2018). These chronic diseases have a significant socioeconomic impact, responsible for over 17 million deaths annually in the age group under 70 years (World Health Organization, 2023c). In South Africa, NCDs accounted for 50.9% of all deaths, and this burden continues to rise (National Department of Health, 2022). Pharmacists provide essential clinical services that assist in the screening and monitoring of NCDs, tracking disease progression and assessing the response to pharmacotherapy (Eades *et al.*, 2011; Akutey *et al.*, 2018).

Pharmacist-driven chronic disease management programs have been associated with favourable clinical outcomes, including improved blood pressure and asthma control and reductions in weight and body mass index (BMI) (Yuan *et al.*, 2019). Other chronic diseases managed by pharmacists include arthritis, palliative care, depression, and osteoporosis (Asayut *et al.*, 2018). A systematic review of pharmacist-led interventions in community pharmacies demonstrated positive effects on diabetes markers (HbA1c), cholesterol and medication adherence in chronic disease (Jokanovic *et al.*, 2017). Screening for diabetes and cardiovascular disease (CVD) risk factors in community pharmacies are feasible and can help identify unknown cases of hypertension and hypercholesterolemia (Willis *et al.*, 2014).

CVD is a leading cause of morbidity and mortality globally, posing a significant public health challenge. Pharmacists can play a vital role in the prevention, detection and management of hypertension, an important modifiable risk factor for CVD. This is facilitated by primary-care interventions such as BP screening and monitoring, along with public health promotion and medicine optimisation (Barrett and Hodgkinson, 2019). Additional assessments include lipid profiles, HbA1c and lifestyle habits (Sabater-Hernández *et al.*, 2016). Counselling hypertensive patients has improved disease knowledge, medication adherence, and BP control (El-Dahiyat *et al.*, 2019).

The COMPASS-BP study demonstrated the practicality and benefits of implementing a pharmacist-provided lifestyle advice program, leading to improved BP Control for patients with hypertension (Okada *et al.*, 2017). The RxACTION and RxEACH randomised trials demonstrated that community pharmacy-based interventions such as pharmacist prescribing and MTM significantly reduce CVD risk (Tsuyuki *et al.*, 2015, 2016). In addition to improvements to clinical parameters, pharmaceutical care and clinical services are cost-effective and have an insignificant impact on healthcare costs (Roque Obreli-Neto *et al.*, 2015).

The pharmacist's role in providing diabetes management to patients is invaluable. Risøy *et al*. (2018) found that it was feasible to conduct diabetes risk assessment and HbA1c measurements in community pharmacies in Norway and that these services could help identify undiagnosed type 2 diabetes. Pharmacist-led interventions, such as diabetes education and medication counselling, can improve clinical outcomes in type 2 diabetes patients (Bukhsh *et al.*, 2018). Several randomised control trials (RCTs) have demonstrated the impact of pharmacist interventions on glycaemic control in type 1 and type 2 diabetic patients (Deters *et al.*, 2018). Intervention group patients displayed significant improvements in clinical outcomes, including reduced HbA1c levels compared to control groups, while showing noteworthy increases in medication adherence and implementation of lifestyle change recommendations (Jarab *et al.*, 2012).

Improvements in glycaemic control can help prevent the development of diabetes-related complications (Aguiar *et al.*, 2018). A Danish study showed that comprehensive and individually targeted interventions provided by community pharmacists to patients with type 2 diabetes could improve adherence and disease self-management. Patients who received more intensive interventions provided by pharmacists, including diabetes education and medication counselling and review, showed more significant improvement when compared to interventions by non-pharmacists (Kjeldsen *et al.*, 2015). Pharmacist interventions lead to improvements in the patient's overall health, well-being, and knowledge of the disease (Melton and Lai, 2017).

Asthma is a major NCD which affects both adults and children. In 2019, the WHO estimated that 262 million people were affected by asthma, with 455,000 deaths attributed to the disease (World Health Organization, 2023a). Community pharmacists can play a constructive role in managing respiratory conditions such as asthma by promoting access to effective medications used appropriately by patients (Mahdavi and Esmaily, 2021). Medication adherence and inhalation techniques are significant areas of concern in asthmatic patients. Therefore, routine medication reviews by a pharmacist are necessary to prevent suboptimal disease management (Garcia-Cardenas *et al.*, 2016). Dispensing records may be used to identify patients with inadequate disease management (Bereznicki *et al.*, 2013).

A systematic review found that pharmacist interventions positively impacted clinical outcomes in asthma patients, such as measuring asthma control, decreasing asthma severity and symptoms, and improving lung function (Garcia-Cardenas *et al.*, 2016). Pharmacists are involved in the screening and follow-up of asthma patients. Other interventions for asthma

include counselling on trigger avoidance, recommendations to adjust therapy, changes in inhaler device changes and the development of written action plans for medication adjustment (Deeks *et al.*, 2018).

Pharmaceutical care interventions for chronic obstructive pulmonary disease (COPD) have positively affected health outcomes. Benefits include improved quality of life and decreased exacerbations and hospitalisations (Hu *et al.*, 2020). Pharmacist-led interventions also involve educating patients on inhalation techniques, leading to improvements in medication adherence and treatment outcomes. Other interventions may include advising on initiating therapy and substituting inadequate medication or inhalation devices (Ottenbros *et al.*, 2014). The pharmacist's role in COPD management also involves disease prevention, screening at-risk patients, disease counselling and education (Hu *et al.*, 2020).

A recent study by Holland-Hart *et al*. (2021) evaluated a novel community pharmacy-based respiratory service which screened and referred patients with potential lung cancer symptoms. Pharmacists identified patients based on pre-defined criteria, conducted consultations, and filled out screening forms. Eligible patients would then be referred for a chest x-ray at a local hospital, and the results would be sent to a doctor. The service was found to be adequate and may benefit socioeconomically deprived communities with limited access to healthcare. However, further analysis was suggested for its practical implementation in a larger population (Holland-Hart *et al.*, 2021).

2.7.4 Immunisations and Vaccinations

Immunisations can provide long-lasting immunity and reduce the incidence of vaccine-preventable diseases (VPDs) (Lee *et al.*, 2020). Community pharmacists are often the most easily accessible point of healthcare and can play a role in reducing VPDs (Meyer *et al.*, 2018). However, they are often unrecognised in public health immunisation campaigns despite offering convenient access to immunisation services (McConeghy and Wing, 2016; Shen and Peterson, 2020). Community pharmacists are involved in controlling the distribution of vaccines and administering them. They act as immunisation educators by promoting the safety and efficacy of vaccines while highlighting their importance (Al Aloola *et al.*, 2020).

Community pharmacists have also made a considerable contribution to help improve vaccination rates by enhancing access to vaccines, participating in vaccination campaigns, and engaging with under-vaccinated populations (Burson *et al.*, 2016). Community pharmacies act as vaccination centres as they are equipped with the necessary refrigerators

for storing vaccines and are sites where administration can be performed by trained pharmacists or nurses (Tseng *et al.*, 2019).

The National Expanded Program on Immunizations (EPI) in South Africa has significantly reduced morbidity and mortality from VPDs by targeting 11 VPDS that can cause serious illness and death and children. The EPI aligns with WHO recommendations for immunization schedules, making vaccines easily accessible to children as part of the primary healthcare system. This program has played a crucial role in protecting children from VPDs, which cause significant mortality to children under 5 years, as well as reducing the burden of illness and improving public health outcomes (Meyer *et al.*, 2018; Edwin, Mackay and Mda, 2022).

The national coverage rate for all 14 vaccine doses that form part of the EPI was 77% in 2020, with the highest coverage in the Northern Cape (81.6%) followed by Gauteng (81.4%) (Makamba-Mutevedzi, Madhi and Burnett, 2020). Incomplete immunizations are attributed to socioeconomic factors, low levels of parental education, vaccine shortages, and geographical location (Edwin, Mackay and Mda, 2022). The decline in vaccination rates is a significant public health concern as it has led to a resurgence of many VPDs (Rhodes *et al.*, 2017). A total of 1162 laboratory-confirmed cases of Measles were reported by the National Institute of Communicable Diseases (NICD) across eight provinces in South Africa from September 2022 to September 2023. The outbreak was attributed to suboptimal coverage of measles 1 and 2 vaccine doses (UNICEF, 2022; NICD, 2023). Measles dropout rates are often higher than other vaccine doses on the EPI with coverage reported to be as low as 54% for the second measles vaccine (Makamba-Mutevedzi, Madhi and Burnett, 2020).

2.7.5 COVID-19 services

During the COVID-19 pandemic, community pharmacists provided access to COVID-19 vaccines as part of the large-scale vaccination campaign to achieve herd immunity (Lee *et al.*, 2020). Community pharmacists had to adapt their traditional workflow in the face of an unprecedented scenario. Systems were developed to increase vaccine uptake, store vaccines, and prevent vaccine waste through vaccination appointments (McCormick *et al.*, 2023). The pandemic highlighted that pharmacy-based vaccination is not only beneficial for COVID-19 but also for future mass vaccination campaigns (Costa *et al.*, 2022). The accessibility of community pharmacies also led to them becoming sites for COVID-19 testing, as many pharmacists were willing to offer COVID-19 rapid tests. Many patients were satisfied with the testing process, often feeling more comfortable visiting the pharmacy than the hospital, with some pharmacies even offering drive-through test services (Risanger *et al.*, 2021; Koski *et al.*, 2023).

Other community pharmacy interventions and services offered in COVID-19 included the provision of patient information and education on prevention measures, direct care of patients (within their scope of practice), supply of protective masks and hand sanitisers, home delivery of medicines, emergency supply of medications (without prescriptions), and symptom-based referral for suspected cases (Costa *et al.*, 2022). Pharmacists also provided telephone support and advice (telemedicine) during lockdown and to isolating patients (Thomas *et al.*, 2021). The COVID-19 pandemic demonstrated that community pharmacists can provide accessible healthcare and medicine provision. It also emphasised various stakeholders' demand for clinical service provision, as many patients were reluctant to visit other primary healthcare sites. Service expansion was hindered by increased workload, staffing and financial constraints, and the poor recognition of community pharmacists' clinical skills (Paudyal *et al.*, 2021; Warr *et al.*, 2023).

The inception of the pandemic enhanced the pharmacist's role in test provision, infectious disease management, and vaccination services. As most healthcare professionals focused on COVID-19, community pharmacists also assisted with the management of chronic diseases by conducting medication reviews and ensuring medication adherence (Kretchy *et al.*, 2021). This expansion of clinical services in community pharmacies has the potential to eventually benefit the primary healthcare system (Durand *et al.*, 2022).

In South Africa, pharmacists were involved in the provision of COVID-19 testing and the supply and administering of vaccines. Community pharmacists helped improve access by offering immunisation services in their clinics during the COVID-19 vaccine roll-out. These vaccines were administered by nurses or trained pharmacists (Perumal-Pillay, 2021). Pharmacists also played a role in procuring and supplying COVID-19 vaccines (Read, Botha and Jamaloodien, 2023). A barrier to the COVID-19 vaccine rollout in South African community pharmacies was vaccine hesitancy among pharmacists which was attributed to concerns about vaccine-related side effects and a lack of vaccine safety data (Dhindayal, Letsoalo and Gengiah, 2023).

2.7.6 Wellness coaching, Smoking cessation and Addiction support services

Obesity, smoking, and excessive alcohol consumption are preventable risk factors for several diseases, such as diabetes, liver disease, cancer, and CVD (Fitzgerald *et al.*, 2015; Sohanpal *et al.*, 2016; Rosenthal *et al.*, 2018). Wellness coaching and smoking cessation are community pharmacist interventions that have also shown benefits for several chronic conditions (Mossialos *et al.*, 2015). Health promotion activities in community pharmacies can help patients change their lifestyles, which may lead to substantial improvements in cholesterol,

blood glucose and blood pressure control. Wellness coaching and other health promotion activities aim to prevent chronic diseases (DiDonato *et al*., 2013; Buss *et al*., 2018).

Smoking cessation interventions in community pharmacies can be described as a dynamic process with various stages (Alzubaidi *et al.*, 2022). Interventions, which may include counselling, behavioural change support and nicotine replacement therapy (NRT), have led to decreases in smoking rates (Buss *et al.*, 2018). The efficacy of other wellness services, such as weight management and alcohol reduction, is unclear (Brown *et al.*, 2016). Additional research is required to determine which interventions are most effective and sustainable and if there is benefit from these services. Greater public awareness of community pharmacy interventions is also needed (Krska *et al.*, 2010). Community pharmacists can reduce the harms of excessive alcohol use by advising on moderate alcohol consumption (Fitzgerald *et al.*, 2015).

Medical aid wellness programmes focus on improving and maintaining the health status of members through various preventive and wellness initiatives. Medical aid schemes such as Discovery Health and GEMS offer wellness programmes that comprise a variety of health screenings and tests that can identify the risk factors for lifestyle diseases (Discovery Health, 2024). These screenings are often conducted in community pharmacies due to their accessibility and cost-effectiveness. Screenings include BMI assessment, random blood glucose measurement, BP screening, and cholesterol testing with some pharmacies also offering HIV counselling and testing as well as influenza vaccinations. Also included is a lifestyle questionnaire regarding physical activity, diet, smoking status and alcohol intake (GEMS, 2024).

Community pharmacists are also increasingly taking up a role in addiction treatment by offering services such as opioid substitution interventions and needles and syringe programmes (Perraudin *et al*., 2016; Look *et al*., 2019). In some countries, naloxone, a safe and effective opioid antagonist that rapidly reverses the effects of opioids in overdose, is dispensed OTC to patients with opioid use disorder (OUD) to take home and administer (Banawis *et al.*, 2023; Rawal *et al.*, 2023). The needle and syringe programme involves the dispensing of sterile syringes and needles as well as their safe disposal to reduce injectable drug-related harms and prevent the transmission of diseases and bloodborne pathogens such as HIV and Hepatitis C (HCV) (Sawangjit *et al*., 2017; Buss *et al.*, 2018). However, it is worth noting that this service is not currently offered in South Africa.

2.7.7 Point of Care Testing

Point of care testing (POCT) for infectious diseases such as HIV and HCV in community pharmacies allows for early detection of the diseases. It also facilitates access to further care and prevents transmission (Gubbins *et al.*, 2014). POCT and rapid diagnostic test services are a means for community pharmacists to develop their patient care services and are a valuable public health service (Gubbins *et al.*, 2017). Community pharmacies now offer POCT tests for Influenza and group A *streptococcus* (GAS) infections. Disease management programmes for influenza and GAS were developed and proved feasible using POCT for early detection and treatment (Klepser *et al.*, 2019).

The accessibility of community pharmacies means they are an ideal location for POCT services, as demonstrated by the offering of rapid tests during the COVID-19 pandemic. Benefits of POCT include improved access to care and preventing overuse of other healthcare services (Koski *et al.*, 2023). POCT is cost-effective and can also help combat antibiotic resistance in the community. POC C-reactive protein (CRP) testing can differentiate between bacterial and viral respiratory tract infections (RTIs), therefore eliminating the unnecessary use of antibiotics for self-limiting viral RTIs (Gubbins *et al.*, 2017; Chalmers *et al.*, 2022).

2.7.8 Novel Services – Pharmacogenomic Services

Pharmacogenomic screening is a novel service that allows community pharmacies to offer personalised medicine (Alexander *et al.*, 2014; Ferreri *et al.*, 2014). Interpatient genetic variability affects the safety and efficacy of medications, leading to intolerance and adverse drug reactions (ADRs). Pharmacogenomics combines aspects of POCT, where pharmacists collect saliva samples for genetic testing, and MTM, where a pharmacist can interpret and apply genetic testing results to optimise patient therapy while performing medication reviews (Ferreri *et al.*, 2014). Community pharmacists, with their knowledge of pharmacokinetics and pharmacology, are ideally suited to implement this novel service (Papastergiou *et al.*, 2017).

Several novel interventions led by community pharmacists have been proposed or are currently in development. These include providing transitional pharmaceutical care for hospital discharge patients using existing pharmacist interventions and working closely with hospital pharmacists and other healthcare providers (Lech *et al.*, 2022). These services aim to ensure continuity of care and provide out-of-hospital support. They also help identify and minimise DRPs post-discharge (Khayyat *et al.*, 2021). Interventions to improve the selection of safe OTC medications and engagement with older adults have been facilitated through dedicated senior sections in community pharmacies (Gilson *et al.*, 2021).

Community pharmacists are also well-placed to support patients with advanced cancer pain, which is frequently complex and poorly controlled. Medicine optimisation interventions, both in person and via telephone, can be beneficial in optimising treatment for patients who have yet to or cannot access palliative care resources to manage their pain (Edwards *et al.*, 2018). An overview of the other novel and innovative clinical services offered in community pharmacies across the world is presented in Table 2. These services include depression screenings, dental and oral healthcare services, POCT for C-reactive protein (CRP) and telemedicine services.

2.7.9 HIV/AIDS Services and PIMART

HIV/AIDS remains a significant public health issue, with an estimated 39.0 million people living with HIV at the end of 2022, the majority of whom are in Africa. In the same year, it was estimated that 7.8 million people were living with HIV (Human Sciences Research Council (HSRC), 2023; World Health Organization, 2023b). South Africa has a high prevalence of HIV due to a variety of biological and socio-economic factors that drive transmission. Although more than 5 million people are currently on Antiretroviral treatment (ART), additional targeted intervention programmes are required to reach the UNAIDS 90-90-90 targets (Zuma *et al.*, 2022). In June 2021, The UNAIDS HIV targets were raised to 95-95-95. The key goals of the UNAIDS targets are to ensure that 95% of all people living with HIV are aware of their HIV status, 95% of all people with diagnosed HIV infection receive sustained ART and 95% of all people receiving ART have viral suppression (UNAIDS, 2021; Frescura *et al.*, 2022).

Community pharmacists can increase access to HIV treatment, particularly in vulnerable and hard-to-reach groups, and play a crucial role in achieving the UNAIDS goals. Pharmacy-based HIV service delivery models are feasible and largely accepted by clients without compromising clinical outcomes (Nyamuzihwa *et al.*, 2023). PIMART has the potential to improve access to testing and treatment for those people whom current programmes have yet to reach. PIMART services are a new form of PIT that pharmacists can offer to help prevent and treat HIV/AIDS. It has been implemented in several countries successfully; however, issuing section 22A (15) permits is currently on hold due to litigation against PIMART (South African Pharmacy Council, 2023c, 2023d). In addition to performing screening HIV tests and providing counselling, pharmacists who have received PIMART supplementary training can administer ART treatment such as PrEP, PEP, and 1st line ART as well as initiation of TB-Preventative Therapy (TPT).

PIMART pharmacists can also monitor treatment outcomes, decide on appropriate therapy and adjust previously prescribed ART (South African Pharmacy Council, 2021a). In

complicated cases or discordant results, PIMART pharmacists must refer patients to a clinician or specialist for further management (South African Pharmacy Council, 2023d). Community pharmacists, through PIMART, can contribute to alleviating the strain on South Africa's public healthcare system by addressing the challenges of HIV testing and treatment. PIMART implementation was suspended when this study was conducted due to legal challenges against the legislation and its implementation with the High Court reserving judgment on the matter until a later date (Spotlight, 2023).

