Perceptions, attitudes and knowledge of managers in clinical roles towards the addition of clinical pharmacists as part of the healthcare team.

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Research Report

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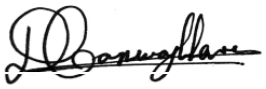
Declaration

I Danica Conway-Cleaves declare that this Research Report is my own, unaided work. It is being submitted for the degree of Master of Science in Medicine (Clinical Pharmacy) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



27 July 2025

Mrs Danica Conway-Cleaves Date

To my husband

Barry Conway-Cleaves

Abstract

Perceptions, attitudes and knowledge of managers in clinical roles towards the addition of clinical pharmacists as part of the healthcare team.

Abstract: Clinical pharmacists, as members of multidisciplinary teams, improve patient outcomes. In South Africa clinical pharmacists are underutilised in the private hospital setting. For the role of the clinical pharmacist to evolve, the smooth integration of the clinical pharmacist into the multidisciplinary team is necessary. Understanding the perceptions, attitudes, and knowledge of clinical management, namely clinical, nursing and pharmacy managers is important in ensuring the growth of this specialisation and to provide insight into possible reasons as to why the uptake of clinical pharmacists has been delayed over the years.

This study aimed to investigate the knowledge, perceptions, and attitudes of clinical, nursing and pharmacy managers in a hospital setting in South Africa toward the need for a clinical pharmacist as part of the patient care team. The study adopted a quantitative cross-sectional design, targeting clinical, nursing, and pharmacy managers within a specific private hospital group in South Africa using a survey, to allow participants to freely provide input while reflecting on the current roles and responsibilities assigned to clinical pharmacists within a South African context.

Managers across all job roles and backgrounds value clinical pharmacists highly and found value in having a clinical pharmacist as part of the healthcare team. The knowledge among the 3 different manager sets is generally consistent, though sector exposure may influence it slightly. There is broad agreement on the beneficial impact of clinical pharmacists.

Cost constraints are a factor of concern to members of the management team who are hindering uptake of clinical pharmacists within the South African setting. With the recent recognition of clinical pharmacy as a speciality within the field of pharmacy by the SAPC it is hopeful that the positive uptake continues. Further studies conducted in both public and private healthcare settings, with larger populations, may provide further insight into the knowledge, perceptions and attitudes of clinical management towards the need for clinical pharmacists as part of the patient care team.

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List of Abbreviations

AMR	Antimicrobial Resistance
AMS	Antimicrobial Stewardship
ANOVA	Analysis of Variance
ASP	Antimicrobial Stewardship Programme
B. Pharm	Bachelor of Pharmacy Degree
DHET	Department of Higher Education and Training
GPP	Good Pharmacy Practice
HREC	Human Research Ethics Committee
IPC	Infection Prevention and Control
LMICs	Low- and Middle-Income Countries
M. Pharm	Master of Pharmacy Degree
MDT	Multidisciplinary Team
PCDT	Primary Care Drug Therapy Pharmacist
REDCap	Research Electronic Data Capture
SANDoH	South African National Department of Health
SAPC	South African Pharmacy Council
SOP	Standard Operating Procedures
TDM	Therapeutic Drug Monitoring

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Chapter 1: Introduction

Clinical pharmacists are highly trained professionals responsible for comprehensive medication management across various healthcare settings. The responsibilities of a pharmacist include ensuring medication safety, effectiveness, and cost-efficiency, often covering entire hospital units or multiple services. Beyond patient care, clinical pharmacists engage in order verification, training programs, committee participation such as Infection Prevention and Control (IPC), research, and protocol development, contributing to optimized medication use, reduced errors, and improved patient outcomes (Rech *et al*. 2022).

The role of the pharmacist in South Africa is a developing one (Bronkhorst *et al*. 2021). It has moved away from focusing solely on the supply of medications and towards a more clinical role (Alonso *et al.* 2024). In an institutional setting the need for clinical pharmacists is becoming more apparent, however, the uptake of this role has been a slow one. Several reasons have been attributed to this including lack of qualification, recognition, resources and limited infrastructure, as well as the possible general lack of awareness of the role of the clinical pharmacist within the South African setting (Der Walt and Trevin, 2015).

The role of the clinical pharmacist represents a specialized extension of the traditional pharmacist's scope of practice. While pharmacists primarily focus on the supply, dispensing, and legal oversight of medicines, clinical pharmacists are embedded within multidisciplinary teams and contribute directly to patient care through advanced clinical services, therapeutic decision-making, and protocol development (Rech *et al.* 2022). Although there is some overlap, particularly in ensuring medication safety and providing patient education, the clinical pharmacist's role is distinguished by its proactive and outcomes-driven approach, which is vital for optimising therapy and supporting the rational use of medicines within hospitals (van Der Walt and Trevin, 2015; Crafford *et al.* 2023)

The management echelon in a hospital plays a vital role in integrating the clinical pharmacist into the healthcare team and providing opportunities for the expansion of this role within the South African setting (Densen, 2011). Few studies have been done on the perception and awareness of management for the need for clinical pharmacist

in their facilities (Santos *et al.* 2018). Understanding knowledge, attitudes and perceptions of management may lead to a better understanding of some of the challenges being faced by clinical pharmacists in a South African context and possibly how best to proceed in growing the profession in the future. This information collected may provide insight into future growth opportunities for clinical pharmacists in the private hospital setting in South Africa by highlighting possible misconceptions held by management or needs that are not currently being met by clinical pharmacists.

1.1 Problem Statement

Clinical pharmacists, as part of multidisciplinary teams, improve patient outcomes (Crafford *et al.* 2023). In South Africa clinical pharmacists are being underutilised in the private hospital setting (der Walt and Trevin, 2015). The further development and growth of the profession rests heavily on the smooth integration of the clinical pharmacist into the multidisciplinary team. For this to occur the perceptions, attitudes, and knowledge of clinical management in a hospital, namely clinical, nursing and pharmacy managers are important in enhancing further growth of this specialisation. By understanding the knowledge, attitudes, and perceptions of these cadres of management, factors limiting further integration of the clinical pharmacist into the hospital setting may be elucidated.

1.2 Research Question

What are the perceptions, attitudes, and knowledge of managers in clinical roles, including clinical, nursing and pharmacy managers, in a hospital setting towards the inclusion of clinical pharmacists as part of the multidisciplinary healthcare team?

1.3 Study Aim

This study aimed to investigate the knowledge, perceptions, and attitudes of clinical, nursing and pharmacy managers in a hospital setting in South Africa toward the need for a clinical pharmacist as part of the patient care team.

1.4 Study Objectives

The objectives of this study are as follows:

1.4.1 To assess the knowledge of clinical, nursing and pharmacy management towards the role of a clinical pharmacist within the healthcare team using a survey.

1.4.2 To determine the factors that influence the attitudes of clinical, nursing and pharmacy managers toward the smooth integration of clinical pharmacists into the healthcare team using a survey.

1.4.3 To investigate the perceptions of clinical, nursing, and pharmacy management regarding the potential impact of clinical pharmacists on patient outcomes, interdisciplinary collaboration, and workload.

1.5 Research Report Layout

Chapter 2 provides a comprehensive review of existing literature to enhance understanding of the current role of clinical pharmacists within South Africa's complex healthcare setting. This chapter explores the established benefits associated with clinical pharmacy services and critically examines the perceptions that have been documented regarding the necessity and value of integrating clinical pharmacists into multidisciplinary healthcare teams.

Chapter 3 outlines the research methodology employed in this study, including the study design, research setting, and data collection tools. A quantitative, cross-sectional design was adopted to investigate the perspectives of clinical, nursing, and pharmacy managers within a selected private hospital group in South Africa. The survey instrument comprised sections on demographic information, as well as questions assessing perceptions, knowledge, and attitudes regarding the inclusion of clinical pharmacists as integral members of the patient care team in hospital settings.

Chapter 4 accounted for the results and discussion of the study. The study received 39 valid responses from healthcare managers across eight South African provinces revealed that the majority were based in Gauteng (33.3%) and the Western Cape (33.3%). The respondents comprised pharmacy managers (48.7%), nursing managers

(33.3%), and clinical managers (17.9%). Notably, 69.2% of nursing managers had prior experience working with clinical pharmacists.

The study assessed perceptions of clinical pharmacists using a Likert scale, where 78% of participants strongly agreed and 18% agreed with positive statements about clinical pharmacists.

Regarding knowledge, the average score was 84%, indicating a strong understanding of the clinical pharmacist's role. However, variations were noted based on years of experience, particularly concerning the involvement of clinical pharmacists in standard operating procedures and risk assessments. Pharmacy managers demonstrated the highest awareness, followed by medical and nursing professionals.

In terms of attitudes, all managerial respondents acknowledged the value of clinical pharmacists as integral members of the multidisciplinary healthcare team. A significant majority (95.8%) reported improved communication between pharmacy departments and ward staff as a direct result of clinical pharmacist involvement. Despite these overwhelmingly positive perceptions, concerns were expressed regarding the financial justification for employing clinical pharmacists. Participants emphasized the importance of quantifying clinical pharmacist interventions in monetary terms to support the sustainability and cost-effectiveness of their role within private healthcare settings.

The final chapter reiterates the critical role that clinical pharmacists play within multidisciplinary healthcare teams, while also addressing some of the apprehensions expressed by managerial respondents. These concerns primarily relate to cost constraints and limited resources, which may hinder the broader integration of clinical pharmacists in certain healthcare settings. Additionally, the chapter reflects on the limitations of the study, including the relatively small sample size and the use of targeted sampling within a single private hospital group, which may affect the generalizability of the findings.

It needs to be stated that the results of the study have been positive in favour for the need of a clinical pharmacist as part of a healthcare team and further studies would be helpful examining the reasons for the delayed uptake in the South African setting.

Chapter 2: Literature Review

Since the end of apartheid in 1994, South Africa has undergone major political and socioeconomic reform, particularly in healthcare. Efforts have been made to expand access to services, improve primary healthcare, and develop professional competencies to meet the needs of the population (Mosiane *et al.* 2022). Despite these efforts, inequality in healthcare access is a significant issue based on the spilt between the private and public healthcare system (Harris *et al.* 2011). To promote equity, the government subsidises public health services (Coovadia *et al.* 2009). As the healthcare needs of the population have evolved over the past decade, so too have the roles and responsibilities of the pharmacist. Pharmacists have increasingly been required to adopt a more clinical approach to align with global healthcare trends and meet the growing demands of patient-centred care. (Bronkhorst *et al.* 2020). Clinical pharmacists were first introduced in South Africa in the late 1980s in response to the growing need for improved patient outcomes and a more integrated approach to patient care (Dowse and Kanfer, 1987).

There has been a notable shift away from pharmacists fulfilling solely dispensing-based roles, primarily focused on the supply and management of medications, toward more patient-focused responsibilities that emphasize direct involvement in clinical decision-making and patient care (Yong, 2021). This evolution has necessitated the global development of the clinical pharmacist's role, as healthcare systems increasingly recognize the pharmacist's contribution to optimizing drug therapy through patient-centred medication management and the enhancement of patient outcomes (Urbańczyk, *et al.* 2023). In parallel, this expanding role has driven the need for the development of advanced training programs and specialized curricula to equip pharmacists with the necessary clinical competencies (Crafford et al. 2021).

Clinical pharmacy is a branch of healthcare in which pharmacists provide direct patient care that optimizes medication therapy and promotes health, wellness, and disease prevention (Dreischulte, 2016). It represents both a professional practice and a field of research, aiming to optimize the utilization of medicines to achieve patient centred and public health goals (Dreischulte, *et al.* 2022). This role differs from the role of a pharmacist in that clinical pharmacists regularly collaborate with the multidisciplinary healthcare team. Generally, pharmacist interaction is primarily patient based with

occasional multidisciplinary healthcare team collaboration (Jacobi, 2016). Pharmacists have a role that is more focused on dispensing with less clinical input while clinical pharmacists fulfil a role that is focused on medication therapy management with active participation in clinical decision making (Anderson and Francetic, 2025). Clinical pharmacy, a specialized branch within the field of pharmacy, focuses on comprehensive medication management. Clinical pharmacists collaborate closely with physicians, nurses, and other healthcare professionals to ensure the safe, effective, and cost-efficient use of medications, ultimately aiming to achieve optimal patient outcomes (Jacobi, 2016). While clinical pharmacy is a key area of specialization, it is not the only one within the South African context. In recent years, there have been significant developments in specialization across several fields of pharmacy in South Africa, reflecting the profession's broader evolution and the growing demand for advanced pharmaceutical expertise.

Radiopharmacy has been recognised as a specialisation for some time with the primary goal ensuring the safe and effective use of radiopharmaceuticals and the contribution to accurate diagnostics and targeted treatments in nuclear medicine (Dhoundiyal *et al.* 2024). This specialization requires meticulous adherence to safety protocols to protect both patients and healthcare professionals (Heston and Tafti, 2024).

Primary Care Drug Therapy (PCDT) pharmacists undergo specialized postgraduate training that authorizes them to diagnose, prescribe, and manage treatment for a variety of common health conditions, including acute infections, family planning, and chronic diseases such as hypertension and diabetes (Ismail, 2024). Upon completion of the qualification, pharmacists may apply for a permit under Section 22A (15) of the Medicines and Related Substances Act. These pharmacists play a critical role in extending primary healthcare services, thereby improving accessibility and contributing to better patient outcomes within community settings (Tromp *et al*. 2023).

Public Health Pharmacy and Management pharmacists specialize in integrating pharmaceutical expertise with public health principles to design and implement health policies, manage healthcare programs, and improve access to essential medicines. Their primary objective is to enhance community health outcomes through effective medication management, rational drug use, and the implementation of health

promotion strategies (Abdul *et al*. 2024).

Industrial pharmacists are involved in the research, development, and manufacturing of pharmaceutical products, ensuring that medications are produced in compliance with regulatory standards. They are also responsible for quality control and quality assurance processes throughout the production lifecycle. The overarching objective of industrial pharmacists is to deliver safe, effective, and high-quality pharmaceutical products to the market (Mayimele, *et al.* 2023).

In South Africa, the uptake of the clinical pharmacist role has been gradual, with numerous challenges encountered during the integration process, reflecting similar trends observed internationally (Kellar, et al. 2021). Many of these challenges are not unique to South Africa or to the pharmacy profession specifically; they often include issues such as accessibility, cost, limited infrastructure, and an insufficient healthcare workforce (WHO, 2016). In high-income countries such as Canada, a significant barrier lies in shifting the traditional perception of pharmacists from being viewed solely as dispensers to being recognized as essential members of the clinical team (Joshi and George, 2024). Conversely, low- and middle-income countries (LMICs) frequently contend with broader healthcare system challenges that take precedence over redefining professional roles (Rosenthal *et al.* 2010). While concerns and apprehensions from other healthcare professionals regarding the integration of clinical pharmacists persist, limited pharmacy resources tend to be a more pressing issue in LMICs (Johnsgård *et al.* 2023). Additionally, a lack of confidence among pharmacists to fully embrace clinical responsibilities, particularly in healthcare systems with long-standing hierarchical structures, can hinder effective interdisciplinary collaboration (Kilonzi *et al.* 2023). Compounding these challenges is the rapid evolution of drug therapies and technological advancements, which demand continuous professional development to ensure the delivery of safe, evidence-based pharmaceutical care (Al-Worafi, 2023).

South Africa’s healthcare system is divided into public and private sectors, each with distinct priorities and requirements for clinical pharmacists operating within hospital settings (Mosiane *et al.* 2023). A significant disparity exists between these sectors, with nearly 50% of the country’s total health expenditure allocated to the 16% of the population covered by private medical insurance (Young, 2016). Consequently, the

remaining 84% of the population, who depend on the public sector, must rely on the other half of the healthcare resources (Govender et al. 2021). A substantial portion of the Department of Health's budget is directed toward district-level services, including primary healthcare clinics, community health centres, and district hospitals. This strategic allocation aims to increase access to basic healthcare for the broader population (De Villiers, 2021). Given South Africa's status as a developing country with a unique dual-sector healthcare system and considerable public health demands, the widespread integration of clinical pharmacy services may progress more slowly than in countries with more established healthcare infrastructures (Crafford *et al.* 2021).
Despite these differences between the two sectors of healthcare in South Africa, the basic principles surrounding patient-centred care remain the focus, with the patient's wellbeing and individual healthcare needs and outcomes being the primary concern. Ultimate success and integration of the clinical pharmacist into the multidisciplinary healthcare team often lies with the support and advocacy for this integration by clinical management, including nursing and pharmacy management, who provide guidance to healthcare teams (Picette *et al.* 2010). This integration may be different within each healthcare team and at each site depending on the needs and priorities of the existing healthcare team (Jorgenson *et al.* 2013).