Table 2: Novel clinical pharmacy services delivered in community pharmacies

Name of service	Description and service details	Country	Reference
Cancer - Services provided to cancer Patients	Pain management for cancer patients: • Medication review to optimise treatment. • Aim is to improve knowledge of medicines and ensure the adequacy of pain control. Lifestyle interventions for men with prostate cancer • Increase physical activity and improve nutrition. • Improve cardiovascular health – measure BMI, weight, blood pressure and total cholesterol	UK	(Edwards *et al.*, 2018; Lemanska *et al.*, 2019)
Dental and oral healthcare (DOHC)	• Pharmacists respond to DOHC queries: Toothaches, mouth ulcers, oral candidiasis, teething, gingivitis, xerostomia, abscesses, lose or broken dentures. • Management of oral health conditions: Halitosis, herpes simplex, oral thrush and mouth ulcers and potential oral cancers • Promotion of DOHC • Provision of Oral health-related medication • Supply of sugar-free medicines • Inter-professional collaboration (referral to dentists)	Multiple Countries - Australia, UK, USA, Canada, Spain, New Zealand, Lebanon, Ethiopia, Romania, France, Turkey, Iran, Malaysia, UAE	(Hu *et al.*, 2021)
Depression screenings	• Administration of a depression screening tool - Patient-Health Questionnaire-9 (PHQ-9) in a community pharmacy setting • Engage with patients regarding their mental health	USA	(Ballou *et al.*, 2019)
Ear Health	• Provision of an ear health care programme by rural community pharmacists can improve ear health and prevent hearing loss. • Interventions: Hearing screening; otoscopic inspection, audiometry service (air conduction tone test) • Provide treatment for Acute otitis media. • Pharmacists refer patients if a full hearing assessment is required	• Australia • England • USA	(Taylor *et al.*, 2021a)

Name of service	Description and service details	Country	Reference
Fall prevention service	• Consists of a fall risk screening and assessment to target modifiable fall risk factors – impaired mobility and environmental hazards. • Medication review for drugs that may increase the risk of falling - Medication regimen adaptations. • Lifestyle interventions – home safety, footwear, and exercise	Netherlands	(Gemmeke *et al.*, 2023)
Osteoporosis screening	• Bone Mineral Density (BMD) screening – measurement of peripheral bone density using portable units. • Physical assessment and identification of risk factors • Lifestyle modification (diet and exercise)	USA	(Deo, Nayak and Rajpura, 2013)
Pharmacist Minor Ailment Services (PMAS)	• PMAS facilitate the treatment and management of self-limiting or uncomplicated ailments in a structured manner. • Examples include Headache, coughs and colds, diarrhoea, lice and scabies, allergies, and back pain. • Provision of OTC medication	• UK • Canada • Qatar • New Zealand • Australia • Costa Rica	(Inch *et al*., 2017; Aly *et al*., 2018, 2021; Nazar and Nazar, 2019; Gilson *et al*., 2021; Yusuff *et al*., 2021; Hikaka *et al.,* 2023; Makhlouf *et al*., 2023; Zavaleta-Monestel *et al*., 2023)
Pharmacogenomic services - personalized medicine services	• Pharmacogenomic screening provides personalized medicine services. • Pharmacists interpret and identify a patient's genetic profile variations and drug response (drug-gene considerations) • Can be an extension of MTM to optimise therapeutic outcomes - Can improve safety and efficacy of therapy and prevent adverse effects and intolerance. • Example: Clopidogrel and CYP2C19	• USA • Canada	(Alexander *et al*., 2014; Ferreri *et al*., 2014; Papastergiou *et al*., 2017; Bright *et al*., 2021; Kisor *et al*., 2021)
Point-of-care (POC) testing for C-reactive protein (CRP)	• Supports the management of upper respiratory infections (URTIs) in pharmacies. • Helps differentiate between viral and bacterial RTIs. • May help increase awareness of antibiotic use. • Barriers: Training of pharmacy staff is required to implement and interpret tests.	Australia	(Chalmers *et al.*, 2022)

Name of service	Description and service details	Country	Reference
	• Public demand is low		
Sleep health management	• Poor sleep health is a significant risk factor for chronic diseases. • Pharmacists can promote sleep health and assist with the management of chronic sleep disorders e.g., insomnia and obstructive sleep apnoea. Services include: • Assessing sleep health and screen for sleep orders • Behavioural interventions • Medication management • Pharmacological and non-pharmacological counselling • Further education and training are required to improve the provision of sleep health care	Australia	(Basheti *et al.*, 2021)
Telemedicine and Telepharmacy	• Used for long-distance healthcare, patient education and public health initiatives. • Increases the accessibility of healthcare and extends the reach of clinical services. • Telemedicine interventions include disease state management, MTM, smoking cessation, blood pressure monitoring and management. • Telehealth used during COVID-19 pandemic	USA	(McCarthy *et al.*, 2021; Melton *et al.*, 2021; Thomas *et al.*, 2021)

2.8 Barriers and Facilitators

Community pharmacy accessibility is often cited as a facilitator for clinical service delivery, allowing pharmacies to expand and improve their services (Melton and Lai, 2017). Siu *et al*. (2021) investigated the factors influencing the successful implementation of a diabetes screening program in Australian community pharmacies. Pharmacists were eager to integrate screening services into their daily practice and reported a favourable trial experience. Vital factors that aided the implementation of these services included strong leadership and entrepreneurial qualities among pharmacists, prioritisation of the service, staff participation, and preparation. Other factors included cooperation with other healthcare professionals and patient recognition of service value (Siu *et al.*, 2021). The capability of a pharmacy to deliver clinical services is determined by factors such as the availability of adequate resources, knowledgeable staff, and workload. Pharmacist innovativeness also supports service delivery (Doucette *et al.*, 2017). Involvement in an interprofessional team and pharmacist-physician collaboration can optimise the effectiveness of clinical services in community pharmacies (Yuan *et al.*, 2019).

Several studies have identified the barriers to implementing diabetes services and management, such as workload, lack of remuneration and time, lack of confidence, and perceived lack of competence. Issues related to pharmacist-physician relationships, community pharmacies' business orientation, and the availability of counselling areas or rooms must be addressed before clinical services can be implemented (Wibowo, Sunderland and Hughes, 2016; Yuan *et al.*, 2019). Barriers such as insufficient financial resources, understaffing and lack of patient interest have also been cited in other studies (El-Dahiyat *et al*., 2019). Lack of interest or low utilisation of pharmacy services may be due to a lack of awareness of clinical pharmacy services (Hindi *et al*., 2018).

2.9 Conclusion

Community pharmacists are well suited to accept an expanded role in the healthcare system. Therefore, prospective national healthcare strategies should emphasise effectively incorporating community pharmacists into the primary healthcare team to enhance clinical service delivery (Mossialos *et al.*, 2015). Several approaches have been proposed to develop the public health role of community pharmacists. These include improving the primary care curricula for pharmacy students, promoting patient self-management, and improving pharmacists' communication techniques. Other strategies involve supporting antimicrobial stewardship and polypharmacy management programmes and adequately remunerating pharmacists for clinical service provision (Agomo and Ogunleye, 2014).

Most community pharmacies will provide a wide range of clinical services but vary in their types and frequencies. The extent and nature of the services offered are yet to be determined. It is, therefore, imperative to understand and evaluate the current situation before suggesting implementation strategies to improve the delivery of clinical services (Hasan *et al*., 2012; El-Dahiyat *et al*., 2019). Various factors can influence the mix of services offered by a community pharmacy. The willingness to provide clinical services is an important facilitator for implementation and delivery. The pharmacy business model and ownership structure also determine the types of clinical services offered and the frequency of provision. Entrepreneurial traits, such as innovativeness, allow a community pharmacy to adapt to the needs of its patients by providing services that will benefit them (Doucette *et al.*, 2017).

Chapter 3: Methodology

This study was a cross-sectional electronic survey designed to identify the clinical services offered in independent community pharmacies in South Africa and the extent to which these services are available. This chapter describes the study design, survey development, survey components, study site and study period. The sampling method, sample size calculation and sample selection are discussed. The description of the variables, data collection and management are discussed, followed by data analysis and ethical considerations.

3.1 Study Design

A quantitative, cross-sectional exploratory survey design was implemented using an electronic survey (Appendix A) distributed to community pharmacies affiliated with the ICPA. A survey is a valuable research methodology that can help describe and explore variables. It can be qualitative with numerically rated items, quantitative with open-ended questions, or a mixed methods approach that uses both strategies (Ponto *et al.*, 2015). Surveys are a popular research method because they are accessible, adaptable and efficient in measuring psychological constructs (Artino *et al*., 2022). Online-based questionnaires are helpful to obtain a large sample size. The survey instrument used in this study was primarily quantitative, with some open-ended questions providing limited qualitative data.

The survey was developed in REDCap© (Research Electronic Data Capture, REDCap© Consortium, Vanderbilt University, Nashville, Tennessee, USA, version 13.0.6), an electronic survey and database application. REDCap© offers intuitive and reusable tools for collecting, storing, and distributing clinical research data. It also allows for the efficient development of studies with minimal resource investment (Harris *et al.*, 2009). REDCap© was selected for this study because it is a flexible and cost-effective informatics system.

3.2 Survey Instrument – Survey Development and Survey Components

The survey instrument was developed over several months through an extensive literature review of clinical services offered in community pharmacies and the minimum standards for services provided in pharmacies as set out in the Good Pharmacy Practice (GPP) Manual (South African Pharmacy Council, 2017). As no validated instrument was available, lecturers in the Clinical Pharmacy division of the Department of Pharmacy and Pharmacology, who had experience working in a community pharmacy and delivering clinical pharmacy services, reviewed the questionnaire after considering the research question and objectives.

The questionnaire was also distributed to 5 pharmacists from ICPA member pharmacies to confirm ease of understanding and functionality. Reviewers also considered readability, length, time to complete the survey, and relevance. The voice-over feature was removed as reviewers found it to be too slow. No content was changed after review. The survey data did not include these responses.

The final survey (Appendix A) contained 48 items. It consisted of the following ten sections: pharmacy demographics (3 items), pharmacy personnel (4 items), physical pharmacy setting (4 items), types of clinical services (19 items), delivery of clinical services and the willingness to offer them (5 items), barriers to implementation (4 items), availability of resources (3 items), training needs (4 items) and views on clinical service delivery (1 item). Likert-type items were used to measure average workload, skills, financial resources, and expertise. The last question was open-ended, and participants were asked to share any other views that they may have had on the delivery of clinical services in community pharmacies.

3.3 Sample Site

The study was conducted from the Department of Pharmacy and Pharmacology at the University of the Witwatersrand, South Africa.

3.4 Study Period

The study commenced after all approvals and permissions had been obtained. The survey was opened for responses in September 2022 and was initially carried out over three months. The survey was extended by three months to obtain more responses to meet the target sample size. At the beginning of the study, participants were invited to complete the survey through the ICPA newsletter. Various strategies were adopted to maximise the response rate. Reminders were then sent out to participants every month by the ICPA to the participant's registered email and through the ICPA newsletter.

3.5 Study population

Pharmacists from ICPA member pharmacies across South Africa were invited by the ICPA to participate in this study.

3.6 Sampling method and sample size calculation

The objective of any sampling method is to obtain a representative sample of the population being investigated. This can be achieved by collecting an adequately sized random sample, which increases the probability of obtaining representative responses from the population

(Ponto *et al.*, 2015). A convenience random sampling method was used for this study. This method is based on the availability of respondents and is time-efficient with low financial implications (Etikan and Babatope, 2019). To ensure study validity, it is necessary that the sample being studied has traits and attributes similar to those of the population being investigated. This similarity ensures that the conclusions drawn from the sample can be confidently applied to the larger population (Fincham, 2008; Ponto *et al.*, 2015).

The study focused on independent community pharmacists who are members of the ICPA as of September 2022. Only one pharmacist per pharmacy was allowed to complete the survey regardless of the number of pharmacists employed by that pharmacy, with preference given to the responsible pharmacist. The sampling frame was designed to capture as many respondents as possible and included all community pharmacies registered with the ICPA. At the study's inception, the ICPA listed 1247 independent pharmacies as members (Independent Community Pharmacist Association (ICPA), 2020). Each of these pharmacies had a responsible pharmacist who would be eligible to participate in this study. Therefore, the resulting total study population was 1247.

An important initial step for any clinical study is sample size calculation. Optimal sample size is vital to prevent underpowered studies or the inefficient use of resources due to substantial sample sizes (Pourhoseingholi *et al*., 2013). The sample size for this study was confirmed with the assistance of a biostatistician and has been calculated using an online population proportion sample size calculator (Select Statistical Services Limited, 2021) as follows: For a population of 1247 members and a 50% sample proportion (confidence level of 95% and 5% margin of error), the sample size will be 294. For a 33% sample proportion (confidence level of 95% and 5% margin of error), the sample size will be 268. Since there is no information on response rates for studies of this nature within the ICPA, a 33% proportion was anticipated. The study examined the delivery of clinical services in all member pharmacies of the ICPA regardless of their location. Therefore, there was no preferred distribution of study participants.

3.7 Sample Selection – Inclusion and Exclusion Criteria

I. Inclusion criteria:

a. All Community Pharmacies who are registered with the ICPA during the study period.
b. Responsible Pharmacists of pharmacies registered with the ICPA during the study period.

II. Exclusion Criteria:

a. Community Pharmacies not registered with the ICPA.
b. Community Pharmacies not within South Africa.
c. Locum Pharmacists who work in more than one pharmacy.

3.8 Data Collection and Management

Data was collected, measured, and managed using the REDCap© (version 13.11.4, Vanderbilt University) electronic data capture tool hosted by Wits Biomedical Informatics and Translational Science at the University of the Witwatersrand. REDCap© is a secure, web-based software platform that supports data capture for research studies. Features include 1) an interface for real-time validated data capture, 2) audit capabilities for tracking data manipulation, 3) automated data export procedures for standard statistical packages, 4) procedures for data integration and 5) central data storage and backups (Harris *et al.*, 2009, 2019).

The survey was distributed via email by the ICPA head office directly to the responsible pharmacist at ICPA member pharmacies. The email contained a participant information sheet (Appendix B) outlining the nature of the study, the contact details of the researchers and the ethics clearance certificate reference number (Appendix C). Also included in the email was a link to access the electronic survey. The link provided the participants with the essential study details and the informed consent sheet. Participants had to provide consent, without which they could not access the survey. The survey was promoted in the monthly newsletter for ICPA members, and a reminder was dispatched throughout the study period.

Data collection was undertaken over six months. The online survey was open from September 2022 to March 2023. The frequency of e-mail reminders was reduced per the recommendation of the Human Research Ethics Committee of the University of the Witwatersrand. Reminder emails were sent to the responsible pharmacists at the start of the survey, then once every month and finally once at the end of the survey period.

3.9 Data Analysis

Data was exported to Microsoft Excel (version 16.79.2), checked for consistency and completeness, and then categorised. Excel was used to clean the data and to perform the descriptive analysis. Descriptive statistics were used to evaluate the ordinal and nominal data obtained from this study and to summarise the main variables obtained. Close-ended

questions were analysed quantitatively, and descriptive statistics were used to describe the results.

Demographic data was presented as proportions of validated responses and represented in tables. Categorical variables such as types of clinical services were described using frequencies and percentages. Data was presented as tables of frequencies and percentages or illustrated using graphs. Each clinical service offered was given a ranking in these tables. Continuous variables were described using mean values and standard deviation (SD) (if the responses were normally distributed) or median and the interquartile range (if responses were not normally distributed). The written responses received for the final open-ended question on the survey were qualitatively assessed—attempts to code the responses according to commonly identified themes and express them as frequencies were unsuccessful.

The survey instrument used several five-point Likert-type items or scales. Likert scales are used in survey studies to measure response options, such as the level of agreement with a statement (Alderman and Salem, 2010). Likert-type items consist of a single question that uses a Likert response format and may be used to measure frequency or importance (Harpe, 2015). Likert scales are composed of a series of Likert-type items to obtain a single composite rating score (Willits *et al*., 2016). The Likert scales generated ordinal data and were assessed by calculating the frequency, median and interquartile range, and the mean ± standard deviation for normally distributed data. A Likert item was used to determine participants' perceptions regarding the importance of clinical services for patient management at the community pharmacy level. Responses were coded as 1 = Strongly Agree (SA) to 5 = Strongly Disagree (SD). Data for the perceived workload in the pharmacy the respondent worked in were coded as 1 = Very Low (VL) to 5 = Very High.

Likert scales were also employed to measure the availability of resources for developing and providing clinical services. These resources included the expertise in developing clinical services, the skills for service provision, and the financial resources for implementing and maintaining services. Responses were coded as 1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good and 5 = Excellent. The percentage of respondents who rated each category was recorded. The availability of resources was reported as a sum of 3 items rated on a 5-point scale from poor to excellent by calculating the mean and standard deviation.

3.10 Ethical Considerations

The study protocol was approved by the protocol committee of the School of Therapeutic Sciences, Faculty of Health of Sciences at the University of the Witwatersrand (Appendix D -

Protocol Number H22/02/11). Ethics approval for this study was granted by the Human Research Ethics Committee (Non-medical) of the University of the Witwatersrand (Ref: R14/49 Ismail). Progress reports were sent to the committee annually. Permission to distribute the study to its members was provided by the ICPA executive (Appendix E).

Participation in this study was voluntary and anonymous. A participant information sheet (Appendix B) describing the nature of the study and explaining the roles of the participants was provided to all participants before commencing the survey. The link to the survey was sent to participants by the ICPA management; thus, the researchers did not have access to the participant's email addresses. Participants were advised that they could agree to participate in the survey by accessing the questionnaire via the link: https://redcap.core.wits.ac.za/redcap/surveys/?s=TAWDLMPAKJWJMDFM.

Informed consent was obtained from each participant by checking a tick box, which allowed them access to the survey. Participants were informed that they could withdraw from the study at any time. The survey was online and did not ask for any identifying details. Responses would remain anonymous. The survey data was aggregated and will be stored digitally under password protection for two years after a publication or six years if there is no publication. The data and password were only accessible to the researchers with administrator rights to the REDCap© platform.

Chapter 4: Results and Discussion

This chapter describes and discusses the key findings derived from the data analysis of the study instrument. The significance of these findings is delineated and compared with the results of similar published studies. The pharmacy demographics of the study sample are summarised along with characteristics regarding pharmacy personnel and physical pharmacy setting. The main focus of this chapter is an analysis of the types and frequencies of clinical services offered by independent community pharmacies. Subsequently, the delivery of clinical services by community pharmacists and their willingness to provide these services is briefly discussed. This is followed by an analysis of the perceived barriers to implementing clinical services and an assessment of the resources available to develop and provide clinical services. Lastly, the training requirements for setting up a clinical service in a community pharmacy are examined.

4.1 Introduction

Community pharmacies provide accessible healthcare to the public by offering a range of pharmaceutical care and clinical services. Community pharmacists can now provide patient-centred care that optimises therapeutic outcomes and reduces overall healthcare costs (Yuan *et al*., 2019; Rotta *et al*., 2023). Clinical services also improve medication adherence and help promote public health initiatives (Choi and Lee, 2022; Jairoun *et al.*, 2022). The majority of clinical services focus on the management of several chronic diseases or NCDs. Community pharmacy clinical services include screening at-risk individuals for CVD and diabetes as well as providing counselling and patient education for these diseases (Hermansyah *et al*., 2016). They also include medication therapy reviews, which aim to improve a patient's knowledge about their medication and identify any potential therapy-related issues (Hazen *et al.*, 2018; Brandt *et al.*, 2020).

The data obtained from the present study will shed light on the current situation regarding the delivery of clinical services within independent community pharmacies. They may also contribute to the development of clinical services within this setting. These findings have the potential to help create awareness of clinical services and the value of these services to patient management. Training requirements for personnel and the resources needed to facilitate clinical service implementation in independent community pharmacies will be investigated.

4.2 Response Rate

The online survey was distributed to all members of the ICPA. One hundred and fifty-six surveys of the sample of two hundred and sixty-eight (12.51% of all ICPA pharmacies) were

returned. The total response rate for the survey was, therefore, 52.8% of the estimated sample size (156/268). The completion rate was 66.7% (104/156) and represents the percentage of respondents who completed every question in the survey. Not all participants answered every question in the survey; as such, the responses are presented in terms of frequency (n) per question.

The response rate for the electronic survey instrument used in this study is comparable to several similar studies that assessed community pharmacy services in the United Arab Emirates, Jordan and New Zealand, which reported response rates ranging from 49.0 to 52.4% (Hasan *et al*., 2012; Smith *et al*., 2018; El-Dahiyat *et al*., 2019). The survey response rate is an important factor when evaluating its quality. A lower response rate increases the risk of a nonresponse error or bias and impacts the reliability of the study findings (Ponto *et al.*, 2015; Costa *et al.*, 2022). A higher response rate is considered a prerequisite for survey validity, with experts proposing a 60% response rate as a good target for most studies (Fincham, 2008; Alderman and Salem, 2010; Hardigan *et al*., 2016).

Although a higher response rate would have been preferable, the present study's response rate of 52.8% is considered to be adequate for evaluation and reporting. A meta-analysis by Wu *et al*. (2022) found the average response rate among 1071 online surveys to be 44.1%. Another study found that if the survey sample size is less than 500, a 20 – 25% response rate will be sufficient for a reliable data analysis (Fosnacht *et al.*, 2017). It has been suggested that representativeness is perhaps more important in survey studies. Many published studies often overestimate response rates, and those with low response rates are frequently not submitted for publication (Cook *et al*., 2000). The response rate for the present study was likely to be affected by various factors, such as interruptions in internet connections attributed to electricity supply constraints.

Studies have shown that the delivery method is the most crucial factor affecting survey response rates. The results of a survey can also be affected by survey length, item placement and the gender of the participant (Hardigan *et al*., 2016). Although electronic surveys have the advantages of lower costs and quick turnaround times, their response rates have decreased over the years. In some cases, this has dropped to 15% (Fincham, 2008). Postal surveys constantly outperform online surveys. They have been shown to have 11 – 12% lower response rates than other survey delivery methods (Wu *et al*., 2022). Only a select number of electronic surveys have achieved higher response rates, with concerns regarding those from lower socioeconomic areas without poor internet access and unable to access the survey (Alderman and Salem, 2010; Stern *et al*., 2014). This could have contributed to the low

response rate of the present study. Electronic survey respondents also tend to be younger and thus may not be representative of the general pharmacist population or sample (Hardigan *et al*., 2016).

Another potential weakness of surveys is demotivated respondents who cannot complete the survey due to conflicting time constraints (Patwardhan *et al*., 2014; Costa *et al*., 2022). This may result in unreliable data but can be addressed by making survey completion convenient. This is done by keeping the survey length short with clear and easy-to-understand questions (Wright *et al.*, 2015; Artino, Youmans and Tuck, 2022). 57.1% of respondents in this study cited lack of time as a barrier to providing clinical services. This data would suggest that respondents needed more time to complete the survey. The length of the survey in the current study was a concern. However, data regarding the influence of survey length is inconclusive (Hardigan *et al*., 2016). Suggestions to improve response rates include multi-mode approaches, using a three-email follow-up procedure (original email and two follow-ups done every three weeks) and increasing survey awareness through preceding mailed contact and newsletters (Fincham, 2008; Alderman and Salem, 2010). Follow-up procedures were employed in this study as recommended in the literature.

4.3 Pharmacy Demographics, Pharmacy Personnel and Physical Pharmacy Setting

4.3.1 Pharmacy Demographics

Table 3 encapsulates the pharmacy demographic and personnel characteristics of independent community pharmacies that participated in this study. The findings revealed that most ICPA-affiliated pharmacies represented in the study were in urban areas (70.0%), with the remainder in rural areas (30.0%). This observation is not surprising as the percentage of South Africans who reside in or near an urban area is estimated to be 68.3% (United Nations, 2022). In a cross-sectional survey of community pharmacy services availability in the UK, 88% of respondents were situated in an urban or suburban area (Barrett and Hodgkinson, 2019).

The geographic distribution of pharmacies is depicted in Figure 1. These findings correlate with several South African studies assessing the distribution of community pharmacies, which found that most community pharmacies are clustered in urban areas (Ward *et al.*, 2014; Moodley and Suleman, 2020). Despite legislative changes allowing laypersons to own community pharmacies, there has yet to be a significant increase in access to community pharmacies in rural and disadvantaged areas (Mosiane *et al.*, 2022). This has been exacerbated by increased corporate ownership of community pharmacies despite independent communities being more likely to establish themselves closer to poorer communities (Ward *et al.*, 2014).

Table 3: Pharmacy Demographics and Personnel Characteristics (n = 156)

Demographic variable	Frequency (n)	%
Years trading	(N = 140)	
0 – 2 years	14	10.0
3 – 5 years	14	10.0
6 – 10 years	18	12.9
11 – 15 years	22	15.7
> 15 years	72	51.4
Pharmacy Location	(N = 140)	
Urban	98	70.0
Rural	42	30.0
Number of SAPC - registered personnel working at pharmacy	(N = 137)	
1	11	8.0
2	31	22.6
3	28	20.4
4 or more	67	48.9
Pharmacist with a PCDT qualification	(N = 136)	
Yes	55	40.4
No	81	59.6
Does the pharmacy offer PCDT consultations?	(N = 55)	
Yes	46	83.6
No	9	16.4
Clinic nurse employed at the pharmacy	(N = 136)	
Yes, Part-time	35	25.7
Yes, Full-time	48	35.3
No	53	39.0

* The *n* for each question differs due to respondents not completing all questions.

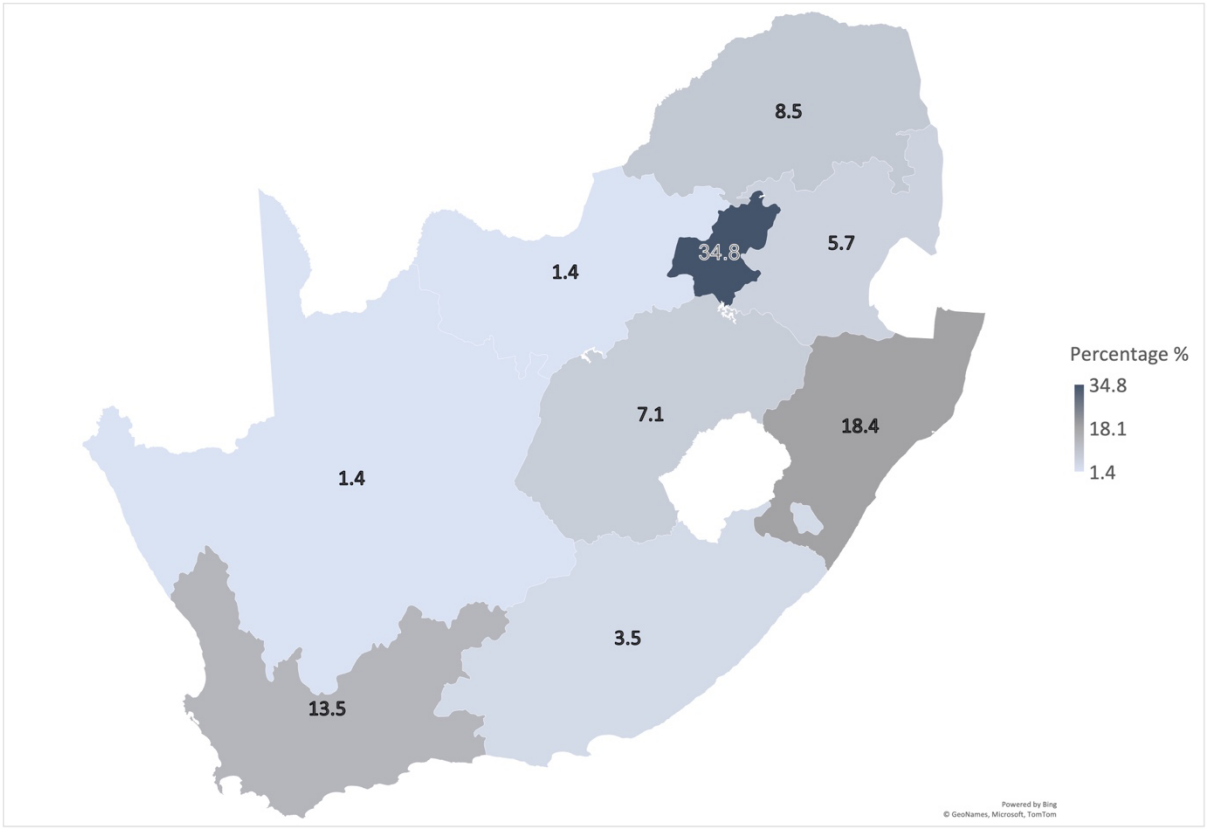


Figure 1: Geographical representation of the percentage of independent community pharmacies captured per province

Fig.1 illustrates the geographical location of independent community pharmacies that participated in the survey. Most independent community pharmacies in the study were located in Gauteng, Kwa-Zulu Natal, and the Western Cape, respectively. Gauteng was the most represented (49, 34.8%) and Northern Cape was the least represented (2, 1.4%). This trend is consistent with the number of SAPC-registered pharmacies per province, Gauteng (1398), Kwa-Zulu Natal 9635) and Western Cape (533) (South African Pharmacy Council, 2023c). Moodley *et al*. (2020) found that most new pharmacies which opened from 2004 to 2014 were located in the major metropolitan areas in the three main urban provinces. The lowest number of respondents was found in the Northern Cape, which also contains the least number of registered community pharmacies (74) (South African Pharmacy Council, 2023c).

Independent community pharmacies that had been operating for over 15 years were predominant (72, 51.4%). Newer pharmacies (0-2 years) only accounted for 10% of respondents to the survey. The average length of time that the community pharmacies had been trading was 12.83 ± 6.21 years. This indicates that most participants in this study were older pharmacists who worked in established pharmacies. No similar studies investigated the number of years that a community pharmacy had been opened; however, they did ask

participants their age or years of experience as a pharmacist. A study in the USA found the median age of respondents to be 39 years (Nichols *et al.*, 2023). In a comparable study from Qatar, the majority of participants (55.3%) fell into the 31- 40 age range (Makhlouf *et al.*, 2023). In New Zealand, the pharmacists were younger, with 31% falling into the 25 - 34 years category (McDonald *et al.*, 2021). In Europe, a survey of community pharmacist service provision across 16 countries found that over 60% of the responding pharmacists had more than five years of experience (Costa *et al.*, 2017). In Nigeria, just under 50% of participants in a similar survey had between 1 - 10 years of experience (Oseni and Erhun, 2021). An interesting point worth noting is that younger pharmacists prefer electronic media; therefore, electronic survey participants might not always accurately represent the population (Hardigan *et al*., 2016).

4.3.2 Pharmacy Personnel

The number of community pharmacies that employed three or more SAPC-registered personnel was 69.3%, while only 11 (8.0%) employed one SAPC-registered staff member. The current study did not differentiate between pharmacists and pharmacist assistants employed at a community pharmacy. The need for more registered pharmacy personnel is reflected by the 74.1% of pharmacists who perceived their current workload to be high or very high. In a study which assessed the provision of pharmaceutical care services across Europe, countries with community pharmacies that had comparable or higher employment rates of 3 or more pharmacists included Denmark (67.0%), Bosnia (71.85) and Sweden (78.7%). In contrast, 21.3% and 27.6 % of pharmacies in Germany and Spain employed three or more pharmacists (Costa *et al.*, 2017). Another study that examined the influences on the frequency and type of community pharmacy services found that 39.1% of pharmacies employed an additional pharmacist, with 23.9% employing 2 to 3 pharmacy technicians. Having more than three technicians in a community pharmacy is negatively associated with the provision of clinical services and implies that the pharmacy has a dispensing focus (Doucette *et al.*, 2017).

A total of 55 pharmacies (40.4%) employed a pharmacist with a PCDT qualification; 39 were located in an urban area, while 16 were in a rural location (29.1%). In 83.6% of the pharmacies that employed a PCDT pharmacist, PCDT consultations were offered to their patients (n = 46). A study by Tromp *et al*. (2023) had similar findings, with 45.3% of respondents practising as PCDT pharmacists and 41.2% situated in rural areas. PCDT is a service which community pharmacists may deliver. PCDT aims to increase access to healthcare and improve patient outcomes by permitting pharmacists to diagnose, prescribe and administer medicine for select conditions (South African Pharmacy Council, 2023a). In the present study, 40.4% of pharmacies employed a pharmacist with a PCDT qualification, most of whom provided PCDT

consultations (83.6%). The number of PCDT pharmacists continues to increase, with eighty PCDT permits being recommended and issued in 2022 (Mosiane *et al.*, 2022; South African Pharmacy Council, 2022b). The SAPC does not currently provide data on the total number of pharmacists with PCDT certificates in South Africa.

Eighty-three community pharmacies (61.0%) also employed a clinic nurse, 48 on a part-time basis and 35 on a full-time basis. In comparison, Tromp *et al*. (2023) found that 32.4% of pharmacies employed a nurse; however, all pharmacies surveyed employed a PCDT pharmacist. Primary healthcare nurses can complement the role of the community pharmacist by increasing the pharmacy's ability to provide clinical services such as screening services and other health promotion activities (McMillan and Emmerton, 2013). A study by Oseni *et al*. (2021) reported that 20.0% of community pharmacies employed a nurse to provide HIV/AIDS services. The number of PCDT pharmacists and clinic nurses is congruent with the number of community pharmacies (more than 80.0%) that stated they had clinics to provide clinical services. These findings indicate that most ICPA pharmacies responding to this survey delivered some form of clinical services.

4.3.3 Pharmacy Premises

A community pharmacy is required to have the appropriate premises, such as a private consultation area, to provide clinical pharmacy services (Vella *et al.*, 2015; Buss *et al.*, 2018). A consultation room or a separate consultation area has been identified as a facilitator for implementing clinical services within a community pharmacy (Weir *et al*., 2019; Weidmann *et al*., 2022). According to the GPP minimum standards for screening and monitoring services (section 2.13), "*the taking of samples and the performance of screening tests must be done in a private consultation area within the pharmacy*" (South African Pharmacy Council, 2017). A significant number of pharmacies participating in this study had clinics within the premises (110, 81.5%), with the most common area for delivering clinical services being a dedicated consultation room (116, 85.9%).

Figure 2 illustrates the percentage of pharmacies with a dedicated private area to provide clinical services within the physical pharmacy setting. The number of community pharmacies which are accredited HIV resource centres is also displayed. The importance of this indicator is further amplified when considering the high burden of HIV in South Africa and the subsequent need for confidential service delivery.

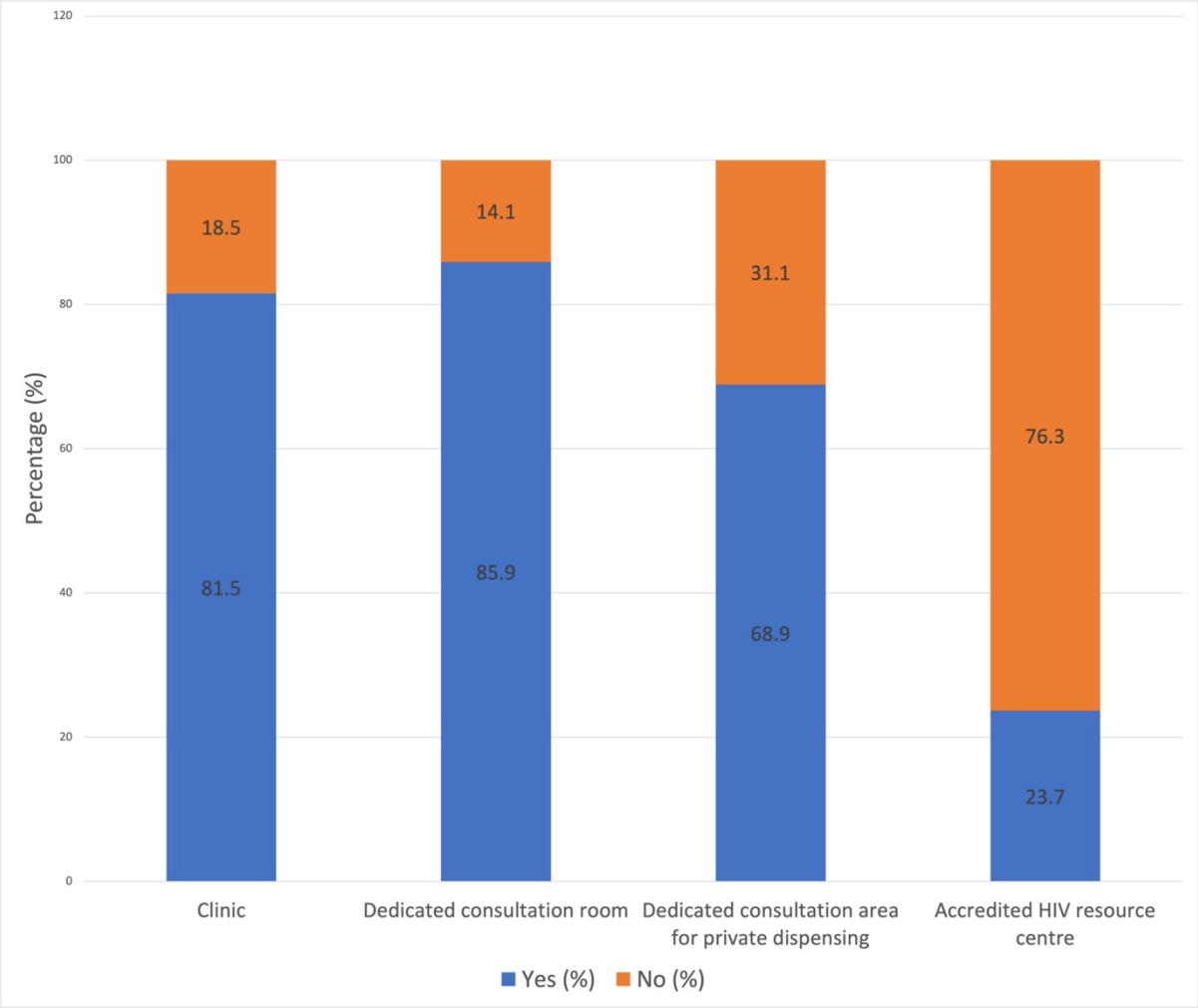


Figure 2: Percentage of community pharmacies with a dedicated area for the delivery of clinical services within the pharmacy premises

These findings illustrate that the majority of community pharmacies in this study had at least one area to provide expanded clinical services, such as screening and monitoring. Costa *et al*. (2017) found that private consultation areas existed to a considerable extent in community pharmacies across Europe. The country which had a similar presence to the current study was Germany (82.8%). Countries such as Norway, Portugal and The Netherlands all had a more than 90% presence of private consultation areas. Only 23.7% of community pharmacies indicated they were an accredited HIV/AIDS Resource Centre. Clinical services provided in the centre focus on prevention, treatment, care, and patient support. Confidentiality and privacy must be upheld; therefore, the AIDS Resource Centre must have the same characteristics and equipment as a consultation area or room (South African Pharmacy Council, 2017).

Several studies have highlighted structural barriers, the lack of space and appropriate facilities or premises, as barriers to delivering clinical services within a community pharmacy (Eades *et*

al., 2011; Kelling, 2015; Alonso-Perales *et al.*, 2017). Due to their primary focus being on dispensing and medicine distribution, many community pharmacies may not have suitable consultation areas for offering clinical services and patient counselling (Eades *et al*., 2011; Campeau Calfat *et al.*, 2021). The presence of a private counselling area is essential. Many patients have highlighted the lack of privacy within the community pharmacy as a concern when discussing sensitive issues with the pharmacist (Vella *et al.*, 2015). In the UAE, 35% of community pharmacists do not conduct private counselling in a designated area (Hasan *et al.*, 2012). Lack of confidentiality when discussing private matters leads to service dissatisfaction and is a significant barrier to the continued use of community pharmacy services. Low utilisation of consultation rooms may also be due to patients being unaware of their availability (Hindi *et al*., 2018). The proportion of pharmacies with a dedicated area for delivery of clinical services indicates that the ICPA pharmacies are suitably equipped to carry out these services.

4.4 Types of Clinical Services

The types and frequency of clinical services delivered in independent community pharmacies within the study sample are described. These are lifestyle modification, screening and monitoring, preventive services, screening tests, immunisations and vaccinations and additional services.

4.4.1 Lifestyle Modification

A total of 125 participants answered the question on lifestyle modification services. The two equally most frequently offered lifestyle modification services were smoking cessation and a nutrition clinic or programme (47, 37.6%). The least offered service was the provision of responsible alcohol consumption recommendations (33, 26.4%). A significant percentage of pharmacies (46, 36.8%) did not offer any lifestyle modification service. Participants were also asked to list any other lifestyle modification service (13, 10.4%) that the pharmacy provided. These services varied and included general primary health services, pain management and wellness program checks. Three respondents indicated that they offered “safe spaces” services for domestic abuse and gender-based violence victims. These novel services highlight ICPA pharmacists' awareness of issues that affect their communities. The frequencies and ranking of lifestyle modification services offered by independent community pharmacies are summarised in Table 4. Frequencies indicate how many pharmacies offer each service. The average period for which a community pharmacy provided lifestyle modification services varied. Most respondents indicated that services relating to lifestyle modification were provided for more than 15 years or at least between 6 – 10 years. (20, 25.3%).