Many hospital groups in South Africa have limited designated positions for clinical pharmacists and make infrequent use of clinical services provided by the existing pharmacy workforce (Crafford *et al*. 2021). This is due to several factors, including financial constraints and a general lack of understanding regarding the role and potential impact of clinical pharmacists (Crafford *et al.* 2023). One of the primary challenges hindering the growth of clinical pharmacy as a profession is the knowledge, perceptions, and attitudes of hospital management toward the roles and responsibilities of clinical pharmacists within the healthcare team (Tegegn *et al*. 2018). Regardless of whether it is the public or private sector, managerial buy-in is essential for the successful integration of any emerging healthcare speciality, including clinical pharmacy, into hospital settings (Govender *et al.* 2018). Without a clear understanding of the defined role and value of clinical pharmacists, there is a risk of these services being underutilized or overlooked, thereby limiting their contribution to improved patient care (Crafford *et al.* 2023).

2.1 The role of hospital pharmacists in South Africa

To become a pharmacist in South Africa, obtaining a Bachelor of Pharmacy Degree (B. Pharm) is a prerequisite. This is a four-year program accredited by the South African Pharmacy Council (SAPC) and offered at Department of Higher Education and Training (DHET) accredited universities. After qualifying with a B. Pharm, graduates must complete a mandatory one-year internship of in-service training during which they must pass a national pre-registration examination set by the SAPC. Following the internship, a one-year mandatory community service at a public healthcare facility, such as a hospital or primary healthcare clinic, is required. Once both the internship and community service are successfully completed, individuals can register with the SAPC as practising pharmacists (Mosiane *et al.* 2022). Once a pharmacist has completed undergraduate training, they are able to practice within most sectors in South Africa without the need for further study, with much of their specialised expertise developing over time from practical mentorship and experience (Njuguna *et al.* 2020). South African pharmacists can work in various fields, including, but not limited to, retail pharmacy, hospital pharmacy, academic pharmacy, and industrial pharmacy, providing that the practicing pharmacist adheres to the professional competencies scope of practice set of by the SAPC as depicted in table 2.1. All of these fields are accessible to a pharmacist with a B. Pharm degree, although some may favour individuals with a higher education or training. The table refers to domains which are the broad areas of professional competency and scope of practice defined by the South African Pharmacy Council (SAPC). These domains outline the key functional responsibilities and expectations for pharmacists (SAPC, 2017). Several postgraduate degrees are available for individuals seeking to further their education; however, these are not mandatory unless one intends to pursue a specialised area of practice (Mosiane *et al.* 2023).

Since 2006, the South African Pharmacy Council (SAPC) had only recognized two registrable pharmacist specialist categories—Clinical Pharmacokinetics and Radio-pharmacy—both requiring specific postgraduate qualifications. In a significant development, the SAPC published a proposed list of additional specialties in October 2024, including Clinical Pharmacy, Public Health Pharmacy, and Industrial Pharmacy; however, these had not yet been formally recognized at that time (SAPC, 2023). In September 2023, the SAPC released national competency standards for specialist

pharmacists, outlining proposed requirements and expectations for clinical pharmacists specifically (SAPC, 2023). Most recently, in 2025, a board notice officially recognized Clinical Pharmacy as a specialty in South Africa. Although formal recognition has now been granted, implementation and enforcement of these requirements remain limited due to the novelty of the classification (SAPC, 2025). Despite the delayed formal recognition, job titles and clinical pharmacy roles have long existed in South African hospitals, with many pharmacists performing these functions in practice (Crafford *et al.* 2023). The roles, resources, and job specifications for clinical pharmacists vary substantially between the public and private sectors, influenced by institutional priorities and funding models (Gray, *et al.* 2016). Regardless of sector, the overarching responsibility of hospital pharmacists remains to ensure the availability of medications while promoting patient safety, quality care, and the reduction of adverse drug events. The variances in scope between a pharmacist and clinical pharmacy as per the South African Pharmacy Council can ben most clearly seen in Table 2.1 (SAPC,2017; SAPC, 2025).

Collaborative practice between the pharmacy team and other healthcare providers has been shown to enhance medication management and streamline hospital processes (Lovey *et al*. 2014). However, in low- to middle-income countries such as South Africa, systemic challenges, such as supply chain inefficiencies and staffing constraints, often take precedence over the implementation of new clinical roles (Rasheed *et al*. 2023). In many hospital settings, pharmacists remain heavily burdened with operational tasks such as stock procurement and dispensing, limiting the capacity to deliver consistent clinical pharmacy services (Bronkhorst *et al.* 2021). Given these constraints, the clinical pharmacist's role should prioritise reviewing pharmaceutical treatment plans and contributing pharmacological expertise to interdisciplinary teams. This approach alleviates the clinical burden on in-pharmacy staff, allowing them to focus on core operational responsibilities without the added expectation of engaging in clinical tasks they may lack the time, resources, or inclination to perform (Crafford *et al.* 2021). While the ideal scenario would involve a seamless and swift integration of clinical pharmacists into their full scope of practice, this requires fundamental shifts not only in operational processes but also in the strategic mindset of healthcare leadership. True integration will extend beyond daily workflow adjustments to systemic transformation within South Africa's healthcare system (Otieno *et al.* 2022).

2.2 Need for clinical pharmacists in a hospital setting

According to the South African Pharmacy Council (SAPC), the scope of practice for pharmacists encompasses the preparation, compounding, dispensing, and supply of medicines in accordance with prescriptions and applicable legislation. Pharmacists are also responsible for ensuring the safe storage, distribution, and control of pharmaceutical products, providing medication counselling, promoting rational medicine use, and engaging in public health initiatives such as screening and health education (SAPC, 2014).

Clinical pharmacists assume a patient-centred role that extends beyond the traditional dispensing duties. The SAPC's competency standards for specialist pharmacists outline the scope of clinical pharmacy practice to include comprehensive medication management through direct involvement in patient care, therapeutic drug monitoring, medication reconciliation, pharmacokinetic dosing, and the identification and resolution of medication-related problems (SAPC, 2018). Clinical pharmacists actively participate in ward rounds, collaborate with multidisciplinary teams, contribute to the development of treatment protocols, and are integral to pharmacovigilance and antimicrobial stewardship programmes (Meyer *et al.* 2017).

Although both pharmacists and clinical pharmacists share foundational competencies in pharmacology and pharmaceutical care, clinical pharmacists operate at a more advanced level, with responsibilities focused on therapeutic decision-making and the optimisation of patient outcomes through evidence-based interventions. The overlap in competencies highlights the continuum between the two roles; however, clinical pharmacists fill a distinct niche within the healthcare system by enhancing the quality and safety of medication use in complex clinical scenarios (SAPC, 2018). A visual representation of the scope of practice of a clinical pharmacist is highlighted in further detail table in 2.1.

Due to various systemic and operational constraints, the roles and responsibilities expected in optimal pharmaceutical care are often not adequately fulfilled in hospital environments without the dedicated involvement of a clinical pharmacist (Bronkhorst; Schellack; Gous, 2021). Although the presence of clinical pharmacists has been associated with improved ward-based services and enhanced patient care, efforts to

integrate this role are frequently met with resistance. This resistance is largely attributed to a limited understanding of the clinical pharmacist's scope and the measurable benefits they can bring to overall patient outcomes (Abduelkarem, 2014; Alcântara *et al*. 2018). While clinical pharmacists have been shown to positively influence patient outcomes and prescribing patterns, a shortage of human resources often results in them being tasked with logistical functions such as ward stock replenishment and medication ordering (Rothmann and Malan, 2007). Within hospital settings, clinical pharmacists should be distinguished from general hospital pharmacists through a defined clinical role that emphasizes individualized therapy and advanced medication management. While all pharmacists contribute to patient care and may intervene, when necessary, the clinical pharmacist should be equipped to assess a patient's health status and collaborate with the healthcare team to tailor medication plans that optimize therapeutic outcomes (Dunn *et al*. 2015).

Improving patient safety by focusing on error reduction, particularly in a ward setting is an important role of a clinical pharmacist (Kaboli *et al.* 2006). Cost reduction by reducing unnecessary or duplicated prescriptions and discontinuing medications (deprescribing) that are no longer part of the healthcare plan is a role of a clinical pharmacist often seen in a hospital setting (Spinewine *et al.* 2023). It must be said that ward-based pharmacists play a crucial role in both aspects of pharmacy, however the clinical pharmacist should be able to give a more in-depth and hands-on focus to each patient (Jackson and Batty, 2000). The clinical pharmacist's increased presence within hospital wards and direct contact with healthcare providers, such as medical physicians, dieticians, physiotherapists, and nursing staff provides a unique opportunity to collaborate closely within the healthcare team in a hospital setting. This direct communication is a skill that can improve patient care and medication management in a hospital setting (Moreno *et al*. 2017).