Table 4: Frequency of Lifestyle Modification Services Offered (n = 125)

Lifestyle modification service	Frequency (%)	Rank
Smoking cessation	47 (37.6)	1
Nutrition clinic/programme	47 (37.6)	1
Weight loss clinic	42 (33.6)	3
Exercise guidelines	40 (32.0)	4
Addiction support services	34 (27.2)	5
Responsible alcohol consumption recommendations	33 (26.4)	6
Other	13 (10.4)	7
None of the above	46 (36.8)	N/A

Pharmacist-provided smoking interventions have been successful and cost-effective, particularly when compared to usual care. There have been substantial positive effects on reported smoking cessation rates and patient outcomes, including improvements in function (Buss *et al*., 2018). A 54.3% smoking cessation rate was reported after systematic interventions by community pharmacists in Spain (Gómez *Martínez et al*., 2024). A survey of community pharmacists found that 74% of community pharmacists in New Zealand offered smoking cessation counselling (McDonald *et al.*, 2021). In comparison, community pharmacists in the UAE assessed patients' level of nicotine dependency (37.8%) or provided counselling on the availability of NRT (44.4%) to assist with withdrawal symptoms (Alzubaidi *et al.*, 2022). The prevalence of smoking cessation services in this study was less (37.6%) than those provided by community pharmacists in Jordan (57.0%) (Smith *et al*., 2018; El-Dahiyat *et al*., 2019).

The low rate of smoking cessation service provision observed in the current study can be attributed to barriers such as lack of time and skills, inadequate staffing, and a lack of designated counselling areas. Some pharmacists may not consider offering smoking cessation to be an essential service in the pharmacy, or patients may simply not be aware of the service (Eades *et al*., 2011; Sohanpal *et al.*, 2016). Training provided to community pharmacists can assist in improving their skills and approach towards smoking cessation services (Appalasamy *et al.*, 2022). It would be interesting to measure the outcomes of the smoking cessation programmes to encourage more ICPA pharmacies to adopt this intervention.

A weight loss clinic was the second most frequently offered service (33.6%). Contrary to the present study's findings, El-Dahiyat *et al*. (2019) reported that 70% of community pharmacists provided weight management counselling to patients. Reviews of community pharmacist

weight and obesity management interventions found that these interventions resulted in modest but significant weight loss for patients. Interventions included dietary advice, exercise, meal replacements, behaviour modification and pharmacotherapy to promote weight loss (Rosenthal *et al.*, 2018). Only 26.4% of pharmacies provided responsible alcohol consumption recommendations. Patients are often only willing to discuss excessive alcohol use with a pharmacist if it is done in a sensitive manner and confidentiality is maintained (Madden *et al.*, 2020). There is also insufficient evidence regarding the effectiveness of alcohol-reduction interventions in community pharmacies, with several studies showing no significant reduction in alcohol consumption (Brown *et al.*, 2016).

4.4.2 Screening and Monitoring Services

Independent community pharmacies offered a wide range of screening and monitoring services. A total of 22 services were assessed, with the most commonly provided services being diabetes (112, 88.9%) and hypertension (110, 87.3%) screenings. HIV screening followed in third place with 62.7% (79). Several other screening services, including UTI, pregnancy, obesity, and dyslipidaemia, were offered by over 50% of pharmacies. The least frequently offered service was pharmacogenomic consultations and related services (4, 3.2%). Table 5 summarises the frequency of services offered by community pharmacies.

Table 5: Frequency of Screening and Monitoring services offered (n = 126)

Screening and Monitoring service	Frequency (%)	Rank
Diabetes	112 (88.9)	1
Hypertension	110 (87.3)	2
HIV	79 (62.7)	3
Dyslipidaemia	77 (61.1)	4
Urinary Tract Infections (UTI)	65 (51.6)	5
Obesity	64 (50.8)	6
Pregnancy	64 (50.8)	6
Mother and Child Health	61 (48.4)	8
COVID-19	59 (46.8)	9
Influenza	56 (44.4)	10
Asthma	51 (40.5)	11
Medical Aid Wellness programme	50 (39.7)	12
Malaria	45 (35.7)	13
Anaemia	43 (34.1)	14
STDs	39 (31.0)	15
Illicit drug urine test	39 (31.0)	15

Screening and Monitoring service	Frequency (%)	Rank
Gout	37 (29.4)	17
Chronic Obstructive Pulmonary Disease (COPD)	24 (19.0)	18
Prostate conditions	22 (17.5)	19
Anticoagulation management	14 (11.1)	20
Group A Streptococcus (GAS)	9 (7.1)	21
Other	7 (5.6)	22
Pharmacogenomic Consultation	4 (3.2)	23
None of the above	10 (7.9)	N/A

Only a small percentage of pharmacies (10, 7.9%) did not offer any screening or monitoring service. Three pharmacies indicated that they provided pap smears as part of other services. A significant number of pharmacies offered comprehensive screening and monitoring services as part of a medical aid wellness programme (50, 39.7%). These included programmes from all major medical aid insurers such as Discovery Vitality, Momentum Multiply and Gems Wellness. Just under a third of pharmacies (33, 28.4%) offered screening and monitoring services for 6 – 10 years. The average time services were provided varied amongst community pharmacies, with no evident trend observed.

Screening and monitoring services in community pharmacies are often associated with chronic disease management. These interventions focus on NCDs such as CVD, diabetes, and asthma (Buss *et al.*, 2018; Hazen *et al.*, 2018). Pharmacists in a study by Doucette *et al*. (2016) offered services such as health screening or coaching (41.0%) and disease state management (24.3%). The study did not provide specific information regarding what types of screening and diseases were assessed. In the present study, screening and monitoring for diabetes and hypertension were the two most offered services. Dyslipidaemia, which was screened for by 61.1.% of community pharmacies, along with hypertension, are both risk factors for CVD. A similar study aimed to identify the types of clinical services provided by community pharmacists in several US states. Healthcare screenings were offered by 51.3% of community pharmacists (Biddle *et al.*, 2021). In comparison, 72.5% of the community pharmacists of Jordan offered patients counselling on chronic diseases (El-Dahiyat *et al*., 2019).

The increasing prevalence of NCDs has become a primary public health concern globally. NCDs contribute to health system inequalities and cause significant morbidity and mortality across the globe (Gassner *et al*., 2022). Consequently, community pharmacies are gradually being used as sites for NCD screening and prevention, especially when other healthcare

services are unavailable (Akutey *et al.*, 2018). NCD-related services include CVD risk assessment and management, hypertension and diabetes management (World Health Organization, 2020). Health screening services for chronic diseases were conducted in community pharmacies in Portugal (81.6%), Italy (75.0%) and Switzerland (74.1%), although the study did not specify which services were provided (Costa *et al.*, 2017). Two hundred and eight-seven participants were enrolled in a community-based study in Iran, which assessed the feasibility of screening services. Of the patients screened, 18.7% were found to have hypertension, 17.4% had high cholesterol levels, and 7.6% had abnormal blood glucose levels (Jahangard-Rafsanjani *et al.*, 2017). The high uptake of ICPA pharmacies with screening services for NCDs bodes well for access by the public to these services and the prevention of morbidity due to NCDs in South Africa.

Community pharmacies are often the first point of contact for healthcare, especially in low- and middle-income countries like South Africa. They also serve as important access points for the delivery of HIV services in disadvantaged communities (Nyamuzihwa *et al.*, 2023). HIV screening services were offered by 65.1% of pharmacies. A survey of adult patients in community pharmacies found that 35.8% of patients were interested in HIV screening services (Darin *et al.*, 2015). A previous study in South Africa conducted in 2010 reported that only 21.7% of pharmacists provided HIV/AIDS counselling services, with a further 31.3% providing HIV/AIDS-related information to patients. Barriers associated with the provision of HIV screening included time constraints, lack of space within the pharmacy and lack of demand in the community pharmacy location (Gilbert, 2016). More pharmacies should be encouraged to offer HIV/AIDS services to assist the country in achieving the national test and treatment goals for HIV, such as the 95-95-95 goals as envisioned by UNAIDS.

Spirometry is an objective and reproducible measurement of airflow, a frequently underused tool in the community pharmacy. It is used to screen, diagnose and manage underlying lung conditions such as Asthma and COPD (Valentino *et al.*, 2021). In the present study, despite chronic respiratory diseases being a major NCD, only 40.5% of participants indicated that they conducted Asthma screening and 19.0% conducted COPD screening services. Bereznicki *et al*. (2013) assessed the uptake and efficacy of community pharmacist asthma management. Their findings showed a 66.6% uptake of face-to-face pharmacist interventions with a significant decrease in the use of reliever inhalers. A community pharmacy service for COPD patients in the UK that emphasised medication adherence, smoking cessation, and vaccinations against influenza enrolled 137 patients. Findings included improved patient medication compliance and perceived quality of life (Wright *et al.*, 2015).

Pharmacogenomic consultation and testing is a novel service that only 3.2% of pharmacies in the current study offer. This could be due to a lack of knowledge or confidence in providing this service. A survey of independent community pharmacists in the USA reported that 75% of participants were interested in delivering pharmacogenomic services but required further training (Alexander *et al.*, 2014). Knowledge about pharmacogenomics has been identified as a barrier to implementing testing services. Other noteworthy barriers include ethical concerns, time, and issues regarding costs and remuneration (Kisor *et al.*, 2021). In South Africa, pharmacogenomic testing has yet to be approved as a service for which pharmacists may levy a fee, and this could be a deterring factor due to time constraints (South African Pharmacy Council, 2023b).

Anticoagulation management and monitoring services were offered by 11.2% of participants. In comparison, just under twenty per cent of community pharmacists in New Zealand provided anticoagulation services (Smith *et al.*, 2018). This service aims to stabilise the INR within the recommended range to optimise warfarin therapy (Ingram *et al.*, 2018). Both pharmacogenomic screening and anticoagulation monitoring are newer clinical service offerings, which likely explains their low occurrence in the current study.

4.4.3 Preventive Services

Three preventive services were commonly provided by ICPA-affiliated pharmacies. Namely contraception (99, 79.2%), immunisation (94, 75.2%) and emergency contraception (92, 73.6%). The least offered service was a travel medicine service (20, 42.0%), while seven pharmacies did not provide any preventive services. The most significant proportion (33.9%) of respondents had offered preventive services for 6 -10 years. Figure 3 illustrates the percentage of pharmacies that offered each type of preventive service ranked in order of the most frequently provided service.

Preventive services are public health interventions that community pharmacists provide. These services effectively improve clinical outcomes and increase patients' access to healthcare (San-Juan-Rodriguez *et al.*, 2018; Thomson *et al.*, 2019). Community pharmacists provide sexual and reproductive healthcare services which aim to prevent STIs such as HIV/AIDS. They play a role in the delivery of family planning services, including the ability to delay or prevent unwanted pregnancies. It may also include preventive care for women, allowing them to space pregnancies suitably and avoid health risks (Bright and DiPietro Mager, 2019).

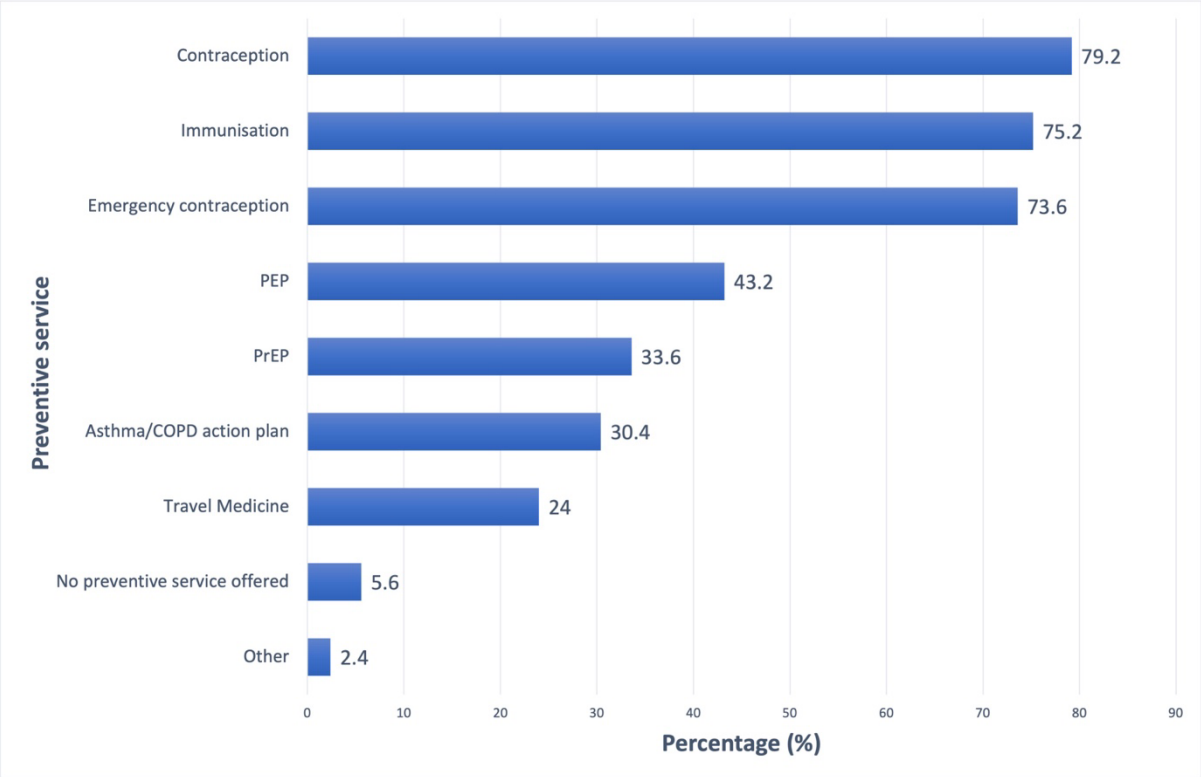


Figure 3: Percentage of community pharmacists that offer preventive services

Sexual and reproductive health services that a pharmacist may provide include emergency postcoital contraception (EPC) and family planning services, which comprise prescribing hormonal contraception and administration of injectable contraceptives (South African Pharmacy Council, 2023c). A significant proportion of pharmacies in the present study offered hormonal contraception and EPC. Community pharmacists play an essential role in the delivery of contraceptive services, which helps reduce healthcare costs and the difficulties women may encounter when accessing these services (Bright and DiPietro Mager, 2019).

In comparison to South Africa, community pharmacists in Thailand are not allowed to dispense emergency contraception medication without a prescription (Tseng *et al.*, 2019). In Belgium and the United Kingdom, EPC is available as an OTC medication in community pharmacies without a prescription (Cameron *et al.*, 2020; Ceulemans *et al.*, 2022). In New Zealand, 95% of pharmacists were accredited to provide EPC and 44% were accredited to provide selected oral contraceptives; however, no data was provided on the frequency of delivery of these services by community pharmacists (McDonald *et al.*, 2021).

Community pharmacists have also been able to increase access to PrEP and PEP for people who may be at risk of HIV infection and who cannot access other healthcare providers. HIV prevention efforts can be augmented by implementing PrEP in pharmacies (Lopez *et al.*,

2020). The current study provided data on the provision of PEP (43.2%) and PrEP (33.6%) in independent community pharmacies. Implementing a community pharmacy-based PrEP service in the USA was found to be a suitable option for PrEP delivery with high uptake rates and low dropout rates. A total of 693 (97.3%) patients were initiated on PrEP in the study (Tung *et al.*, 2018). In South Africa, the scope of practice of PIMART pharmacists includes the initiation of PrEP and PEP, as well as the management and assessment of patients who might need these treatment options (South African Pharmacy Council, 2021a).

Reproductive health services, as well as PrEP and PEP, may only be provided by community pharmacists if they are conducted in a private consultation area that complies with the GPP minimum standards and if the pharmacists are adequately trained to provide such services (South African Pharmacy Council, 2017, 2022a). The findings of the current study indicate that a high percentage of pharmacies comply with this regulation (Fig. 2). It is likely that these services were conducted in dedicated consultation areas within the pharmacy premises, as over 80% of pharmacies in this study had private consultation areas and clinics and 23.7% of community pharmacies had an accredited AIDS resource centre. These resource centres are meant to provide counselling, support, and other clinical services to patients with HIV and AIDS. A previous study indicated that a significant portion of pharmacists cited being unaware of this service as the reason for not applying for accreditation, with only 14.4% admitting to having detailed knowledge about AIDS resource centres (Gilbert, 2016). More independent community pharmacists need to be informed about HIV/AIDS resource centres as a service they may offer to patients.

4.4.4 Screening tests

Participants were asked to select screening test services they offered from a list of 28 options. A summary of the frequency of screening tests offered is listed in Table 6. Over 50% of community pharmacies offered screening tests such as BMI calculation, weight measurement, random blood glucose tests, HIV rapid tests, pregnancy tests and total cholesterol measurements. Gene testing was the least delivered screening test service and was only offered by five pharmacies (4%). Other tests offered by less than 10% of pharmacies were Framingham risk assessment, INR, syphilis test, ACR and the COPD population screener. Participants listed two other services, Pathcare services and all blood tests ordered by prescribers, as screening tests they offered. Thirteen (13) pharmacies did not provide any screening tests to their patients. Most pharmacies offered screening tests for 6 -10 years (41, 36.6%).

Table 6: Frequency of Screening tests offered (n = 125)

Screening test service	Frequency (%)	Rank
Blood Pressure (BP) measurement	101 (80.8)	1
Body Mass Index (BMI)	87 (69.6)	2
Weight measurement	82 (65.6)	3
Random blood glucose (BG) measurement	80 (64.0)	4
HIV rapid test	78 (62.4)	5
Pregnancy test	72 (57.6)	6
Total cholesterol measurement	71 (56.8)	7
Urinalysis	59 (47.2)	8
COVID-19	52 (41.6)	9
Peak flow assessment	48 (38.4)	10
Paediatric growth curve chart	43 (34.4)	11
Diabetic foot exam	41 (32.8)	12
HbA1c level	36 (28.8)	13
Influenza	36 (28.8)	13
Haemoglobin (Hb)	35 (28.0)	15
Malaria rapid test	33 (26.4)	16
Analysis of drugs of abuse	32 (25.6)	17
Prostate-specific antigen (PSA)	29 (23.2)	18
Uric acid level	26 (20.8)	19
Lipid panel	24 (19.2)	20
Creatine level	16 (12.8)	21
Framingham risk assessment	10 (8.0)	22
International normalized ration (INR) - for coagulation studies	10 (8.0)	22
C-reactive protein (CRP)	10 (8.0)	22
Syphilis test	9 (7.2)	25
ACR (Albumin to Creatinine ratio)	7 (5.6)	26
COPD population screener	6 (4.8)	27
Gene testing	5 (4.0)	28
Other	2 (1.6)	29
None of the above	13 (10.4)	N/A

Community pharmacists provide screening tests as part of their array of clinical services (Kelling, 2015). Point of care testing (POCT) is non-invasive and has been used to screen for risk factors and manage various disease states. Tests may include measurements for blood pressure, blood glucose, glycosylated haemoglobin (HbA1c), and cholesterol (Steltenpohl et al., 2018; Amador-Fernández *et al*., 2023). In South Africa, community pharmacists may offer

screening and testing services to patients if they are competent and may levy a professional fee for these services (South African Pharmacy Council, 2017). Biddle *et al*. (2021) reported that 44.9% of community pharmacies across several US states offered POCT but did not indicate which tests were offered.

The screening tests offered in the present study correlate with the most frequently encountered diseases with high morbidity in South Africa, such as NCDs and HIV/AIDS. BP measurement was offered by 80.8% of participants and was the most frequently delivered screening test service. This finding was higher than those reported in a study conducted in the United Kingdom, which stated that 61.0% of community pharmacies offered free BP checks to their patients (Barrett and Hodgkinson, 2019). A similar study in New Zealand reported that 51.0% of community pharmacies carried out blood pressure measurements (Smith *et al.*, 2018).

Community pharmacy screening interventions are not only effective for identifying individuals with hypertension but are also adept at screening those at high risk of developing diabetes and hyperlipidaemia (Willis *et al.*, 2014). In the present study, random blood glucose and HbA1c tests were delivered by 64.0% and 28.0% by community pharmacists, respectively. In a Norwegian study, diabetic risk assessments were conducted for 211 participants. HbA1c measurements were performed for those at high risk (22%), with those having an HbA1c > 6.5% being referred to a doctor (Risøy *et al.*, 2018).