Throughout a clinical pharmacy postgraduate degree, specialised clinical knowledge is gained and continues to develop though work-based learning (Moura et al. 2022; Ilcewicz *et al.* 2020). This knowledge allows for the clinical pharmacist in a hospital setting to provide knowledge to other members of the healthcare team. This also affords the clinical pharmacist the knowledge that they need to select appropriate drug therapies and make appropriate recommendations with regards to safe and effective treatment plans (Viktil and Blix, 2008).

International evidence consistently highlights the benefits of incorporating clinical pharmacists into hospital settings, particularly within specialized units and among critically ill patient populations (Jantarathaneewat *et al.* 2022). Clinical pharmacists play a vital role in antimicrobial stewardship programs, especially within intensive care units (ICUs) and neonatal ICUs, where their involvement has been linked to more appropriate antibiotic use and reduced resistance patterns (Yalçın *et al*. 2023). In oncology and haematology centres, the integration of clinical pharmacists has been associated with enhanced patient safety, improved pharmacotherapeutic outcomes, reduced medication errors, and cost savings (Oliveira, 2021).

Table 2.1. Comparative table of the scope of practice of a pharmacist and a clinical pharmacist

Domain	**Scope of a Pharmacist**	**Scope of a Clinical Pharmacist**
1. Public Health	• Promotion of health and wellness • Medicines information • Health economics • Epidemic and disaster management	• Promotion of clinical pharmacy services • Pharmacoeconomics
2. Safe and Rational Use of Medicines	• Patient consultation and counselling • Patient medicine review and management • Therapeutic outcome monitoring • Pharmacist-initiated therapy	• Direct involvement in patient care • Medication reconciliation • Pharmacokinetic dosing • Identification and resolution of medication-related problems
3. Supply of Medicines and Medical Devices	• Medicine dispensing • Medicine compounding • Supply chain management • Disposal/destruction of medicines	• Development of medicine-related policies and procedures • Leadership in supply-related decision-making

4. Quality and Organisation Management	• Quality assurance • Pharmaceutical infrastructure management • Human and financial resource management • Change and policy development	• Lead clinical audits of medicine use • Develop and implement clinical pharmacy strategy
5. Professional and Personal Practice	• Patient-centered care • Good record keeping • Ethical and legal practice • Continuing professional development	• Advanced clinical decision-making • Leadership within multi-professional teams • Justify evidence-based clinical decisions
6. Education, Training and Research	• Education and training • Clinical trials • Research • Practice-embedded workplace education	• Conduct research • Teach and publish in clinical pharmacy • Appraise evidence and guide treatment decisions

Adapted from (South African Pharmacy Council (2017). Competency Standards for Pharmacists in South Africa 2017. Board Notice 33 of 2017, Government Gazette No. 40610) (South African Pharmacy Council (SAPC). (2025). Competency standards for pharmacists providing clinical pharmacy services. Board Notice 123 of 2025. Pretoria: SAPC)

2.3 Role of clinical pharmacists in hospitals in South Africa

In many high-income countries, clinical pharmacists are well-established members of primary healthcare teams. Although significant progress has been made toward their further integration, the role of clinical pharmacists within these teams continues to evolve and is still in the process of being fully defined and standardized (Moura *et al*. 2025).

In South Africa, the scope of practice for pharmacists has traditionally centred on stock management and the safe, cost-effective supply of medications (Gray *et al.* 2016). This focus is clearly defined and embedded within undergraduate pharmacy training. However, the roles and responsibilities of clinical pharmacists within hospital pharmacy

settings have been a topic of ongoing debate, even among clinical pharmacists themselves (Bronkhorst *et al.* 2023). This uncertainty is largely due to the historical lack of a clearly defined role for clinical pharmacists within the South African context (Crafford, et al. 2023). In a recent development, the South African Pharmacy Council (SAPC) has published a formal scope of practice for clinical pharmacists (SAPC, 2025). According to this newly proposed framework, clinical pharmacists are expected to assess patients' health needs and deliver pharmaceutical care that includes both treatment and preventative strategies, guided by evidence-based medicine. Their responsibilities include conducting medication reviews, tailoring individualized drug therapies, and optimizing patient care plans (SAPC, 2023). Despite its formal release, this scope has not yet been widely adopted in practice. As a result, many current job roles and key performance indicators (KPIs) are modelled on international standards to help define expectations and demonstrate the benefits of clinical pharmacist integration within South African healthcare teams (Elmien *et al.* 2022). Additionally, the Good Pharmacy Practice (GPP) standards, applicable to all pharmacists and related healthcare professionals, serve to guide the delivery of pharmaceutical care in accordance with global norms and values. These standards aim to improve the quality of pharmaceutical services and, ultimately, enhance patient health and quality of life in both the public and private sectors (GPP, 1996; Suleman and Gray, 2017). Despite these guidelines being modelled predominantly after those used in first-world healthcare systems they have been adapted to consider the unique needs of the South African healthcare system and have been a long time in the development stages before being approved (Department of Health, 2023).

Direct patient care is one of the competencies, which entails the observation and close evaluation of the patient’s medication related needs where the clinical pharmacist is required to use detailed knowledge to make appropriate suggestions about possible changes that may be required to the treatment plan to ensure best patient outcomes (ACCP, 2023). Suboptimal medication usage can increase patient morbidity, mortality and cost (Religioni *et al*. 2025). By improving overall quality of pharmaceutical care and decreasing drug-related readmissions it can be expected that the satisfaction with pharmacy services would increase (Graabæk and Kjeldsen, 2013).

A key component of direct patient care within clinical pharmacy is pharmacokinetic intervention, which involves understanding and applying knowledge of drug absorption,

metabolism, distribution, and excretion, as well as their effects on the body (Pokkuluri *et al.* 2023). These foundational skills are introduced and developed during undergraduate pharmacy training, equipping pharmacists to contribute meaningfully to the optimization of patient care (Mosiane *et al.* 2022). As pharmacists pursue postgraduate studies in clinical pharmacy and gain practical experience, these pharmacokinetic competencies are further refined and applied in more complex clinical scenarios (Bronkhorst *et al*. 2020).

The clinical pharmacist is required to provide comprehensive medicine management, as part of the clinical team, by providing assessment on the most safe and effective use of medications to achieve the intended goals of therapy (Bronkhorst *et al.* 2020).This encompasses being a source of information for nursing staff, medical specialists and other healthcare providers especially during ward or clinical rounds (Quirós-Romero and Chaverri-Fernández, 2024). This direct contact provides a benefit over pharmacy-bound individuals as it offers the hands-on opportunity for pharmacy to interact with the multi-faceted team to share and discuss patient care and treatment, leading to better outcomes (Crafford *et al.* 2023).

Due to the immense dispensing load and limited patient interaction that pharmacists experience in many cases, it is difficult to provide individualised care to patients in a hospital setting (Jordaan, 2020). Clinical pharmacists are likely to interact with patients and providers in the ward and be able to provide individualised care that should present itself in the form of clinical interventions, drug monitoring, involvement in antimicrobial stewardship monitoring and the provision of pharmacokinetic input as required (Bronkhorst *et al.* 2020).

Antimicrobial stewardship (AMS) is a critical area of focus in modern healthcare, and clinical pharmacists play a pivotal role in the success of AMS programs. Their contributions include reviewing antibiotic prescriptions and providing evidence-based feedback to prescribers to promote appropriate use and support the timely de-escalation of antibiotic therapy (Dramowski *et al*. 2024). Clinical pharmacists may also be involved in the development and management of institutional guidelines to ensure that antibiotic policies are current, contextually appropriate, and aligned with the hospital's specific needs. Therapeutic drug monitoring (TDM) is another essential component of AMS, as it allows for the optimization of dosing and the minimization of

drug-related toxicity, ultimately improving patient outcomes and reducing healthcare costs (Garau and Bassetti, 2018). Collectively, these activities enhance antibiotic prescribing practices, reduce unnecessary antibiotic use, optimize antimicrobial therapy, and contribute to better overall patient outcomes (Jantarathaneewat *et al*. 2022).

In delivering clinical services and contributing to the development of pharmaceutical care plans, clinical pharmacists often engage with a range of healthcare practitioners and are expected to provide accurate, evidence-based information on medications and other clinically relevant topics (Saseen *et al.* 2017). Beyond the provision of information, the ability to communicate effectively—both with healthcare providers and patients—is essential to ensuring clarity, collaboration, and the successful implementation of treatment plans (Wolters *et al*. 2017).