Total Cholesterol Measurements were delivered by more than half of the community pharmacies (56.8%) surveyed in this study. However, a much smaller percentage of pharmacies offered lipid panels (19.2%) and Framingham risk assessment tests (8.0%). The frequency of cholesterol testing in this study was considerably higher than the 3% reported by Smith *et al*. (2018). A review of cholesterol testing in community pharmacies reported that POCT can help identify patients with dyslipidaemia and other lipid disorders requiring further treatment and referral (Haggerty and Tran, 2017).

The BMI (69.6%) and weight measurement (65.6%) were the second and third most offered screening tests. Obesity is a risk factor for CVD and diabetes and is a significant public health concern (Rosenthal *et al.*, 2018). A study by Hasan *et al*. (2011), which assessed community pharmacy services, reported that 57.0% of pharmacists provided weight measurements, with over 90.0% of pharmacies offering some weight reduction treatment. Weight management interventions in community pharmacies have reported moderate but noteworthy weight loss

among patients, as well as decreases in BMI and weight circumference (Buss *et al.*, 2018; Thomson *et al.*, 2019).

Community pharmacies have become sites for HIV and HCV testing. This has increased access to screening for these highly transmissible diseases (Kherghehpoush and McKeirnan, 2021). Pharmacists in South Africa may provide HIV rapid tests to patients. Tests must be performed in a private consultation area, and patients must give informed consent after pre-test counselling. Post-test counselling is provided once the test results are known (South African Pharmacy Council, 2023c). HIV rapid tests were offered by 62.4% of community pharmacies in the current study.

In comparison, a prior study in South Africa reported that only 21.7% of pharmacists offered HIV testing services (Gilbert, 2016). In Nigeria, 22.9% of community pharmacists were involved in HIV pre-test counselling, with only 18.9% providing HIV rapid tests (Oseni and Erhun, 2021). These findings show that community pharmacies have been able to increase access to HIV screening services in South Africa in comparison to other countries.

Screening tests in the form of POCT were also provided for other infectious diseases such as COVID-19 (41.6%), Influenza (28.8%), Syphilis (7.2%) and Group A *streptococcus* (GAS) (7.1%). Due to Community pharmacy accessibility, POCT for infectious diseases has the potential to become an integral public health intervention in the efforts to contain the spread of these diseases. The COVID-19 pandemic increased the awareness of these services and highlighted their value (Akinwale *et al.*, 2015; Koski *et al.*, 2023). A noteworthy finding was that POC C-reactive protein (CRP) tests were offered by 8.0% of participants. CRP testing, along with POCT for influenza and GAS, can support antimicrobial stewardship efforts by assisting with the management of RTIs at the community pharmacy level (Klepser *et al.*, 2019; Chalmers *et al.*, 2022).

4.4.5 Immunisations and Vaccinations

Community pharmacists offered an array of vaccinations and immunisation services. Seven vaccination or immunisation services were offered by 50% or more community pharmacies in the study, with 31.9% offering these vaccinations for 6-10 years. Table 7 lists the frequencies of pharmacies that offer vaccinations and provides the ranking for each immunisation or vaccination. Respondents offered a total of 22 different vaccines. The influenza vaccine was the most offered vaccination and was supplied by 76,8% of pharmacies (n = 96). This was significantly more than the next most frequently offered vaccine, the tetanus toxoid vaccine (76, 60.8%). Covid vaccines were also provided by 33.6% of pharmacies. The typhoid vaccine

was the least offered vaccination amongst all respondent pharmacies (21,16.8%). Six pharmacies did not offer any vaccination or immunisation.

Table 7: Frequency of Immunisation and Vaccination services offered (n = 125)

Immunisation or Vaccination service	Frequency (%)	Rank
Influenza	96 (76.8)	1
Tetanus toxoid	76 (60.8)	2
Measles Mumps and Rubella	67 (53.6)	3
Hepatitis B	66 (52.8)	4
Rotavirus	65 (52.0)	5
Measles	65 (52.0)	5
DTaP-IPV-HiB-HB (Diphtheria-Tetanus-Pertussis-Polio-Haemophilus influenzae type b-Hepatitis B)	63 (50.4)	7
Pneumococcal Conjugated Vaccine (PCV)	61 (48.8)	8
DTaP (Diphtheria-Tetanus-Pertussis)	57 (45.6)	9
Tetanus and Diphtheria	57 (45.6)	9
Human Papillomavirus (HPV) Vaccine	55 (44.0)	11
Oral polio	54 (43.2)	12
DTaP-IPV-Hib (Diphtheria-Tetanus-Pertussis-Polio-Haemophilus influenzae type b)	52 (41.6)	13
Rabies Vaccine	52 (41.6)	13
Hepatitis A	50 (40.0)	15
Pneumococcal Polysaccharide Vaccine (PPSV-23)	48 (38.4)	16
DTaP-IPV (Diphtheria-Tetanus-Pertussis-Polio)	47 (37.6)	17
BCG (Bacillus Calmette-Guérin)	45 (36.0)	18
Varicella Vaccine	45 (36.0)	18
Meningococcal Quadrivalent Vaccine (ACW135Y)	44 (35.2)	20
Covid Vaccines	42 (33.6)	21
Typhoid fever	21 (16.8)	22
Other	2 (1.6)	23
None of the above	6 (4.8)	N/A

Immunisations were one of the most frequently delivered preventive services in this study. Ninety-four (75.2%) community pharmacies provided an immunisation service (Figure 3). Immunisation is a primary public health intervention that aims to prevent the onset of infectious diseases. Immunisation services in South African community pharmacies involve vaccine administration, screening of at-risk individuals and vaccine education. Pharmacists also

promote paediatric immunisation as part of the EPI (South African Pharmacy Council, 2017). In contrast, Spanish community pharmacists are not officially allowed to vaccinate patients but can vaccinate pharmacy staff against COVID-19. They can also participate in vaccination education campaigns and procure and supply vaccines (Amador-Fernández *et al*., 2023).

Community pharmacies are an underutilised resource for adult vaccination even though they are well-positioned to provide access to immunisation owing to their convenient location and flexibility for scheduling vaccination appointments (San-Juan-Rodriguez *et al.*, 2018). The implementation of immunisation services in community pharmacies has proven to be cost-effective, and, more significantly, it has led to a substantial increase in immunisation rates. Pharmacists have specifically been able to target, through a variety of interventions, populations who usually would not get vaccinated (Burson *et al.*, 2016). Two recent studies assessing pharmacy service delivery in the USA reported higher immunisation rates than the present study. Study findings showed that immunisation services were offered by 87.2% - 96.9% of community pharmacies (depending on location) (Biddle *et al.*, 2021; Daly *et al.*, 2021). Vaccine screening tools have also been developed where community pharmacists provide vaccine education during dispensing, which helps minimise missed vaccination opportunities and improve vaccination rates (Rhodes *et al.*, 2017).

The influenza vaccine is one of the most commonly administered in community pharmacies and was also the most frequently offered service in the current study. Influenza vaccination can help prevent death and reduce hospital admissions in high-risk populations such as adults ≥ 65 years old, pregnant women, and those suffering from chronic diseases (Anderson and Thornley, 2016). Influenza vaccination was offered by 76.8% of pharmacists in the current study. This is an important finding due to the disease and economic burden associated with influenza in South Africa. Over 10.7 million influenza-associated illnesses occur per annum, with more than 11,000 deaths attributed to the virus. The vast majority of these cases occur in known at-risk groups such as senior citizens, pregnant women and those with HIV and Tuberculosis (TB) (Tempia *et al.*, 2020). Community pharmacy immunisation services in South Africa can help target these at-risk individuals by increasing access to the vaccine and improving vaccination rates.

Other vaccines provided by community pharmacists in this study included the Hepatitis B Vaccine (52.8%), Pneumococcal Conjugate vaccine (48.8%), Human Papillomavirus (HPV), DTaP (Diphtheria-Tetanus-Pertussis) (45.6%) and the Meningococcal Quadrivalent vaccine (35.2%). Several of these vaccines form part of the South African EPI schedule. South Africa has a low immunisation coverage rate despite the efforts of the EPI and the availability of free

vaccines in the public sector. The result has been recent outbreaks of VPDs such as measles and pertussis (Blose *et al.*, 2022). Community pharmacists can help improve access to EPI vaccines and boost immunisation rates by offering immunisation services. This would be a valuable public health initiative as VPDs cause significant illness and mortality.

Community pharmacists also assisted with the COVID-19 vaccine rollout and supplemented the traditional immunisation provider network (McCormick *et al.*, 2023). The delivery of COVID-19 vaccines in the present study was relatively low, with only 33.6% of independent community pharmacies offering this service. This could be attributed to the abundance of options available for patients to receive the COVID-19 vaccines, such as corporate pharmacies and public health facilities. The survey was conducted in late 2022, towards the latter end of the COVID-19 pandemic, when many patients had already received their vaccination. It is worth noting, however, that the pandemic did not impede the delivery of non-covid vaccines in community pharmacies (AlMahasis *et al.*, 2023). This accessibility to vaccines in community pharmacies has a significant role in minimising antibiotic misuse, allaying vaccine hesitancy and reducing morbidity from vaccine-preventable diseases.

4.4.6 Additional Services

Participants were asked to select which additional services were offered in the community pharmacy (n =123). Injection administration services for medications, such as Vitamin B and insulin, were offered by 78.9% of pharmacists, making it the most frequently selected option provided additional service in the present study. However, 15.4% of pharmacies did not offer any additional service. Support groups in the pharmacy were the least offered service and were only provided by 6.5% of pharmacies. Groups identified included SANCA, Safe Spaces and the Women's Agricultural Union. In addition, support groups for diseases such as diabetes, asthma and mental health were also mentioned. The frequency and ranking of each additional service offered are listed in Table 8.

A community pharmacist can provide injection administration services if they are competent in administering injections such as injectable contraceptives (South African Pharmacy Council, 2017). Injection technique forms part of the PCDT training programme and includes the administration of intramuscular (IM) injections and vaccines (South African Pharmacy Council, 2023a). In the present study, most pharmacies offered injection administration services (78.9%) and provided injectable medications such as IM Vitamin B12 injections. In a similar study by McDonald *et al*. (2021), it was reported that only 10% of respondents offered the administration of Vitamin B12 injections in their community pharmacy. However, 11% stated

they intended to provide such a service in the future. Some respondents in the present study likely included immunisation administration as part of the injection administration service.

Table 8: Frequency of Additional Services Offered (n = 123)

Additional service	Frequency (%)	Rank
Injection administration service (e.g., Vitamin B, insulin, erythropoietin, testosterone)	97 (78.9)	1
Medication review consultation	42 (34.1)	2
Medication adherence clinic	25 (20.3)	3
School visits	21 (17.1)	4
Nursing home visits	20 (16.3)	5
Palliative care	13 (10.6)	6
Travel Clinic	10 (8.1)	7
Support groups	8 (6.5)	8
None of the above	19 (15.4)	N/A

Medication use reviews and medication adherence clinic services were offered by 34.1% and 20.3% of pharmacists, respectively. A similar frequency of medication review service provision was reported in a study by Smith *et al*. (2018), with 31% of New Zealand community pharmacies offering the service. The presence of a medication adherence clinic was not assessed in the study, but medication therapy assessments were provided by 5% of pharmacies (Smith *et al.*, 2018). Medication use reviews were also provided by a significant percentage of community pharmacies in The Netherlands (94.3%), Serbia (68.3%) and Northern Ireland (66.0%) (Costa *et al.*, 2017). As there is a great deal of heterogeneity in the types of medication use reviews globally, comparisons can be made regarding the delivery of these different services. In the USA, they are referred to as Medicines Therapy Management (MTM) and Home Medicines Reviews in Australia (HMR) (Buss *et al.*, 2018; Adeoye *et al.*, 2019).

A study by Bisset *et al*. (2021) found that 82.1% of American community pharmacists provided MTM services, with 17.9% having received specific training to provide MTM services. An analogous study by Daly *et al*. (2021) conducted in independent community pharmacies in New York reported that 93.8% of pharmacies provided MTM. In England, community pharmacists offer two types of medicine optimisation services that aim to improve adherence: Medicines Use Review (MUR) and the New Medicines Service (NMS). Pharmacists are remunerated by the British National Health Service (NHS) for both these medicine review

services (Stewart *et al.*, 2020). NMS focuses on newly prescribed medications for patients with long-term conditions (Latif *et al.*, 2016).

A recent pilot study assessed the feasibility of implementing an NMS in an independent community pharmacy in South Africa. The study found that NMS can potentially improve patient outcomes, promote adherence to chronic medication, and detect therapy problems. However, the authors did note that funding is required to implement NMS in community pharmacies and that further studies are required to assess the full impact of NMS (Naidoo *et al.*, 2023). Presently, community pharmacists may levy a fee for medication use reviews; however, no competence standards or further training for NMS are currently available in South Africa (South African Pharmacy Council, 2023b). The findings of the present study and others suggest that there is potential for further implementation of medication use reviews and similar services in independent community pharmacies.

A travel clinic was the least offered additional service in the study (8.1%). Many respondents likely thought of this service as a formal travel clinic that offered vaccinations for travellers. A survey of Malaysian community pharmacies reported that 85.0% provided clinical services to domestic and foreign tourists. These services ranged from dispensing OTC medication, such as antihistamines and antidiarrheal agents, to providing screening and monitoring services to international travellers (Bhuvan *et al.*, 2020).

Additional services had been provided for 6-10 years by 32.0% of pharmacies. This correlates with the length of service delivery for other clinical services. Figure 4 compares how long each type of clinical service has been offered at the community pharmacies that participated in the study. Each column shows the percentage of independent community pharmacies that have been providing a specific category of clinical service for that period. This data demonstrates that even though clinical services have been provided for more than 15 years there has been an increase in the uptake of clinical services in the last 6 – 10 years. Clinical service provision has become more prevalent due to pharmacists having to generate other sources of income as well as provide clinical benefits and improve health outcomes for their patients.

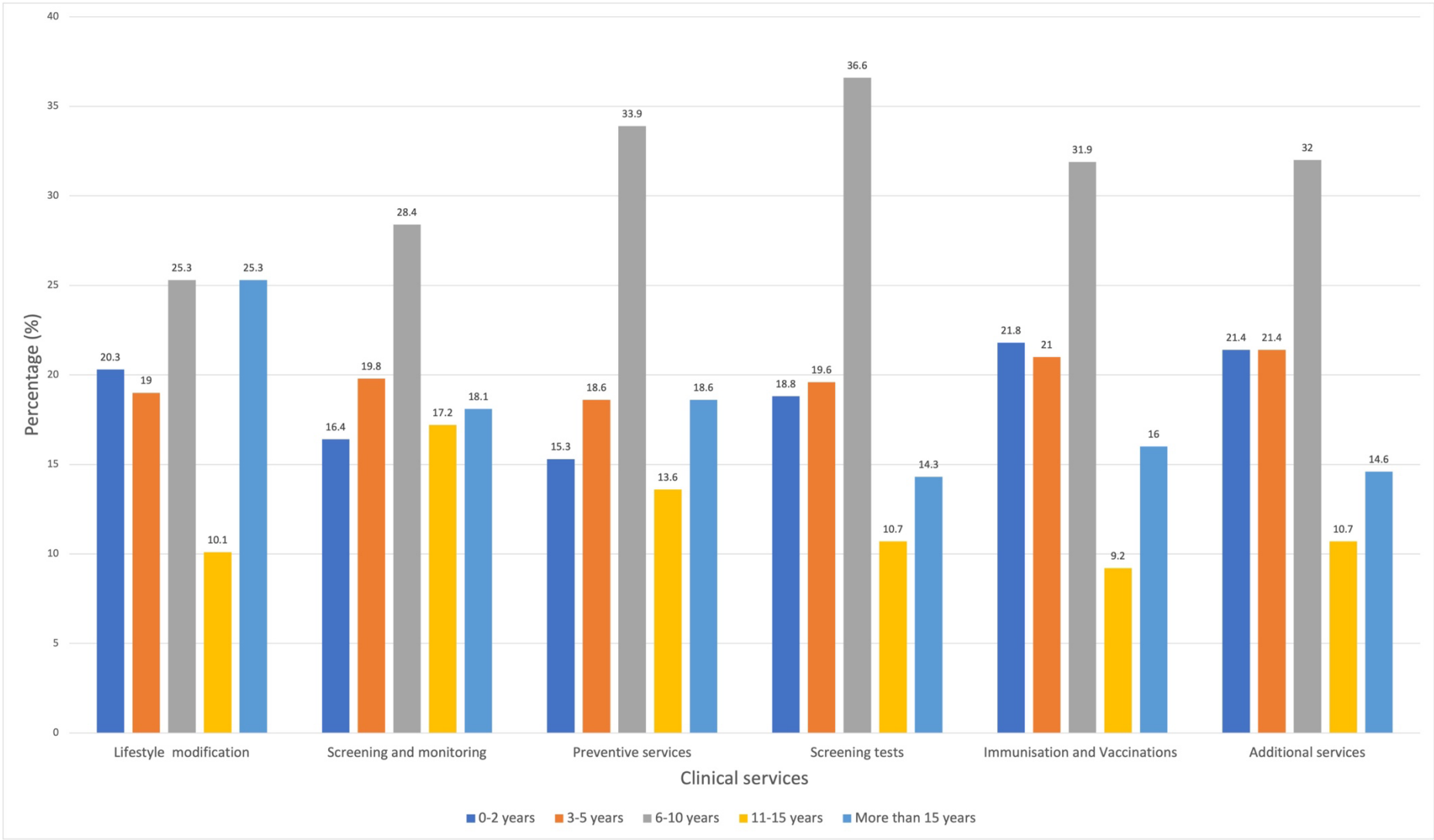


Figure 4: Number of years for which each clinical service has been provided

4.5 Delivery of Clinical Services and Willingness to Offer Them

The majority of clinical services were delivered by a pharmacist (39.5%) or a clinic nurse (32.5%). Figure 5 illustrates which healthcare professionals were responsible for providing most clinical services within the community pharmacies that participated in the study. Respondents were not asked if this individual was the only healthcare professional delivering clinical services, nor were they asked if more than one individual was providing clinical services in the pharmacy. PCDT pharmacists only delivered the majority of clinical services in 26 community pharmacies (22.8%).

PCDT pharmacists may only practice if they possess a Section 22A (15) permit from the NDoH (South African Pharmacy Council, 2023a). Not all PCDT pharmacists who responded likely possess a Section 22A (15) permit, as only eighty PCDT permits were issued in 2022 (South African Pharmacy Council, 2022b). The responsibility for delivering clinical services in some community pharmacies may be shared between a pharmacist, clinic nurse and PCDT pharmacist. This difference in service delivery may also be attributed to the individual's scope of practice and level of competency or even a lack of knowledge or training to deliver clinical services. Lack of specific training and skills are often cited as barriers to service delivery (Aly *et al.*, 2021).