In an era of rapidly evolving therapeutic guidelines and the continual development and release of new drugs and treatment techniques, clinical pharmacists are tasked with staying up to date with the latest advancements and disseminating this information to other healthcare professionals. Within the hospital setting, their responsibilities may also extend to policy development, as well as the creation and maintenance of health-based monitoring systems (Bronkhorst *et al.* 2020). These efforts help ensure alignment and cohesion between clinical wards, pharmacy departments, and hospital management, ultimately supporting more efficient and effective patient care (Engle et al. 2020).

With the upcoming implementation of the National Health Insurance (NHI) in South Africa, which seeks to expand equitable access to healthcare services across public and private sectors, the roles of both pharmacists and clinical pharmacists are likely to evolve (Department of Health, 2023). As access to healthcare increases and the burden on health services grows, pharmacists are expected to play a more active role in primary healthcare delivery, chronic disease management, and preventative care. Concurrently, clinical pharmacists are well positioned to support the NHI's goals by improving therapeutic outcomes, reducing medication-related hospital admissions, and contributing to cost-effective care models within multidisciplinary teams. The integration of clinical pharmacists in such a framework may become increasingly vital, particularly in resource-constrained settings where optimizing pharmacotherapy can

directly impact patient outcomes and system efficiency (Santos Júnior *et al.* 2018)

2.4 The role of management in facilitating the uptake of clinical pharmacists into the healthcare team

The financial demands experienced within the hospital pharmacy setting make the buy-in of management vital for an increase in the uptake of the clinical pharmacist role (Rothman and Malan, 2007). The perspective of management for the need of a clinical pharmacist may be based on the organization's behaviour or experience (Dong and Wang, 2025). The seamless uptake of this role is more likely to succeed if management can influence change, is ready to change, feels prepared and recognises the value of a clinical pharmacist in the hospital setting and to the patient (Nilsen *et al.* 2020)

The pharmacy manager, nursing manager and clinical manager all play an integral role in the successful integration and uptake of clinical pharmacists into the hospital and the wards. Clinical pharmacists report to the pharmacy manager, who is responsible for advocating for the role of the clinical pharmacist as part of the healthcare team. This will include promoting the overall benefit and profitability that may arise from interventions such as the decrease in drug interactions and rational drug use (Alcântara *et al*. 2018). Pharmacy managers are the first line of support for the clinical pharmacist and are ultimately responsible for the implementation and management of pharmacy services, including clinical services. The pharmacy manager will need to assess each facilities current situation and evaluate whether the need for a new service can benefit the health care team, considering the resources available (Mohamed Ibrahim, 2023).

Nursing managers are the first line leaders for the respective wards and can drive change, including supporting the establishment and growth of the integration of the clinical pharmacist into the wards with various members of the healthcare team (Kodama and Fukahori, 2017). Nursing manages, as direct contact to ward-based management that are focused predominantly on patient care and clinical outcomes, provide a unique link between clinical management and pharmacy management that tend toward slightly more administrative roles (Armstrong *et al.* 2015). Nursing managers can partner with many members of the healthcare team, including physicians, ward nurses, physiotherapists and dieticians to gain support for the need

for clinical management for the addition of clinical pharmacists as part of the healthcare team (Preslaski, 2013). Nursing managers can encourage the use of clinical services to satisfy nurses' need for information and education about safe and effective use of medicines and the physician's need for other clinical services (Bryant, 2018).

Clinical managers serve as a crucial link between hospital leadership and pharmacy management, enabling the design of supportive systems and facilitating funding for the integration of clinical pharmacist roles within hospital groups. Their position allows them to address hospital-specific barriers, such as resistance to pharmacy-led interventions or educational initiatives, by fostering collaboration and aligning institutional priorities (Otieno *et al.* 2022). For this reason, support and advocacy from all levels of management, clinical, administrative, and pharmacy, are essential for the successful and sustained integration of clinical pharmacists into South African hospitals (Pickette *et al*. 2010).

With clinical pharmacy now formally recognized as a specialty by the South African Pharmacy Council (SAPC), the support and encouragement of hospital management for its integration has become more critical than ever (SAPC, 2025). In the context of South Africa's continuously evolving healthcare system—characterized by numerous structural and resource-related challenges—it is essential that clinical pharmacy continues to advance. By doing so, it holds the potential to significantly contribute to the delivery of positive patient outcomes and strengthen the overall quality of care within the health system (Mosiane *et al.* 2022).

Chapter 3: Research Methodology

3.1. Study Design

This study adopted a quantitative cross-sectional design, targeting clinical, nursing, and pharmacy managers within a specific private hospital group in South Africa. The study employed an online structured survey-based approach, allowing participants to freely provide input while reflecting on the current roles and responsibilities assigned to clinical pharmacists within a South African context (Bronkhorst *et al.* 2021; Crafford *et al*. 2023; SAPC, 2023).

3.2. Study Site

The study was conducted within a private hospital group operating across South Africa. Hospitals belonging to this group located outside of South Africa were excluded, in accordance with the group's internal policies governing research and study activities.

Within South Africa, the hospital group primarily focuses on acute care hospitals, which are facilities designed to provide immediate and short-term medical treatment for patients with severe or urgent health conditions. These hospitals admit patients for a wide range of medical, surgical, and emergency services, and are the primary settings where clinical pharmacy services are actively integrated into patient care. These facilities usually have intensive care and specialised care units that can offer patients a wide range of specialities, medical and surgical care, including emergency services (Kohanová *et al*. 2024).

In addition to acute care, the hospital group also operates subacute facilities, as well as mental health and day clinics. Subacute facilities typically offer intermediate care for patients who require ongoing medical supervision and rehabilitation, but not the intensive level of care provided in acute hospitals. These include services such as post-operative recovery, wound care, and physiotherapy. The aim of subacute care is to bridge the gap between the acute care and home or long-term care (Ting *et al*. 2019).

For the purposes of this study, only acute care hospitals were included. Subacute, mental health, and day clinic facilities were excluded, as their operational models and

patient care frameworks do not align with the study's inclusion criteria. Specifically, these excluded facilities do not follow an organogram that incorporates a pharmacy manager, clinical manager, and nursing manager—key roles central to the study's objectives. One of the primary target groups in this research is clinical management, selected due to their unique position in facilitating the integration of clinical roles within the hospital setting. Clinical managers serve as a critical link between hospital executives and pharmacy leadership, possessing both clinical insight and business acumen necessary to support the implementation of clinical pharmacy services. In the hospital hierarchy, both nursing and pharmacy managers' report to the clinical manager. For the clinical pharmacist, the pharmacy manager serves as the primary point of contact for operational issues, while the nursing manager—through their direct relationship with the clinical manager—plays a pivotal role in ensuring the smooth integration of clinical pharmacists into ward-based teams. The structure and categorization of these healthcare facilities are illustrated in Figure 3.1.

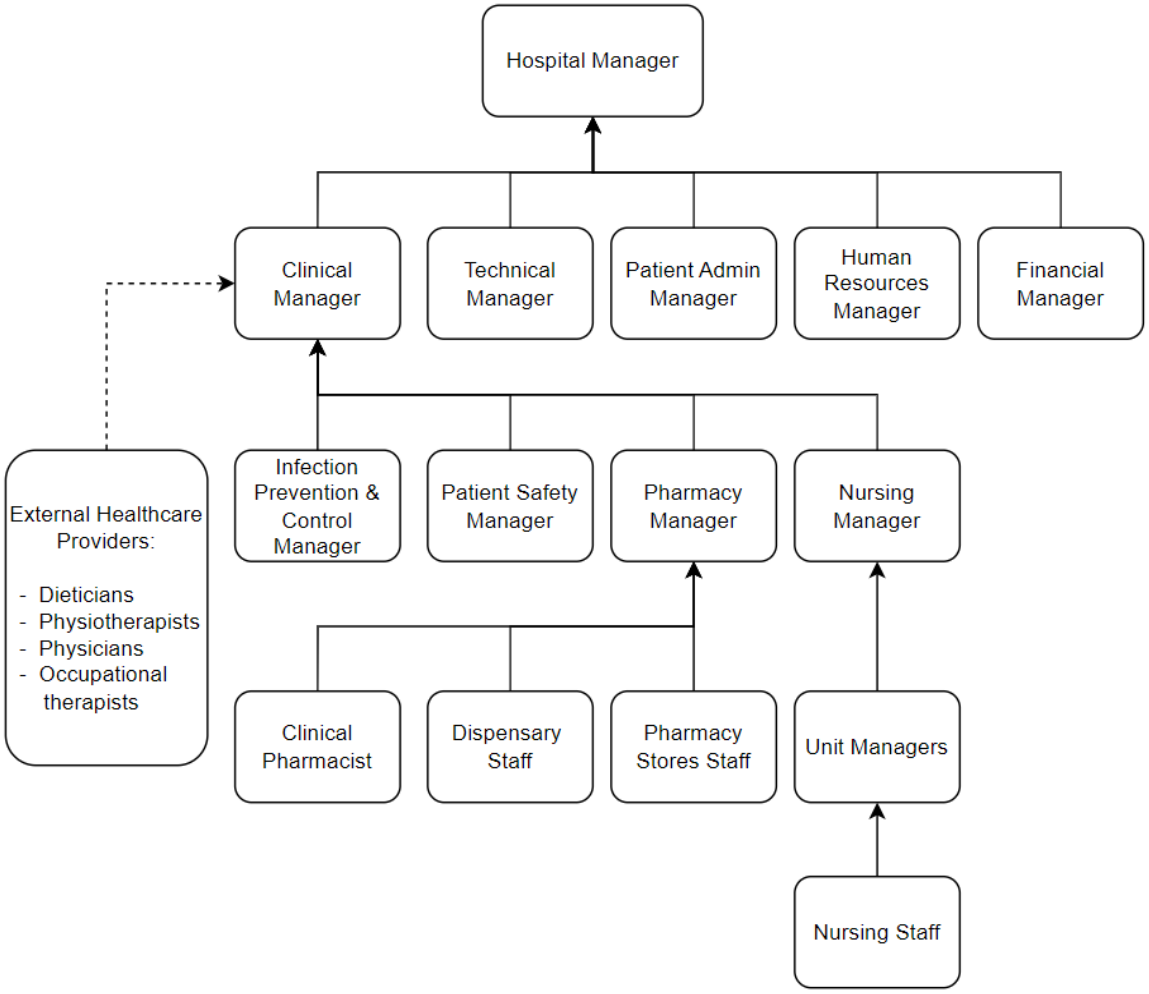

Figure 3.1 Facility structure and categorisation (Adapted from facility organogram)

3.3. Population and Sample Size

The study targeted 46 acute care hospitals within the selected private hospital group. Each hospital had to include a clinical manager, a nursing manager and a pharmacy manager, yielding a total estimated population of 138 individuals. Given the relatively small population size, the entire population was included in the study. A purposive sampling approach was employed for this study ensuring that only relevant hospital management who could provide meaningful insight into the study objectives were included.

3.4. Inclusion and Exclusion Criteria

3.4.1. Inclusion Criteria:

- Clinical, nursing, and pharmacy managers within the specified private hospital group.
- Clinical, nursing and pharmacy managers with any number of years of experience

3.4.2. Exclusion Criteria:

- Non-permanent staff members.

3.5. Data Collection Tool

The survey was designed by the researcher based on the existing literature and consisted of four key sections:

1. **Demographics:** Nine questions designed to capture participants' qualifications and experience, which provided additional insight into their responses.
2. **Perceptions:** Ten Likert scale questions (Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree) assessing current perceptions regarding the roles and responsibilities of clinical pharmacists (Elmien, 2022).
3. **Knowledge Assessment:** Seventeen True or False questions aligned with the competency standards outlined in the proposed Board Notice of Competency

Standards for Pharmacists providing Clinical Services (South African Pharmacy Council, 2023).

4. **Attitude Assessment:** Six Yes or No questions aimed at consolidating participants' perspectives on the necessity of clinical pharmacists in hospitals.

These questions were designed to provide insight into how previous job roles, current job role, years of experience and qualifications may impact the knowledge of clinical, nursing, and pharmacy management regarding the role of clinical pharmacists in the healthcare team.

The perception component of the survey was informed by pre-existing perceptions of clinical pharmacists within the South African context, as well as established practice guidelines for clinical pharmacists from other low- to middle-income countries (Crafford, 2023). The aim was to assess whether management's perceptions aligned with those reported by clinical pharmacists themselves in previous studies.

The knowledge section of the survey was based on the proposed Board Notice of Competency Standards for Pharmacists Providing Clinical Services, as published by the South African Pharmacy Council (SAPC, 2025). This component sought to evaluate whether management's understanding corresponded with the roles and responsibilities formally outlined for clinical pharmacists in the proposed national standards.

The attitude section aimed to capture participants' views on the necessity of clinical pharmacists within hospital teams. This was measured using a series of 'Yes' or 'No' questions, designed to reflect current and past experiences of the respondents and to provide a comprehensive sense of their stance on the subject.

Following ethical approval from both the university and the participating institution, the survey instrument was pilot tested with 15 individuals who were not part of the final study sample. Based on the feedback received, several adjustments were made to improve clarity and participant understanding. These included the addition of a signature section to the consent declaration, ensuring informed and voluntary participation, as well as the correction of minor spelling and grammatical errors. A few sentences were also rephrased to enhance readability. No major structural changes

were required. After these revisions, the final version of the survey was distributed to the study population.

3.6. Ethical Considerations

Ethical approval was sought out and obtained (M240616) from the University of the Witwatersrand Human Research Ethics Committee (Medical) (Appendix B). In addition, the hospital group where the study was conducted provided ethics approval (Ref: 20240401) to conduct research within the group (Appendix C).

- Participation was **voluntary and anonymous**.
- A participant information sheet (Appendix A) outlined the study's nature, ethical approval, and researcher contact details.
- Consent was obtained via a consent box before accessing the survey.
- The researcher had no direct contact with participants.
- No identifiable information was collected, and participants were able to withdraw at any time.

Collected data will be **digitally stored for two years** post-publication under password protected cloud storage service, accessible only to the researcher. If no publication arises from this research, the data was be retained for **six years**.

3.7. Data Collection Process:

The ethical integrity of the study was overseen by the hospital group's research department, which also facilitated communication with prospective participants. An email, distributed via hospital administration, included a link to the survey, a participant information sheet (Appendix A), and details pertaining to ethical clearance. The survey was conducted using REDCap© version 14.0.1, a secure web-based platform that ensured participant anonymity.

The initial email was distributed on 13 February 2025, followed by a reminder email on 3 March 2025 to increase participation. Following the initial distribution, 28 responses were received, resulting in a response rate of 20%. After the reminder email, the total number of responses increased to 42, yielding a final response rate of 30.4%. This

level of participation is consistent with findings from Brown (2024), whose study among healthcare providers reported a projected response rate range of 20% to 47%.

3.8. Data Capture and Statistical Analysis

Quantitative methods were employed to analyse survey responses. Data was extracted from REDCAP (version 14.0.1) and processed in Microsoft Excel (version 2408 Build 16.0.17928.20336).

The survey captured the knowledge, attitudes, and perceptions of clinical, nursing, and pharmacy management regarding the need for a clinical pharmacist as part of the multidisciplinary healthcare team. The questionnaire consisted of 4 sections and 43 questions.

The ten Likert-scale perception questions were analysed by assigning numerical values to each response: strongly agree = 5, agree = 4, neutral = 3, disagree = 2, and strongly disagree = 1 (Elmien et al., 2022; Rokeman, 2024).

The seventeen True/False knowledge questions were aligned with the proposed Board Notice of Competency Standards for Pharmacists Providing Clinical Services (SAPC, 2023). Responses were scored as 1 for correct answers and 0 for incorrect ones. These scores were then analysed in relation to key demographic and professional variables.

The attitude component of the survey consisted of Yes/No questions, where a ‘Yes’ response indicated a positive attitude toward the role of clinical pharmacists, and a ‘No’ indicated a negative perception. Branching logic was employed to skip certain attitude-related questions for participants who had not previously worked with a clinical pharmacist.

The dataset did not meet the assumptions of normality; therefore, non-parametric statistical tests, including the Kruskal-Wallis and Mann-Whitney U tests, were utilized where appropriate (Table 3.1).

Table 3.1 Survey objectives, variables, questions and methods of analysis

Objective	Variables	Survey Questions	Method of Analysis
To investigate the perceptions of clinical, nursing, and pharmacy management regarding the impact of clinical pharmacists on patient outcomes, interdisciplinary collaboration, and workload.	Job role, years of experience, qualifications, work sector experience	10 Likert scale questions	Kruskal-Wallis test (comparison between perceptions and demographics). Results compared using Mann-Whitney U test.
To assess the knowledge of clinical, nursing, and pharmacy management regarding the role of clinical pharmacists in the healthcare team.	Job roles, current job role, years of experience, qualifications	17 True/False questions	Kruskal-Wallis test, analysis of variance (ANOVA) (comparison between knowledge and demographic factors)
To determine how the attitudes of clinical, nursing, and pharmacy managers influencing the integration of clinical pharmacists into healthcare teams.	Perceptions and knowledge regarding clinical pharmacy, previous job roles, current job role, years of experience, qualifications	6 Yes/No questions	T-test to compare attitudes, perceptions, and knowledge

Each objective was analysed separately to provide the best understanding based on the variable. When comparing the perceptions of managers toward the integration of clinical pharmacists within the healthcare team a Kruskal-Wallis test was used. This allowed the comparison of each group of management (nursing management, clinical management and pharmacy management) with each of the variable's, namely current job role, years of experience, years since last qualification and sector work experience. Results of significance were then compared using a Mann-Whitney U test. Each objective was presented in the most appropriate figure or table that provides ease of interpretation.