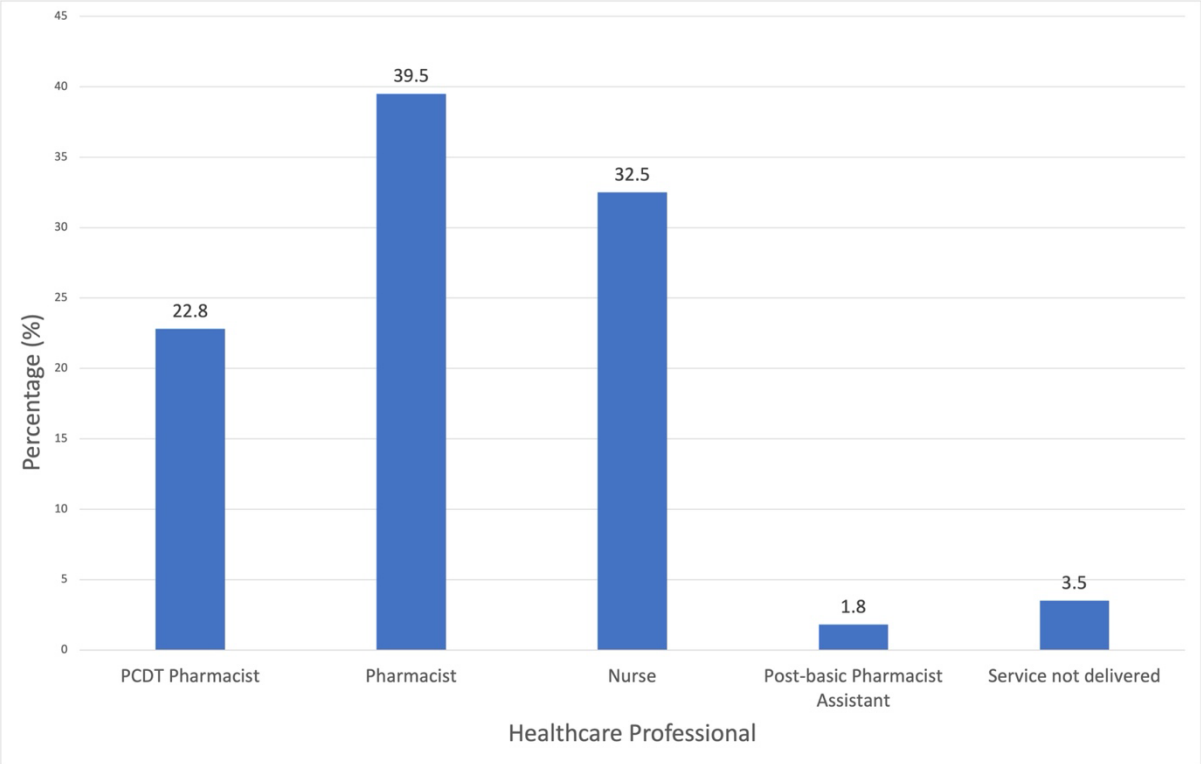


Figure 5: Healthcare professionals delivering the majority of clinical services

Figure 6 shows the years of experience since qualification of the individuals who delivered clinical services in each community pharmacy. The average duration of practice experience in the present study was 11.28 ± 6.35 years. Just over half of the respondents in the present study (51.8%) had more than ten years of postgraduate experience, with only 10.0% of individuals having been qualified for less than two years. In comparison, 63.0% of community pharmacy staff in New Zealand had more than ten years of experience postgraduation (McDonald *et al.*, 2021), with a similar figure (60.0%) reported by Barrett and Hodgkinson (2019) for British community pharmacies. However, the percentage reported in the present study was higher than that reported for similar studies that assessed clinical service delivery. In Jordan, 36,1% of pharmacy staff had more than ten years of experience (El-Dahiyat *et al*., 2019), while in Nigeria, this figure increased to 43.9% (Oseni and Erhun, 2021).

The community pharmacist's role is evolving from a traditional dispensing role into one that places more focus and responsibility on patient care. However, inconsistencies exist in the uptake and delivery of clinical services and how pharmacists view this change in role (Schindel *et al.*, 2017; Weir *et al.*, 2019). The majority of respondents in the present study (97.4%) believed that clinical services are important for patient management at the community pharmacy level. Participants either strongly agreed (96, 84.2%) or agreed (15, 13.2%) with this view. Only 2.6% of participants strongly disagreed (n = 3) that clinical services were necessary.

The percentage of participants in the present study who believed that clinical services are necessary was higher than that reported in a study by Biddle *et al*. (2021), with 87.8% of pharmacists agreeing that providing clinical services will benefit their patients' health. Several studies examined community pharmacists' perspectives regarding the importance of specific clinical services. Just over 90% of respondents believed that HIV/AIDS services should be the responsibility of Nigeria community pharmacists in Nigeria (Oseni and Erhun, 2021). In Iran, 74.6% of pharmacists felt that a community pharmacy is a suitable location for providing cardiovascular risk screening services (CRS), with 80.5% of pharmacists believing that the delivery of CRS is a role for a pharmacist who has been adequately trained (Jahangard-Rafsanjani *et al.*, 2014).

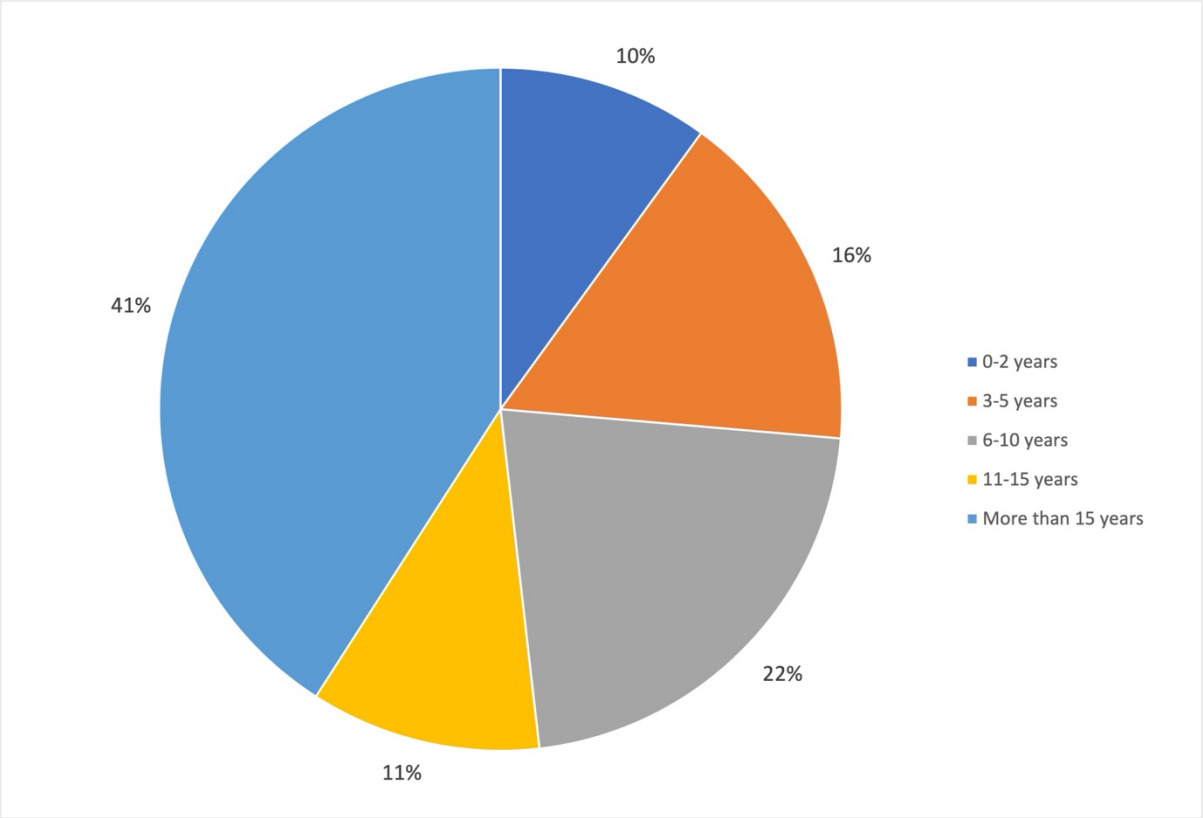


Figure 6: Years of experience of healthcare professionals delivering clinical services

One hundred and eight participants (94.7%) indicated they would be willing to offer additional services in the future. Most pharmacists (92.6%) also stated that it would take them less than two years to implement additional clinical services at their community pharmacy. There was no difference in willingness to offer clinical services between urban (95.0%) and rural (94.1%) community pharmacists. Most participants (n = 94, 83.9%) considered themselves innovators and promoters of new services. Table 9 summarises the time participants believed it would take them to implement additional clinical services at their community pharmacy. Several studies assessed community pharmacists' willingness to offer clinical services.

Biddle *et al*. (2021) reported that 68.9% of pharmacists were willing to implement new clinical services in their community pharmacy. In comparison, a similar study by Daly *et al*. (2021) reported that 81.5% of pharmacists were willing to offer clinical services if they were reimbursed adequately to cover costs, with 21.5% of respondents even willing to provide services with no remuneration. Additional services that pharmacists were willing to provide included POCT (69.5%), disease state management (49.2%) and smoking cessation (49.2%). The predominant clinical services that community pharmacists from New Zealand intended to provide in the future were the supply of NRT (37.0%), smoking cessation (30.0%) and BP monitoring (16.0%) (McDonald *et al.*, 2021). In Saudi Arabia, 91.7% of pharmacists agreed

that Antimicrobial Stewardship (AMS) should be incorporated in community pharmacies (Haseeb *et al.*, 2022). Understanding the viewpoints of independent community pharmacists who provide clinical services can provide valuable insights on enhancing the quality and implementation of these services (Dosea *et al.*, 2017).

Table 9: Implementation of additional clinical services in the community pharmacy

Time taken to implement service	Frequency (%)
0 – 3 months	35 (32.4)
6 months	25 (23.1)
1 year	29 (26.9)
2 years	11 (10.2)
More than 2 years	8 (7.4)

According to a study by Hasan *et al*. (2012), pharmacists in independent community pharmacies were more actively involved in providing clinical services. It was also suggested that independent pharmacies offer better-quality patient counselling and more personalised attention than chain pharmacies. Howarth *et al.* (2019) indicated that rural community pharmacists are more likely to offer additional clinical services than their urban counterparts. They are also more willing to take on new roles and improve access to healthcare services for their communities (Taylor *et al*., 2021b). The present study did not find a difference in willingness between rural and urban pharmacists to offer clinical services; however, the difference in clinical service delivery between the two was not assessed and may be a suggestion for future research.

A review by Eades *et al*. (2011) found that most community pharmacists have a positive outlook towards offering clinical services and understand the significance of providing such services to their patients. This indicates that the shift in the community pharmacist's role from traditional dispensing to more patient-centric services is beginning to be accepted. Many community pharmacists do not only acknowledge the expansion of clinical service delivery but feel that it is necessary to safeguard the future of the profession (Weidmann *et al*., 2022). An earlier study by Grindrod *et al*. (2010) reported that most pharmacists preferred medication or disease management services over traditional dispensing activities. It is also worth stating that many community pharmacists are content with their current dispensing roles and have reservations about providing expanded clinical services (Braund *et al.*, 2012). The present study's findings suggest that the staff working in independent community pharmacies in South Africa are reasonably experienced and willing to offer clinical services.

4.6 Barriers to implementation of clinical services

A total of 122 participants were asked to identify the possible barriers to implementing clinical services within the community pharmacy from 21 barrier options. Figure 7 shows the frequency of each barrier to implementation. The two significant barriers to the implementation of clinical pharmacy services, as reported by participants, were time and remuneration for service (64, 57.1%). These were followed by the cost of setting up the service (51, 45.5%) and infrastructure (47, 42.0%). The least identified barriers were social distancing (1, 0.9%) and personal choice (4, 3.6%). Participants also cited the current legal framework, the slow pace of the government in implementing rural incentives and the difficulty in obtaining medicine from the public sector as other barriers to implementation. Several participants stated they should have access to state medication such as vaccines that form part of EPI. They felt that providing these immunisation services would reduce the burden on the public sector.

Wider implementation of vaccine services in independent community pharmacies is restricted by limited support from the public healthcare system and access to EPI vaccines, which are available free of charge in public healthcare facilities (Edwin, Mackay and Mda, 2022). Pharmacists were asked about their perception of their current workload in the pharmacy. Over half of the participants indicated a high workload (n = 58, 51,8%). The workload rating for each pharmacy is presented in Figure 8. As expected, no pharmacists indicated that their daily workload was very low.

A variety of disruptive factors can complicate the implementation of clinical services in community pharmacies. These barriers limit a pharmacist's willingness and ability to provide such services effectively. It is, therefore, necessary to identify and assess these barriers so they can be addressed before the implementation of any clinical service (Alonso-Perales *et al.*, 2017; Moecker *et al.*, 2021). Various studies have described community staff perceptions of barriers and facilitators of clinical and professional services. The common barriers to clinical services that have been well documented include time constraints, inadequate remuneration, high workload, availability of a private counselling area and patient demand (Eades *et al*., 2011; Jahangard-Rafsanjani *et al*., 2014; Jairoun *et al*., 2022). Additional barriers to clinical service implementation include insufficient funds and resources, no financial incentives, lack of appropriate space, no access to patient clinical data or records, inadequate staffing, lack of documentation skills, poor teamwork, lack of motivation and administrative support (Mohamed *et al*., 2015; Hilmer and Sawan, 2018; Moltó-Puigmartí *et al*., 2018; Boura *et al*., 2022; Weidmann *et al*., 2022).

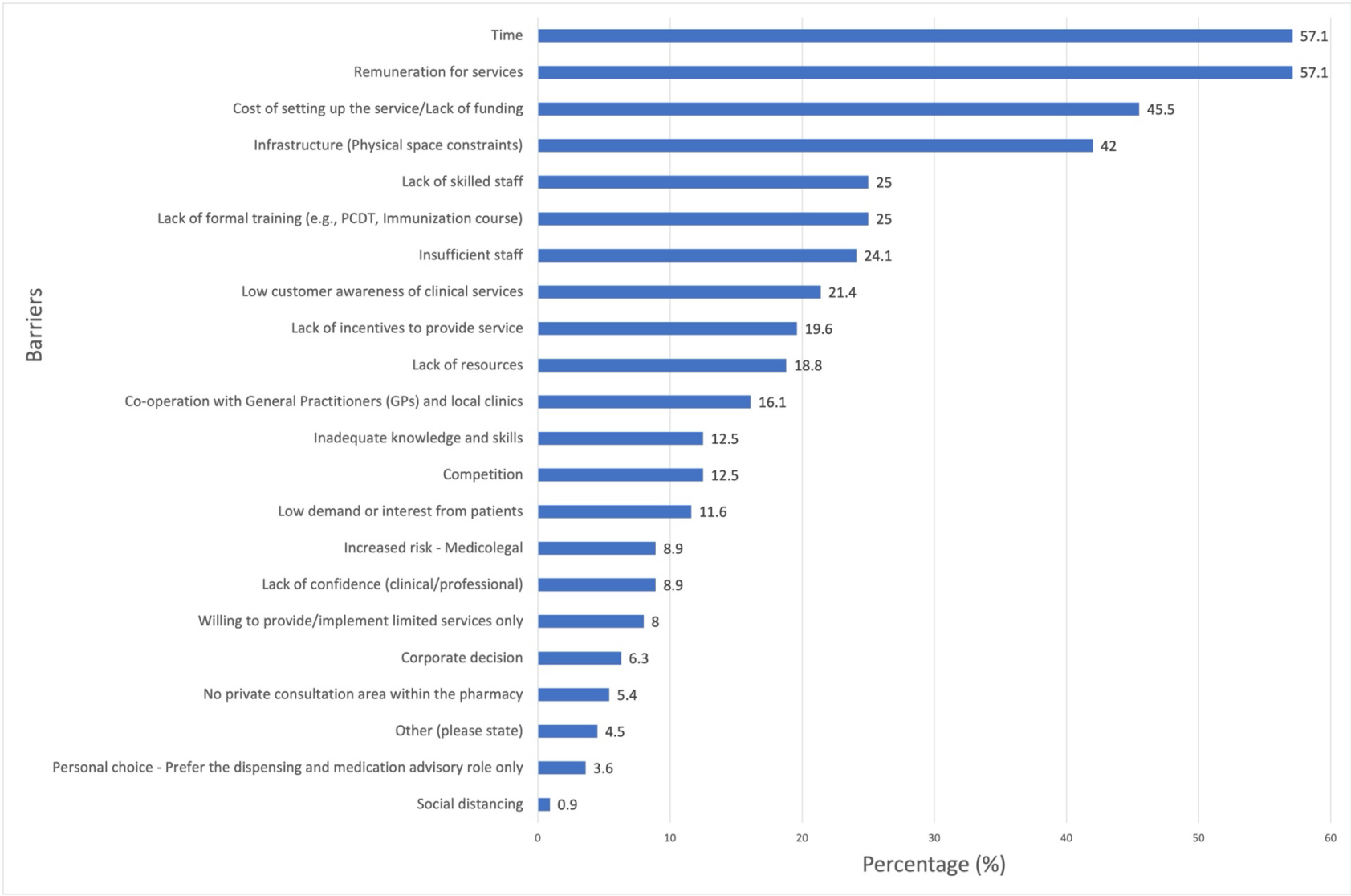


Figure 7: Barriers to the implementation of clinical services

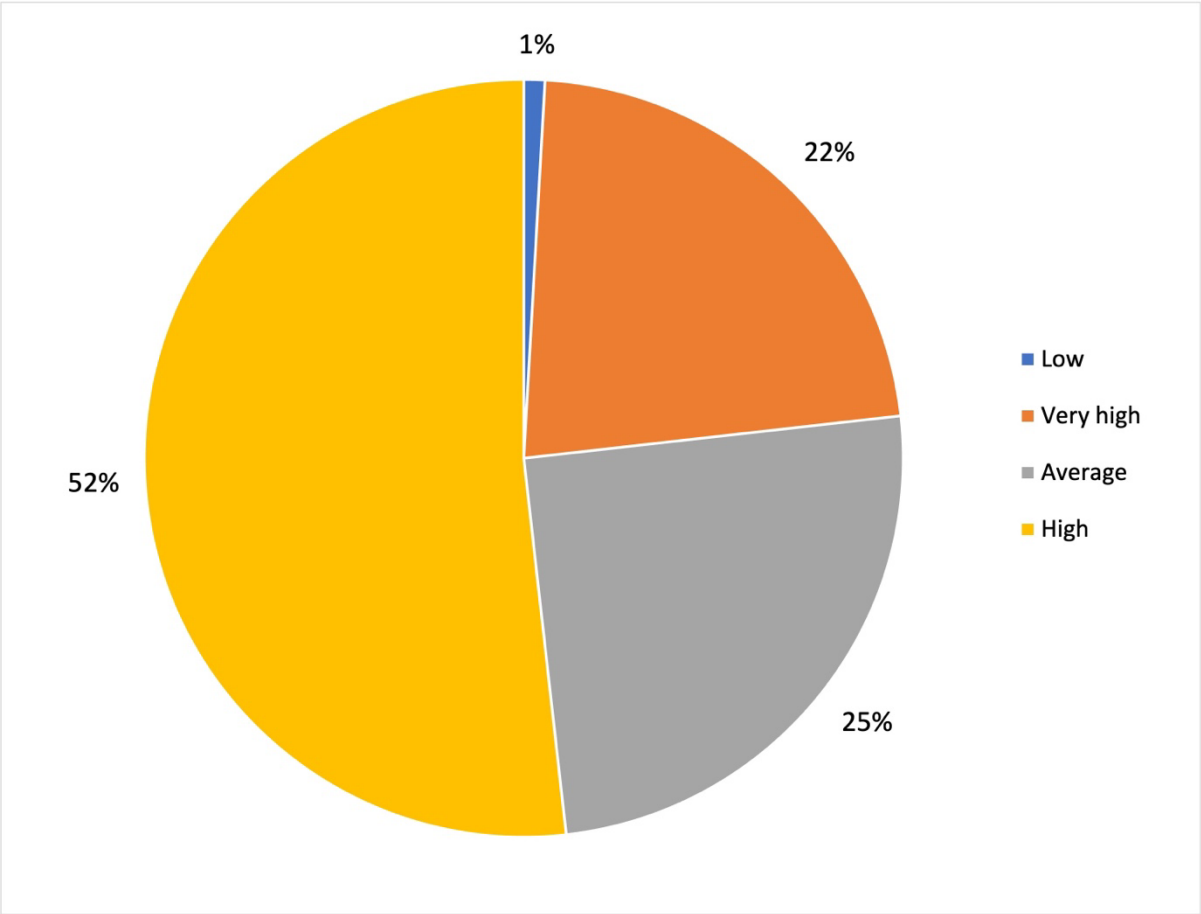


Figure 8: Average workload rating of community pharmacists

The autonomous nature of independent community pharmacies and their requirement to be profitable is another barrier which can often influence the implementation of a clinical service (Weir *et al.*, 2019). Other studies have reported inadequate training, education, and a lack of clinical knowledge and communication skills (Eades *et al*., 2011; Mehralian *et al.*, 2015; Dosea *et al.*, 2017; Tesfaye and Yismaw, 2020). Role definition has also been mentioned as a possible factor. Specifically, how community pharmacists perceive their roles in the healthcare system and their areas of responsibility (Weidmann et al., 2022). A study by Davies *et al*. (2014) found that despite the desire and need for a role change. Community pharmacists in the UK predominantly spend most of their time dispensing prescriptions and offering advice on non-prescription medicines. Less than 20% of their time is spent on providing clinical pharmacy services (Davies *et al*., 2014).