The second objective assessed the knowledge of clinical, nursing, and pharmacy

management regarding the role of clinical pharmacists within the healthcare team. This was evaluated using responses to questions 21 to 37 of the survey, which comprised True/False items based on the proposed competency standards. Correct responses were scored and analysed using ANOVA and Kruskal-Wallis tests to determine associations between knowledge scores and various variables, including job role, years of experience, qualifications, healthcare sector experience, and perception and attitude scores from Objective 1. Knowledge scores were also presented as percentages and depicted in separate graphs by job role to allow for visual comparison.

The third and final objective investigated whether the attitudes of clinical, nursing, and pharmacy managers influence the integration of clinical pharmacists into healthcare teams. This analysis considered respondents' perceptions and knowledge of clinical pharmacy, as well as demographic factors such as job role, years of experience, qualifications, and sector background. The findings are presented in three tables that illustrate the distribution of knowledge scores across the different managerial roles, providing insight into how these factors may impact the uptake of clinical pharmacy services.

Statistical analysis was conducted using descriptive and inferential methods to evaluate the knowledge, perceptions, and attitudes of clinical, nursing, and pharmacy managers. ANOVA, T-tests, and Kruskal-Wallis tests were employed to determine associations between respondent characteristics and survey responses. A p-value threshold of $p < 0.05$ was used to denote statistical significance. P-values between 0.05 *and* 0.10 were interpreted as approaching significance and considered for discussion where relevant. Results with $p \geq 0.10$ were regarded as not statistically significant. This threshold was uniformly applied across all comparative analyses to ensure consistency in interpreting the strength of evidence against the null hypothesis.

Chapter 4: Results & Discussion

4.1 Demographics

Of the 42 responses, 39 (92.9%) were valid (Table 4.1). The remaining 3 surveys could not be included in the study as they were not complete, and the results were not taken into consideration for this study. The survey was completed by respondents from 8 of the 9 provinces with the majority based in Gauteng (33.8%) and Western Cape (33.3%). There are a higher proportion of hospitals within this hospital group in Gauteng and the Western Cape, this result therefore correlates with the distribution of the hospitals within the group. There are currently no hospitals within this hospital group located in the Eastern Cape.

There were respondents from all three of the target groups. Pharmacy managers were the highest proportion of respondents (48.7%), followed by nursing managers (33.3%), and finally clinical managers (17.9%). Some of the smaller facilities may have nursing and pharmacy managers reporting directly to a hospital manager instead of through the clinical manager, this may account for the lower response rate from the clinical managers.

The demographic data were obtained directly from the survey and categorized into relevant variables. Respondent demographics were analysed across several key areas, including geographic location, job role, and both previous and current work sector. This categorization enabled more accurate analysis and allowed these variables to be used effectively in addressing the subsequent research objectives.

Table 4.1 Respondent Demographic Information

Measure	Item	Number (N=39)	Percentage (%)
Province	Free State	5	12.8
	Gauteng	13	33.3
	KwaZulu-Natal	1	2.6
	Limpopo	1	2.6
	Mpumalanga	2	5.1
	Northern Cape	2	5.1
	North-West Province	2	5.1
	Western Cape	13	33.3
Job Role	Clinical manager	7	17.9
	Nursing manager	13	33.3
	Pharmacy manager	19	48.7
Work Sector	National Private	39	100.0
	International Private	5	12.8
	National Public	20	51.3
	International Public	3	7.7

The nursing managers (69.23%) had more previous experience working with a clinical pharmacist than clinical managers (57.14%). This coincides with the fact that nursing managers play a vital role in patient centred care and the facilitation of the multidisciplinary healthcare team (Kwame and Petrucka, 2021). The nursing manager focuses on the support of various members of the healthcare team and their integration into the ward (Joseph *et al.* 2023). Similar studies also found that factors such as years of work experience, and previous experience working with a clinical pharmacist did not have baring on the healthcare providers understanding or attitude regarding the clinical pharmacist (Crafford *et al*. 2023; Hasan *et al*. 2022).

Table 4.2 Respondent Work Experience

Measure	Item	Clinical manager	Nursing manager	Pharmacy manager	Total
Current Role Experience	0 - 2 years	3	5	4	12
	3 - 5 years	3	3	3	9
	6 - 10 years	1	1	4	6
	11 - 15 years	0	2	3	5
	> 15 years	0	2	5	7
Number of years since last pertinent Qualification	0 - 5 years	0	2	2	4
	6 - 10 years	1	2	4	7
	11 - 20 years	3	2	4	9

	21 - 30 years	2	2	4	8
	> 30 years	1	5	5	11
Experience working with a clinical pharmacist	No	3	4	8	15
	Yes	4	9	11	24

Diverging opinions among healthcare providers regarding the role of clinical pharmacists have previously been observed within the South African hospital setting (Kellar *et al.* 2021). One contributing factor is the lack of a clear and consistent understanding of clinical pharmacy among members of the multidisciplinary healthcare team (Crafford *et al.* 2023). Given the relatively small and focused sample size of this study—limited to selected members of hospital management—it is challenging to determine whether the misconceptions identified represent a broader trend or are isolated instances. Further research involving a larger and more diverse population would be necessary to explore this issue in greater depth and to assess the generalizability of these findings.

4.2 Objective 1: Perceptions of Management Regarding the Role of Clinical Pharmacists

Investigating the perceptions of clinical, nursing, and pharmacy management regarding the impact of clinical pharmacists on patient outcomes, interdisciplinary collaboration, and workload involved analysing variables such as job role, years of experience, qualifications, and work sector. Most respondents strongly agreed (78%) or agreed (18%) with positive statements about clinical pharmacists (Figure 4.1).