Time constraints are repeatedly cited by pharmacists across the globe as a significant barrier to implementing additional clinical services in community pharmacies (Duckett, 2015; Yuan *et al.*, 2019; Moecker *et al.*, 2021). A review by Alonso-Perales *et al*. (2017) found that 95.8% of studies reported the need for more time as a barrier to promoting clinical services that promote health in community pharmacies. In the present study, 57.1% of pharmacists stated that time

was the primary barrier to delivering clinical services in their community pharmacy. In comparison, 46.0% of community pharmacists in New Zealand noted that they were too busy dispensing to offer more clinical services (McDonald *et al.*, 2021). Similar sentiments were reported in a study in Iran, where 46.4% of community pharmacists also perceived time as a barrier to screening services (Jahangard-Rafsanjani *et al.*, 2014). However, only 28.8% of respondents in the USA felt that time was the most considerable barrier to implementing additional clinical services (Biddle *et al.*, 2021).

An equal number of respondents cited the lack of service remuneration as time constraints in the present study (57.1%). Compared to the present study, only 30.1% of pharmacists in Nigeria stated that the absence of reimbursement was a barrier to clinical service delivery (Oseni and Erhun, 2021). A survey conducted by Alexander *et al*. (2014) of independent community pharmacists revealed the two main barriers to implementing a personalised medicine service were lack of remuneration and the cost of delivering the service. The cost of setting up a clinical service was the third most reported barrier in the current study (45.5%).

The findings of the current study regarding lack of remuneration are noteworthy. Pharmacists in South Africa may levy fees for their services, provided they comply with the rules for levying such fees. These include informing patients of the fees before providing services and clearly displaying a list of services and fees in the pharmacy (South African Pharmacy Council, 2023b). Community pharmacists in the UAE also identified a lack of remuneration as a barrier to offering screening services; however, this is due to their inability to charge patients for such services (Hasan *et al.*, 2012). A study by Daly *et al*. (2021) reported that community pharmacists in New York were willing to provide clinical services if adequately compensated, but legislative approval prevents them from doing so.

Potential costs have also been identified as a factor that may influence patient usage of clinical services (Schumacher *et al.*, 2020). Patients' reluctance to participate due to increased waiting times is another noteworthy impediment (Mehralian *et al.*, 2015). Lack of patient demand or interest (11.6%) was also identified as a barrier in the present study. Findings in other studies regarding patient factors as barriers to clinical services are inconsistent. Several other studies have identified a lack of demand as a significant barrier to providing clinical services (Eades *et al*., 2011; Moecker *et al.*, 2021). At the same time, just over 50% of Jordan community pharmacists (50.8%) stated that they would not offer clinical services due to patient factors such as lack of interest (El-Dahiyat *et al*., 2019).

In comparison, most participants in surveys on clinical services in the USA and Nigeria did not think that lack of patient demand was a noteworthy obstacle to service delivery (Eades *et al*., 2011; Oseni and Erhun, 2021). McDonald *et al*. (2021) reported that 64% of community pharmacists believed there was sufficient patient demand for additional clinical services. However, only 26% thought patients would be willing to pay for these services.

Low customer awareness was reported by 21.4% of pharmacists in the present study. Lack of awareness and understanding of clinical services in community pharmacies has been examined in various studies and is often associated with low service usage (Hindi *et al*., 2018). Many patients need to be made aware of pharmacist counselling skills or understand the newly expanded services offered by community pharmacists (Alonso-Perales *et al*., 2017; Weidmann *et al*., 2022). Just over 16% of respondents in the current study cited the need for more collaboration with general practitioners and local clinics as a potential barrier. Participants in a descriptive study involving rural community pharmacists in Australia highlighted the lack of collaboration with other healthcare professionals as an obstacle to the delivery of clinical services (Taylor *et al*., 2021c). Interdisciplinary collaboration is a vital part of pharmaceutical care, and agreements should be made with other health professionals to facilitate the successful delivery of clinical services (Hossain *et al*., 2017).

Most participants in the present study (74.1%) considered their workload to be high or very high. The average workload rating in this study was 3.96 ±0.07. In comparison, a survey by Doucette *et al*. (2016) reported a perceived workload rating of 3.85 ± 0.77. The high workload for the present study correlates with the finding that time is the main barrier to clinical service delivery in independent community pharmacies. Determining community pharmacists' views of the barriers that hinder clinical service implementation is essential to tackling them (Schindel *et al*., 2017; Makhlouf *et al*., 2023). The present study identified the barriers that independent community pharmacists encounter. Analysis of these barriers will help derive strategies to overcome them and facilitate enhanced delivery of clinical services.

4.7 Availability of Resources

The percentages of participants who rated the availability of resources needed to develop and provide clinical resources are encapsulated in Table 10. Just over 40% of participants considered their skills in providing clinical services to be very good (n = 45, 41.3%). The availability of financial resources to implement and maintain clinical services was generally considered fair (n = 42, 38.5%), and 38.5% of participants thought their expertise in developing

clinical services to be good (n = 42). The adequacy of resources was also reported as a sum of 3 items using the 5-point scale, and the mean was 9.52 (SD 2.64).

Table 10: Community pharmacist perception of the adequacy of resources (n = 109)

Availability of resources	Poor (%)	Fair (%)	Good (%)	Very Good (%)	Excellent (%)	Mean (SD)
Skills to provide clinical services	3.7	13.8	27.5	41.3	13.8	3.48 ± 0.097
Financial resources to implement and maintain services	8.3	38.5	29.4	17.4	6.4	2.75 ± 0.100
Expertise to develop services	6.4	12.8	38.5	29.4	12.8	3.29 ± 0.101

The availability of sufficient resources and perceived workload are significant predictors of a community pharmacy's ability to deliver expanded clinical services (Doucette *et al.*, 2017). Insufficient resources have been frequently identified as a barrier (Weir *et al.*, 2019). In the present study, only 23.8% of pharmacists reported higher scores for the availability of resources to implement and maintain clinical services in their community pharmacy. Despite this, only 18.8% of respondents cited a lack of resources as a barrier to clinical service delivery. Findings in a study by Biddle *et al*. (2021) were similar, with 16.5% of participants citing the lack of resources as an obstacle to delivering community pharmacy services. However, participants in the same study rated their ability to access resources was higher, with 45.3% of respondents believing they could access adequate resources to implement additional clinical services.

Pharmacists in the present study were more optimistic about their skills in providing clinical services, with 55.1% rating their skills as very good or excellent. In comparison, 75.7% of pharmacists in Alaska and Idaho felt they possessed the skills to provide clinical services (Biddle *et al.*, 2021). The mean sum of the adequacy of resources for the current study was 9.52 ±2.64. In contrast, Doucette et al. (2016) reported the mean adequacy of resources as 13.65 ±4.30 in a study which assessed the frequency and type of community pharmacy services in the USA. This difference can be attributed to the latter study incorporating independent and well-resourced corporate pharmacies. Inadequate knowledge and skills have been reported as barriers to the delivery of clinical services in community pharmacies (Tesfaye and Yismaw, 2020). In the present study, only 12.5% of pharmacists identified inadequate knowledge and skills as barriers. Notwithstanding this finding, it is still important

to ensure that independent community pharmacists are competent to offer clinical services to ensure they are effective and comply with legislation.

4.8 Training needs for clinical service implementation

The majority of participants (85.3%) identified short courses with assessments as the most suitable training method to help them fulfil their training needs to set up and deliver clinical services in their community pharmacy. Only 11.9% believed a master's degree would help them meet their training needs. An online learning course, completed at their own pace, was chosen by 42.2% of participants as the preferred platform to accomplish their training needs. A summary of the training needs and the preferred platforms of the participants is summarised in Table 11.

Table 11: Training requirements identified for clinical services (n = 109)

Variables	Frequency (%)	Rank
Training Need		
Short courses with assessments (one- or two-day course)	93 (85.3)	1
CPD Events (webinars, presentations)	69 (63.3)	2
Post-graduate diploma	27 (24.8)	3
Master's degree	13 (11.9)	4
Training Platform		
Online learning course (done at own pace)	46 (42.2)	1
Face to face (physically attend a workshop)	24 (22.0)	3
Blended (combination of online and face to face)	27 (24.8)	2
On-the-job training	12 (11.0)	4

Several studies have identified the need for training as a potential barrier to the delivery and uptake of clinical services (Eades *et al*., 2011; Jahangard-Rafsanjani *et al*., 2014; Aly *et al*., 2021). Participants in a study by Dosea *et al*. (2017) reported difficulties with providing clinical services. Due to inadequate training, pharmacists either lacked clinical skills or had trouble applying them when interacting with patients. Lack of formal training was identified as a barrier by 25.0% of pharmacists in the current study. This has also raised concerns among patients and physicians regarding the capability of community pharmacists to deliver proficient clinical services (Hindi *et al*., 2018). These concerns often stem from the general public being unaware of a community pharmacist's knowledge and skills. An additional barrier is that pharmacists frequently lack confidence in their clinical skills, limiting their capacity to deliver clinical services. Technical training has been proposed to overcome this issue and improve clinical skills (*Dosea et al*., 2017; Campeau Calfat *et al*., 2021; Weidmann *et al*., 2022).

Continuing education (CE) programmes are important for expanding pharmacist skills and knowledge, especially in areas where undergraduate training may be deficient. Several countries have implemented mandatory CE programmes to ensure pharmacists continuously enhance and update their clinical proficiencies (Roque Obreli-Neto *et al.*, 2016). In South Africa, pharmacists must adhere to the concept of Continuous Professional Development (CPD), which involves lifelong learning to ensure that they continuously improve their professional knowledge and skills to maintain a high level of competency. South African pharmacists must receive adequate supplementary training before they can provide services such as immunisations, PIMART and PCDT (South African Pharmacy Council, 2017, 2021a, 2023a). Community pharmacists in New Zealand are also required to complete mandatory training courses before receiving accreditation to provide services such as MURs, immunisations, and the supply of oral contraceptives (McDonald *et al.*, 2021).

Training and education requirements for clinical service skills vary, and there is also uncertainty as to which is the most effective approach for providing clinical service training (Roque Obreli-Neto *et al.*, 2016; Aly *et al.*, 2021). A study conducted by Nichols *et al*. (2023) reported that 88.4% of pharmacists used structured CE programmes rather than on-the-job training (40.6%) or webinars (31.9%) as an educational resource for providing clinical interventions. On-the-job training was only selected by 11.0% of respondents in the current study; however, 63.3% chose webinars as a training resource. Almost double the participants selected an online course than a face-to-face workshop (42.2% versus 22.0%). In contrast, 78% of pharmacists in a study by *Alexander et al*. (2014) preferred learning through in-person continuing education rather than an online delivery method. Determining independent community pharmacists' preferences for training can help service providers and training institutions develop effective training programmes that will meet their training needs.

4.9 Views

In the open-response comment section, participants were asked to share their views on the delivery of clinical services in community pharmacies. Responses were assessed, but no meaningful pattern was found; therefore, responses could not be coded for analysis. Some responses were irrelevant to the question posed or to the objectives of this study, e.g. immigration issues. Several respondents indicated that they had no further views or that their views were covered in prior questions.

Responses to open-ended questions varied, and a broad range of themes were mentioned. Several common themes were identified as listed below:

1. Clinical services are an essential aspect of community pharmacy.
2. Barriers included time, lack of remuneration, and insufficient staff.
3. Additional training is required, and changes to the pharmacy curriculum should occur.
4. Clinical services provide patients with access to cost-effective healthcare.
5. Clinical services in community pharmacies help reduce the burden on the public sector.
6. Clinical services ensure the relevance of community pharmacy. They can improve the skills of community pharmacists and help the profession grow.
7. Promotion of clinical services and public awareness of their value and what they entail.

The majority of respondents indicated that clinical services were an essential aspect of community pharmacy and that they would like to be involved in the delivery of additional services. Several responses highlighted the importance of clinical services and their value to patient care. Many community pharmacists could not offer clinical services due to time constraints, lack of remuneration and staffing concerns. Adequate reimbursement was viewed as the key to the sustained implementation of clinical services, with payment made through medical aids or by patients. Profitability is vital to the survival of independent community pharmacies as they need to compete with larger and well-resourced corporate chains (Berenbrok *et al.*, 2022). Public perception supports adequate reimbursement for community pharmacists' clinical services (Anderson *et al.*, 2022). Participants felt additional public and private sector support would be necessary for clinical service implementation.

Some respondents felt that staff were not adequately trained. Training pharmacists was perceived as a necessary step for clinical service implementation, with respondents viewing PCDT supplementary training positively. Nonetheless, many were concerned about the lack of remuneration and difficulty in obtaining a PCDT qualification. Some believed that the NDoH should facilitate training. The justification for this view is that many pharmacists felt that clinical services would reduce the burden on the public sector. Respondents also felt that there needs to be greater transparency from the government in terms of medicine pricing structures and that there should be greater access to state medications such as EPI vaccines. Rural incentives were seen as a possible solution to the need for more community pharmacies in rural areas. Another barrier participants cited was the lack of awareness of community pharmacy clinical services, with many stating that more must be done to promote them.

Chapter 5: Conclusion

This chapter summarises the key findings of this study and their implications. The study's limitations are considered, and recommendations for future research are presented.

5.1 Study Limitations

This study encountered several limitations over its duration. The principal limitation of this study was the low response rate, as just over half of the survey sample responded. Declining response rates to surveys have become a reality in recent years. Survey research has the potential for errors, including sampling and nonresponse errors. Although the response rate was comparable to similar studies and considered adequate for analysis, the results should still be interpreted conservatively as non-response bias can be a possible error. This limits the ability of the results to be generalised to all community pharmacies in South Africa. Another limitation was that not all participants completed the survey because not all questions were compulsory. Participants also had the option to exit the study at any time. However, they also had the option to save their answers and return to the survey if they chose to do so. Some questions had fewer responses, and missing data was particularly evident towards the end of the survey. Follow-up procedures for survey respondents in the current study may have also needed to be improved.

An additional limitation was the study's reliance on self-reported data. The survey design meant that data collected was not observed and, therefore, dependent on the honesty of the participants. This has the potential to create self-reporting bias and errors due to recall difficulties by the participants. Another concern arising from the self-reporting process is social desirability bias. Participants may have concealed their actual opinions and provided answers to make themselves look better to others by stating they offer more services or are willing to provide additional services. The nature of an online survey-based study also means that researchers can not follow up with participants to determine the reasons for them not providing certain clinical services.

Only responsible pharmacists at independent community pharmacies belonging to the ICPA were asked to participate in the survey. Those who were not part of the ICPA and those in corporate community pharmacies were not surveyed. Thus, the study's findings do not reflect the views of these groups of participants. Due to the anonymous nature of the survey, it is assumed, but not verified, that the intended participants completed the surveys. Multiple participants from the same community pharmacy may have answered the survey, however,

the prospect of this occurring is unlikely due to the sampling process and the survey link being sent directly to the responsible pharmacist of each pharmacy.

The response rate to the survey may not have been representative of all the demographic areas in the country as it was only available online and may have excluded participants who did not have reliable access to the Internet. Many participants were unable to access the survey due to disruptions in the internet connectivity caused by electricity supply problems. Electronic survey respondents also tend to be younger and thus may not be representative of the general pharmacist population. Another limitation worth considering is that volunteer bias may occur due to pharmacists' tendency to have minimal involvement in pharmacy practice studies. This is often attributed to competing tasks within the pharmacy or some pharmacists needing more motivation to respond than others. Finally, the study did not investigate the perceptions of the patients who received clinical services from community pharmacies.

5.2 Recommendations and implications for future research

This study employed a quantitative, exploratory research design and provided a descriptive analysis of the delivery of clinical services in independent community pharmacies. Based on the findings, there is a need for further investigation, with several recommendations being proposed. Firstly, it is suggested that additional research be conducted to investigate why certain clinical services are being offered, and others are not, despite being within the scope of practice of community pharmacists. A qualitative interview study could be conducted with community pharmacists to evaluate their reasons for not providing specific clinical pharmacy services.

Secondly, it is recommended that a larger sample of community pharmacies be surveyed to obtain a more representative sample of the study population. This could be achieved by inviting pharmacists from corporate community pharmacies and non-ICPA independent community pharmacies to participate in the study. Comparisons between independent and corporate community pharmacies can also be considered. Thirdly, future studies should explore the feelings and opinions of patients and other healthcare professionals towards the delivery of clinical services by community pharmacists. Patient satisfaction with clinical service delivery could also be assessed. These studies can help overcome barriers such as lack of demand and awareness of clinical services, which can enhance interprofessional collaboration.

The present study identified the barriers to the delivery of clinical services. Therefore, future research should focus on developing strategies to overcome the barriers to the implementation of clinical services in independent community pharmacies. Future studies should also evaluate the factors facilitating and enabling clinical service delivery. The development of efficient structures and systems can help expedite the delivery of additional clinical services and increase their frequency. Frameworks can also be developed to evaluate the implementation process to ensure that barriers are circumvented. In-person interviews should be conducted to obtain community pharmacists' thoughts on how to overcome these barriers. Further research is also required to assess the quality of services offered by independent community pharmacies. This ensures that therapeutic outcomes are consistently achieved and patient satisfaction is constantly maintained.

Survey research, like any research methodology, has the potential for errors. However, several strategies can be implemented to improve response rates and reduce the likelihood of bias affecting the validity of results. These include a mixed-method design for survey administration that can increase sample coverage. Questionnaire items should be ordered logically and arranged clearly on each page to produce reliable results. A user-friendly layout with an improved visual design and appropriate font size for participants can also reduce the risk of non-response bias. In addition, follow-up procedures for non-responders must be effective. The use of reliable instruments also decreases the chance of measurement errors. Other strategies include keeping the survey short and making it convenient to complete by writing clear instructions and pretesting the survey.

The following recommendations will produce findings that are important to the delivery of clinical services in community pharmacies in South Africa:

a) Compare the differences in clinical service provision per location. This includes comparisons between rural and urban community pharmacies or between provinces.
b) Compare the types of clinical services delivered in independent and corporate community pharmacies.
c) To investigate if factors such as age, gender and experience influence the provision of clinical services in a community pharmacy.
d) To investigate if qualification impacts the frequency of clinical service delivery.
e) To conduct a feasibility study and cost analysis of clinical service delivery in an independent community pharmacy.
f) Determine the opinions of pharmacist interns, pharmacist assistants, locum pharmacists and nurses working in pharmacies regarding providing clinical services in community pharmacies.

g) Identify the enablers and facilitators of clinical service delivery.
h) Focus on specific categories of clinical services to keep the survey length short.

5.3 Conclusion

This study aimed to identify the different types of clinical services currently being delivered in independent community pharmacies in South Africa and the extent to which these clinical services are offered. In addition, the study also assessed the willingness of pharmacists to provide clinical services and identified the most prevalent barriers which hinder the implementation of clinical services. A quantitative, cross-sectional electronic survey was employed as the study instrument. Surveys are considered an appropriate research methodology that can help describe and investigate a multitude of variables due to their flexibility and practicality. The findings of this study demonstrated that pharmacists in independent community pharmacies in South Africa provide a wide range of clinical pharmacy services, with immunisations and preventive services being the most prevalent clinical service categories offered. Diabetes screening, blood pressure measurements and Influenza vaccination were the most frequently delivered services by community pharmacists.

The types of clinical services offered in this study are comparable to those provided by community pharmacies in other studies; however, the types and frequency of services delivered vary across different countries and regions. These differences could be attributed to legislation, costs and demand for a specific service. The services identified in this study also correlate with some of the most prevalent diseases and health issues encountered in South Africa. On average, most pharmacies have been offering clinical services for 6 – 10 years. Most community pharmacists in the present study were willing to provide clinical services as they felt they were an important aspect of patient management.

Although the findings of this study indicated a positive shift towards the provision of additional clinical services in independent community pharmacies, significant barriers still limited the delivery of clinical services. A noteworthy barrier to offering more clinical services was the lack of time, which was attributed to a high perceived workload in the pharmacy. Other notable barriers identified in the study included the lack of remuneration and funding to set up clinical services, as well as inappropriate infrastructure and physical space constraints. These findings are consistent with similar studies in other countries which evaluated the barriers to clinical service delivery. Addressing the barriers identified in this study will improve the delivery and enhance the quality of clinical services offered.

The results of this study revealed that the presence of a dedicated private area for the provision of clinical services and the availability of adequately trained personnel are notable factors that affect the delivery of clinical services. Furthermore, the findings of this study highlighted the need for additional support and resources for pharmacists in independent community pharmacies to improve their ability to offer expanded clinical services. Training pharmacy staff to acquire adequate skills and knowledge to provide clinical services is an essential facilitator for effective clinical service delivery. The majority of pharmacists felt that short courses with assessments that are presented on an online platform would be the most suitable method to address their training needs. These findings could help inform service providers and academic institutions to create training programs that will meet the needs of independent community pharmacists who often lack time to participate in training.

An important contribution of this research is to highlight the perceptions of independent community pharmacists in South Africa regarding their willingness to offer clinical services and the potential barriers they may encounter. This is the first study to evaluate the types and extent of clinical services delivered in community pharmacies in South Africa. There is a limited amount of information in the literature regarding the provision of clinical services in independent community pharmacies (Daly *et al.*, 2021). The findings of this study provide valuable insights into the current state of clinical services in independent community pharmacies in South Africa. They can be used to improve the implementation of the services offered in these pharmacies. The findings of this study will also guide pharmacy policymakers in their efforts to develop community pharmacy clinical services in South Africa. Additionally, the findings can help identify other services that can be implemented to improve patient access to healthcare.

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APPENDIX A – Survey Instrument

A Survey of the Delivery of Clinical Services in Independent Community Pharmacies in South Africa

Participant Information Sheet

Dear Pharmacist

My name is Tahir Ismail. I am a Masters in Pharmacotherapy student, in the Department of Pharmacy and Pharmacology at the University of the Witwatersrand, Johannesburg. As part of my studies, I am required to undertake a research project. The aim of this study is to identify the clinical services offered in independent community pharmacies in South Africa and the extent to which these clinical services are available to the public.

As part of this project, I would like to invite you to participate in this research by answering our web-based survey/questionnaire, which is on the REDCAP® survey instrument. There will be a consent check box where you agree to take part in the study followed by a series of questions with options for you to select. Completion of the questionnaire will take approximately 15 - 20 minutes. Your responses will be stored and you may return to the survey at a later stage if necessary.

Participation in this study is voluntary. There will be no personal costs or risks to you if you participate in this project, you will not receive any direct benefits from participation but there are no disadvantages or penalties if you do not choose to participate or if you withdraw from the study. You may withdraw at any time or not answer any questions if you do not wish to. The questionnaire will be completely confidential and anonymous. I will not be asking for your name or any identifying information.

The survey data will be stored digitally on the REDCAP survey instrument under password protection for two years after publication, or six years if there is no publication. The data and password will only be accessible to the researcher and supervisors. With your permission, the data collected from this research may be used by other researchers in an anonymized format.

If you have any questions during and after this research, please feel free to contact me or the supervisors using the information listed below. The study will be written up as a research report and may be presented or published. It may be available online through the university library website. If you wish to receive a summary of this report, I will be happy to send it to you.

If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email: hrecnon-medical@wits.ac.za.

Thank you! Your participation is appreciated.

Yours Sincerely,

Tahir Ismail

Researcher

Tahir Ismail | 0501411T@students.wits.ac.za

Supervisors:

Mrs Razeeya Khan | Razeeya.khan@wits.ac.za

Dr Ane Orchard | Ane.orchard@wits.ac.za

Mr Muhammed Vally | Muhammed.vally@wits.ac.za

Please complete the survey

Do you give consent to participate in this study?

◯ Yes
◯ No

Pharmacy Demographics	
For how long has this pharmacy been trading?	◯ 0-2 years ◯ 3-5 years ◯ 6-10 years ◯ 11-15 years ◯ More than 15 years
In which province is the pharmacy located?	◯ Gauteng ◯ KwaZulu-Natal ◯ Western Cape ◯ Eastern Cape ◯ Northern Cape ◯ Free State ◯ North-West Province ◯ Limpopo ◯ Mpumalanga
In what area/setting is the Pharmacy located?	◯ Urban ◯ Rural

Pharmacy Personnel	
How many South African Pharmacy Council (SAPC) registered personnel work at the pharmacy?	◯ 1 ◯ 2 ◯ 3 ◯ 4 or more
Is there a pharmacist with a Primary Care Drug Therapy (PCDT) qualification employed at the pharmacy?	◯ Yes ◯ No
Does the pharmacy offer PCDT consultations?	◯ Yes ◯ No
Is there a clinic nurse employed at the pharmacy? if yes, Part-time or Full time?	◯ Part-time ◯ Full-time ◯ No

Physical Pharmacy Setting	
Does the Pharmacy have a clinic?	◯ Yes ◯ No
Does the pharmacy have a dedicated consultation room?	◯ Yes ◯ No
Does the pharmacy have a dedicated consultation area where private dispensing is carried out?	◯ Yes ◯ No
Is the pharmacy an accredited HIV resource centre?	◯ Yes ◯ No

Types of Clinical Services	
Which of the following lifestyle modification services does the pharmacy offer?	☐ Smoking cessation ☐ Weight loss clinic ☐ Nutrition clinic/programme ☐ Exercise guidelines ☐ Responsible alcohol consumption recommendations ☐ Addiction support services ☐ Other (please state) _____ ☐ None of the above (More than one option may be selected)
For how many years have these services been offered by the pharmacy?	◯ 0-2 years ◯ 3-5 years ◯ 6-10 years ◯ 11-15 years ◯ More than 15 years
Which of the following screening and monitoring services does the pharmacy offer?	☐ Diabetes ☐ Hypertension ☐ Obesity ☐ Dyslipidemia ☐ Gout ☐ Urinary Tract Infections (UTI) ☐ Anticoagulation management ☐ Anaemia ☐ Asthma ☐ Chronic Obstructive Pulmonary Disease (COPD) ☐ Mother and Child Health ☐ Pregnancy ☐ Prostate conditions ☐ Malaria ☐ Illicit drug urine test ☐ HIV ☐ STDs ☐ COVID-19 ☐ Influenza ☐ Group A streptococcus ☐ Pharmacogenomic consultation ☐ Medical Aid Wellness Programme (if yes, which one?) _____ ☐ Other (please state) _____ ☐ None of the above (More than one option may be selected)
For how many years have these services been offered by the pharmacy?	◯ 0-2 years ◯ 3-5 years ◯ 6-10 years ◯ 11-15 years ◯ More than 15 years
Which of the following preventive services does the pharmacy offer?	☐ Travel medicine ☐ Immunisation ☐ Pre-exposure Prophylaxis for HIV (PrEP) ☐ Post-exposure Prophylaxis for HIV (PEP) ☐ Contraception ☐ Emergency contraception ☐ Asthma/COPD action plan ☐ Other (please state) _____ ☐ None of the above (More than one option may be selected)

For how many years have these services been offered by the pharmacy?	◯ 0-2 years ◯ 3-5 years ◯ 6-10 years ◯ 11-15 years ◯ More than 15 years
Which of the following screening tests are carried out at the pharmacy?	☐ Weight measurement ☐ Body Mass Index (BMI) calculation ☐ Urinalysis ☐ Blood Pressure (BP) measurement ☐ Creatinine level ☐ ACR (Albumin to Creatinine ratio) ☐ Random blood glucose measurement ☐ HbA1c level ☐ Diabetic foot exam ☐ Total cholesterol measurement ☐ Lipid panel ☐ Framingham risk assessment ☐ Haemoglobin ☐ Uric acid level (for gout) ☐ (International Normalized Ratio (INR) - for coagulation studies ☐ Peak flow assessment ☐ COPD population screener ☐ Paediatric growth curve/chart ☐ Pregnancy test ☐ Prostate-Specific Antigen (PSA) ☐ Analysis of drugs of abuse ☐ HIV rapid test ☐ Malaria rapid test ☐ Syphilis test ☐ C Reactive Protein (CRP) ☐ Influenza ☐ COVID-19 ☐ Gene testing ☐ Other (please state) _____ ☐ None of the above (More than one option may be selected)
For how many years have these services been offered by the pharmacy?	◯ 0-2 years ◯ 3-5 years ◯ 6-10 years ◯ 11-15 years ◯ More than 15 years

Which of the following immunisations and vaccinations are offered at the pharmacy	☐ Oral polio ☐ BCG (Bacillus Calmette-Guérin) ☐ Rotavirus ☐ DTaP (Diphtheria-Tetanus-Pertussis) ☐ DTaP-IPV-Hib (Diphtheria-Tetanus-Pertussis-Polio-Haemophilus Influenzae type b) ☐ DTaP-IPV-HiB-HB (Diphtheria-Tetanus-Pertussis-Polio-Haemophilus Influenzae type b-Hepatitis B) ☐ DTaP-IPV (Diphtheria-Tetanus-Pertussis-Polio) ☐ Tetanus toxoid ☐ Typhoid fever ☐ Hepatitis A ☐ Hepatitis B ☐ Pneumococcal Conjugated Vaccine (PCV) ☐ Pneumococcal Polysaccharide Vaccine (PPSV-23) ☐ Measles ☐ Measles Mumps and Rubella ☐ Meningococcal Quadrivalent Vaccine (ACW135Y) ☐ Tetanus and Diphtheria ☐ Rabies Vaccine ☐ Influenza ☐ Human Papilloma Virus (HPV) Vaccine ☐ Varicella Vaccine ☐ Covid Vaccines ☐ Other (please state) _____ ☐ None of the above (More than one option may be selected)
For how many years have these services been offered by the pharmacy?	◯ 0-2 years ◯ 3-5 years ◯ 6-10 years ◯ 11-15 years ◯ More than 15 years
Does the pharmacy provide any of the following additional services?	☐ Injection administration service (e.g., Vitamin B, insulin, erythropoietin, testosterone) ☐ Palliative care ☐ Support groups (if yes, please state which) _____ ☐ Medication adherence clinic ☐ Medication review consultation ☐ School visits ☐ Nursing home visits ☐ Travel clinic ☐ None of the above (More than one option may be selected)
For how many years have these services been offered by the pharmacy?	◯ 0-2 years ◯ 3-5 years ◯ 6-10 years ◯ 11-15 years ◯ More than 15 years

Delivery of clinical services and willingness to offer them

Who delivers the majority of these services in the pharmacy?

- ◯ PCDT pharmacist
- ◯ Pharmacist
- ◯ Nurse
- ◯ Post-Basic Pharmacist Assistant
- ◯ Services not delivered

For how many years has this individual(s) been qualified?

- ◯ 0-2 years
- ◯ 3-5 years
- ◯ 6-10 years
- ◯ 11-15 years
- ◯ More than 15 years

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Do you believe that these services are important for patient management at the pharmacy level	◯	◯	◯	◯	◯

Would the pharmacy be willing to provide these additional services in the future?

◯ Yes ◯ No

If yes, how long would it take you to start implementing these services?

- ◯ 0-3 months
- ◯ 6 months
- ◯ 1 year
- ◯ 2 years
- ◯ More than 2 years

Barriers to Implementation

What are the possible barriers to implementing these clinical services in the pharmacy?

- ☐ Time
- ☐ Infrastructure (Physical space constraints)
- ☐ No private consultation area within the pharmacy
- ☐ Cost of setting up the service/Lack of funding
- ☐ Remuneration for services
- ☐ Lack of incentives to provide service
- ☐ Competition
- ☐ Lack of resources
- ☐ Lack of confidence (clinical/professional)
- ☐ Inadequate knowledge and skills
- ☐ Lack of formal training (e.g., PCDT, Immunization course)
- ☐ Low demand or interest from patients
- ☐ Low customer awareness of clinical services
- ☐ Insufficient staff
- ☐ Lack of skilled staff - (Have enough but they are not trained to provide clinical services)
- ☐ Corporate decision
- ☐ Personal choice - Prefer the dispensing and medication advisory role only
- ☐ Increased risk - Medicolegal
- ☐ Co-operation/engagement with General Practitioners (GPs) and local clinics (for referrals and follow-ups)
- ☐ Social distancing
- ☐ Willing to provide/implement limited services only
- ☐ Other (please state)

(More than one option may be selected)

Other possible barriers to implementing clinical services _____

	Very low	Low	Average	High	Very High
How would you rate the current workload in the pharmacy	○	○	○	○	○

Would you consider the pharmacy to be an innovator and promoter of new services? ○ Yes ○ No

The following questions relate to the availability of resources that are required for the development and provision of clinical services: Please use the scale to rate how adequate these resources are in your pharmacy

		Poor	Fair	Good	Very Good	Excellent
1	The skills to provide clinical services	○	○	○	○	○
2	The financial resources to implement and maintain services	○	○	○	○	○
3	The expertise to develop services	○	○	○	○	○

TRAINING NEEDS	
What training needs would you identify to assist you in setting up this service?	☐ CPD Events - Webinars, Presentations ☐ Short courses with assessments - One or two day courses ☐ Post-graduate diploma ☐ Masters degree ☐ Other (please state) (More than one option may be selected)
Other potential training needs	_____
Which platform do you prefer for your training needs?	◯ Online learning course (done at your own pace) ◯ Face to face (physically attend a workshop) ◯ Blended (combination of online and face to face) ◯ On-the-job training ◯ Other (please state)
Other training platforms	_____
Please share any other views you may have on the delivery of clinical services in community pharmacies	_____ (Briefly summarize your views)

APPENDIX B – Participant Information Sheet







Faculty of Health Sciences I 7 York Road Parktown, 2193 I Johannesburg I South Africa I Tel: +27 11 717 2052

Participant Information Sheet

Dear Pharmacist

My name is Tahir Ismail. I am a Masters in Pharmacotherapy student, in the Department of Pharmacy and Pharmacology at the University of the Witwatersrand, Johannesburg. As part of my studies, I am required to undertake a research project. The aim of this study is to identify the clinical services offered in independent community pharmacies in South Africa and the extent to which these clinical services are available to the public.

As part of this project, I would like to invite you to participate in this research by answering our web-based survey/questionnaire, which is on the REDCAP® survey instrument. There will be a consent check box where you agree to take part in the study followed by a series of questions with options for you to select. Completion of the questionnaire will take approximately 25 – 30 minutes. Your answers will be recorded, but this questionnaire will be anonymous.

Participation in this study is voluntary. There will be no personal costs or risks to you if you participate in this project, you will not receive any direct benefits from participation but there are no disadvantages or penalties if you do not choose to participate or if you withdraw from the study. You may withdraw at any time or not answer any questions if you do not wish to. The questionnaire will be completely confidential and anonymous. I will not be asking for your name or any identifying information.

The survey data will be stored digitally on the REDCAP survey instrument under password protection for two years after publication, or six years if there is no publication. The data and password will only be accessible to the researcher and supervisors. With your permission, the data collected from this research may be used by other researchers in an anonymized format.

If you have any questions during and after this research, please feel free to contact me or the supervisors using the information listed below. The study will be written up as a research report and may be presented or published. It may be available online through the university library website. If you wish to receive a summary of this report, I will be happy to send it to you.

If you have any concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (Non-Medical), telephone +27(0) 11 717 1408, email hrecnon-medical@wits.ac.za.

By clicking on the link below and checking the consent box, you are agreeing to participate in this survey. Completing the survey indicates that you have consented to participate in this study.

(Survey link):

https://redcap.core.wits.ac.za/redcap/surveys/?s=TAWDLMPAKJWJMDFM



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APPENDIX C – Ethics Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 Ismail

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H22/02/11**
PROJECT TITLE	A survey of the delivery of clinical services in independent community pharmacies in South Africa
INVESTIGATOR(S)	Mr T Ismail
SCHOOL/DEPARTMENT	School of Therapeutic Sciences/
DATE CONSIDERED	18 February 2022
DECISION OF THE COMMITTEE	Approved Risk Level: Minimal
EXPIRY DATE	22 March 2025

DATE 23 March 2022 **CHAIRPERSON** _____ (Professor J Watermeyer)

cc: Supervisor : Dr R Khan, Dr A Orchard and Dr M Vally

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to submit an amendment of the protocol to the Committee. **I agree to completion of a regular progress report. For Minimal and Low studies, this is due annually on 31 December. For Medium and High Risk studies, this is due twice annually on 30 June and 31 December.**

_____ 01 / 04 / 2022
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX D – Protocol Approval Letter

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

03 January 2022
Person No: 0501411T
PAG

Mr T Ismail
P O Box 9269
Azaadville
1750
South Africa

Dear Mr Tahir Ismail

Master of Science in Medicine: Approval of Title

We have pleasure in advising that your proposal entitled *A survey of the delivery of clinical services in independent community pharmacies in South Africa* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

APPENDIX E – ICPA Permission Letter to Conduct Research

INDEPENDENT COMMUNITY PHARMACY ASSOCIATION

ICPA (NPC), Unit 3, Mews 2, Rosmead Centre, 67 Rosmead Avenue, Kenilworth, Cape Town, 7708
Tel: +27 21 671 4473 | **Fax:** +27 86 5152 000 | **Website:** www.icpa.co.za.
CIPC Reg. No: 2012/021809/08 | **NPO Reg. No:** 141-903 | **VAT Reg. No:** 4420262976

28 September 2021

Att: Razeeya Khan
Wits University
Email: razeeya.khan@wits.ac.za

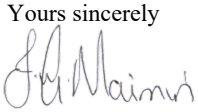
Dear Razeeya,

Re: Survey on the clinical activities undertaken in independent community pharmacies

This serves to acknowledge that ICPA will forward the link to "A survey of the delivery of clinical services in independent community pharmacies in South Africa," to our membership of 1247 pharmacies.

We look forward to participating in your research,

Yours sincerely



Jackie Maimin
CEO

Board of Directors: Kgabo Komape (Chairman), Sham Moodley (Deputy Chair), Simonè Eksteen (Treasurer), Rakesh Daya, Mehboob Cassim, Pauline Randles, Kobus le Roux, Mogologolo Phasha (NHI Representative)

APPENDIX F - TURNITIN REPORT

turnitin

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	Tahir Ismail
Assignment title:	Turnitin for checking protocol Part 1 (Moodle TT)
Submission title:	Ismail T - Research report Final Draft
File name:	3324_Tahir_Ismail_Ismail_T_-_Research_report_Final_Draft_37...
File size:	2.71M
Page count:	171
Word count:	58,810
Character count:	342,995
Submission date:	18-Feb-2024 08:49PM (UTC+0200)
Submission ID:	2294218264



Chapter 1: Introduction

The purpose of this study is to determine the extent of the delivery of clinical pharmacy services by independent community pharmacists in South Africa and to assess the barriers that limit the implementation of these clinical services.

1.1 Background

The pharmacy profession has evolved from the traditional role of supplying and dispensing medicines to a direct patient-centred model of care. This development has led to pharmacists becoming integral to the multidisciplinary primary healthcare workforce (Wiedenmayer et al., 2006; Perraudin et al., 2016; Asayut et al., 2018). Progression into an outcome-orientated model of care involves providing value-added clinical pharmacy services that align with the concept of Pharmaceutical Care (Chukwu, 2020). Pharmaceutical care was defined by Hepler and Strand (1990) as "*The responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life*". It involves drug therapy that is appropriate, safe, and effective, as well as being convenient for the patient (Wiedenmayer *et al.*, 2006).

The philosophy of pharmaceutical care has seen the pharmacist's traditional role evolve from a product-orientated into a patient-orientated clinical service provider (Mossialos et al., 2015; Hindi et al., 2018). As their role expands and evolves, community pharmacists are providing more professional services (Melton and Lai, 2017). Pharmacies now offer screening services, point-of-care testing, promotion of public health, medicine therapy management, adherence-enhancing interventions, disease and lifestyle management programs, and immunisations (McMillan et al., 2014; 2016; Chukwu, 2020). Extending the scope of practice for pharmacists and collaboration with other members of the healthcare team has improved patient access to healthcare and also led to positive therapeutic outcomes for patients (Nabhani-Gebara et al., 2020; Chiutsi et al., 2022).

The pharmacist's role in the healthcare system is not static and has evolved to meet the ever-changing and increasingly demanding healthcare needs of the public (Shen and Peterson, 2020). Pharmacists have continuously worked to adapt and re-evaluate current practice models. Re-professionalization is the term used to describe these "*continuous efforts to upgrade and develop the status of pharmacy within changing healthcare environments*"(Bader *et al.*, 2017). An increase in competition and patient expectations are the driving factors behind pharmacy re-professionalization (Vella *et al.*, 2015). Patients' expectations of the services

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