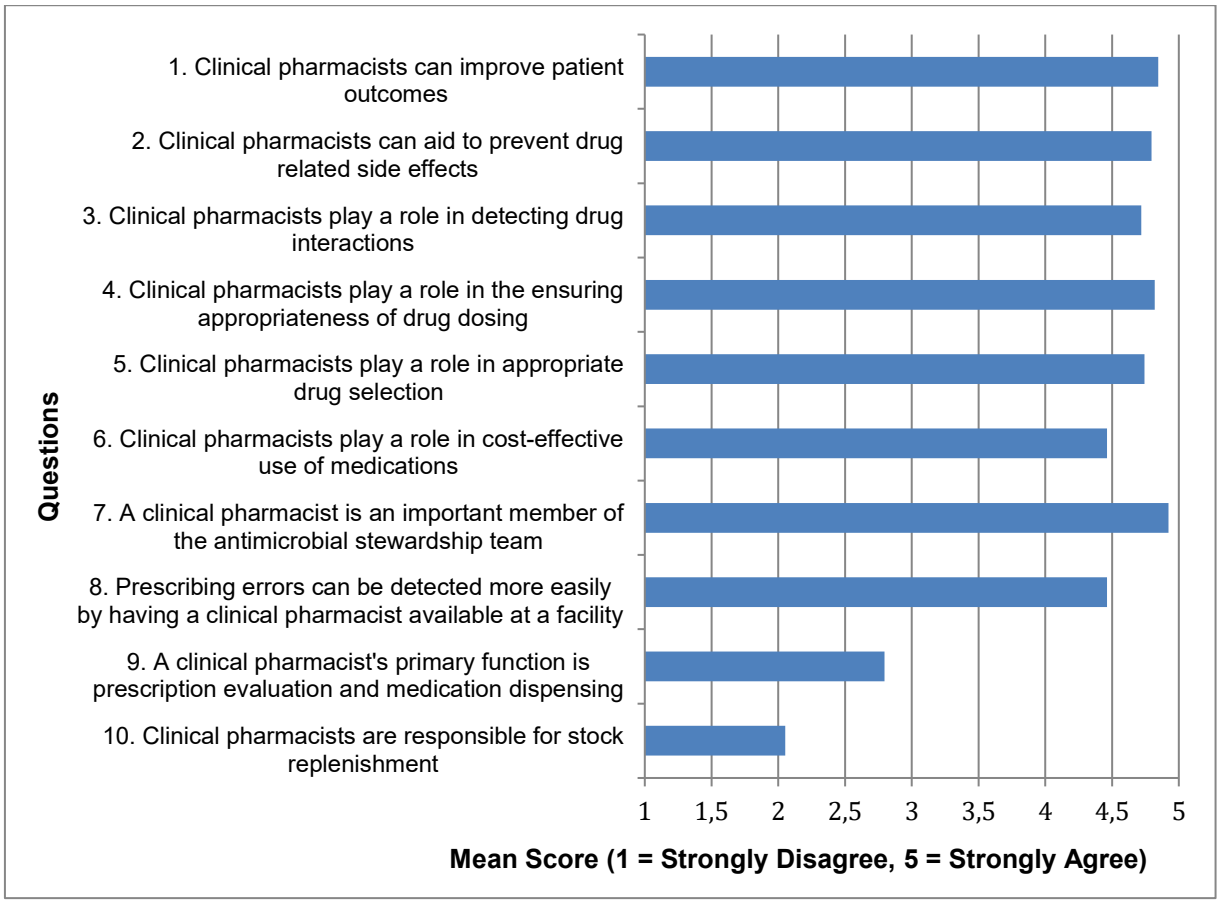

Figure 4.1 Average Perceptions Scores (Likert Scale)

The consensus amongst respondents was that clinical pharmacists improve patient outcomes (M =4.85). One of the main functions of the clinical pharmacist is to improve patient outcomes (Bronkhorst *et al.* 2020). This has been further reiterated by the newly released competency standards for clinical pharmacists practicing in South Africa (SAPC, 2025). The positive responses echo both global and national trends and provide a good understanding of the role of clinical pharmacists in the South African setting by respondents (Zhang *et al.* 2024).

There was general agreement among participants that clinical pharmacists play an important role in antimicrobial stewardship (Mean = 4.92). This aligns with global literature, which consistently highlights the value of clinical pharmacists in supporting antimicrobial stewardship (AMS) initiatives (Jantarathaneewat *et al.* 2022). The perceptions of most respondents were positive, recognizing that clinical pharmacists are instrumental in delivering key AMS functions such as pharmacy-led audits, feedback mechanisms, monitoring of antimicrobial use, and ensuring prescription appropriateness and compliance (Nampoothiri, 2021).

Participants also agreed that clinical pharmacists contribute significantly to cost-effective medication use and the detection of prescription errors, with both roles receiving a mean score of 4.46. While clinical pharmacists are essential in optimizing treatment plans with cost considerations, particularly within the resource-constrained South African healthcare context, these responsibilities are shared across the pharmacy team (de Villiers, 2021). Similarly, although clinical pharmacists possess advanced knowledge relevant to medication safety, all dispensing staff play a vital role in detecting errors (Rech, 2022). The unique contribution of clinical pharmacists lies in their individualized care, prevention of adverse events, and efficient clinical resource utilization, which collectively support cost reduction efforts (Valliant *et al*. 2022).

There was more variation in responses regarding whether dispensing is the primary function of clinical pharmacists, with a lower mean score of 2.79. This indicates a general understanding that the clinical pharmacist's scope extends beyond dispensing. Although clinical pharmacists may perform dispensing duties on occasion, this should not constitute the core of their role (SAPC, 2025). Confusion in this regard may stem from the rapid development of clinical pharmacy in South Africa and variability in how the role is implemented across facilities. In many cases, clinical pharmacists may be required to adapt their responsibilities to meet facility-specific needs, which can include stepping in to support dispensary operations (Crafford *et al*. 2021). The recently published competency standards for clinical pharmacists now offer a clearer definition of the role and help distinguish clinical functions from operational ones (SAPC, 2025).

Respondents generally disagreed that clinical pharmacists are responsible for stock replenishment (Mean = 2.05). According to the South African Pharmacy Council's newly published competency standards, this is not considered a core function of the clinical pharmacist (SAPC, 2025). The low mean score aligns with these guidelines, although occasional involvement in stock-related tasks may still occur in practice. This is particularly true in under-resourced environments where pharmacists are required to perform multiple roles, including assisting with workflow optimisation in dispensary areas (Elmien *et al*. 2022).

A Mann-Whitney U test was conducted to explore specific group differences observed in the Kruskal-Wallis analysis (Table 4.3). These post-hoc comparisons offered greater insight into which demographic variables most influenced participants' perceptions of

the clinical pharmacist's role.

Table 4.3 Perceptions of Managers Based on Demographic Variables

Demographic	Perception Statement	H	p-value	Interpretation
Job Role	*Prescribing errors can be detected more easily by clinical pharmacists*	5.91	0.052	Borderline significant
Experience	*Cost-effective use of medications*	8.79	0.067	Borderline significant
Sector	*Clinical pharmacists play a role in detecting drug interactions*	5.11	0.078	Borderline significant
Qualifications	*All statements*	—	> 0.1	No significant differences

These borderline significant findings reflect trends also observed in the literature. For example, studies have found that healthcare professionals' familiarity with clinical pharmacy—often shaped by their exposure through job role or workplace environment—can influence their acceptance of the role (Abduelkarem, 2014; Moura *et al.* 2025).

4.2.1 Perceptions by Job Role

Pharmacy managers were significantly more likely to agree that clinical pharmacists improve error detection compared to nursing managers (Table 4.4). This may be due to their closer professional alignment and understanding of clinical pharmacists' responsibilities, particularly regarding medication safety and prescription review (SAPC, 2025).

Table 4.4 Job Role vs. Perception Comparison

Comparison	U	p-value	Interpretation
Clinical Manager vs Nursing Manager	36.0	0.251	Not significant
Clinical Manager vs Pharmacy Manager	80.0	0.408	Not significant
Nursing Manager vs Pharmacy Manager	**176.5**	**0.017**	Significant

This is supported by the work of Dunn (2015), who highlight that clinical pharmacists play a central role in preventing prescribing errors through comprehensive medication review and collaborative rounds, which pharmacy managers are more likely to observe

firsthand. Nursing managers may have more indirect interaction with clinical pharmacists, possibly contributing to a less informed perception of this function.

4.2.2 Perceptions by Years of Experience

Respondents with fewer years of experience (0–2 years) held significantly more positive views on the cost-effectiveness of clinical pharmacy services compared to those with 6–15 years of experience. This suggests that younger professionals may be more open to evolving healthcare roles or have had more exposure to interprofessional education during their training.

Table 4.5 Years of Experience vs. Perception Comparison

Comparison	U	p-value	Interpretation
0–2 yrs vs 11–15 yrs	**50.0**	**0.014**	Significant
0–2 yrs vs 6–10 yrs	**56.0**	**0.028**	Significant
Others	>0.05		Not significant

This mirrors findings from international studies that suggest early-career professionals often display more flexible thinking and enthusiasm toward interdisciplinary roles, including clinical pharmacy (Alcântara; *et al.* 2018). In contrast, more experienced professionals may maintain traditional views of pharmacists' roles, particularly in systems where clinical pharmacy is still being established (Crafford *et al.* 2023).

4.2.3 Perceptions by Sector Experience

Respondents with international experience rated the clinical pharmacist's role in drug interaction detection significantly higher than those with national (public and private) experience. This may reflect differences in institutional structures and interprofessional collaboration models, which are often more mature in international contexts.

Table 4.6 Sector Experience vs. Perception

Comparison	U	p-value	Interpretation
International vs National Private	27.5	0.117	Not significant
International vs Public & Private	**20.0**	**0.030**	Significant
National Private vs Public & Private	129.0	0.450	Not significant

In more established healthcare systems, clinical pharmacists are deeply integrated into clinical rounds, medication reconciliation, and safety initiatives (Jantarathaneewat *et al.* 2022). Such exposure likely leads to an appreciation for the nuanced role clinical pharmacists play, particularly in high-risk areas like ICU, oncology, or geriatrics, where drug interactions can have serious consequences (Garau and Bassetti, 2018).

4.2.4 Overall Perceptions

Regardless of demographic background, most respondents held positive views regarding the clinical pharmacist's ability to improve patient outcomes—97% agreed that pharmacists contribute to the prevention of drug-related side effects. Additionally, 100% of participants agreed that clinical pharmacists play a role in appropriate drug dosing.

These findings reinforce global evidence of the impact of clinical pharmacists in reducing adverse drug events and improving medication safety (Oliveira *et al.* 2021; Yalçın *et al.* 2023).

However, perceptions of the pharmacist's role in ensuring cost-effective medication use were more variable. While all clinical managers strongly agreed with this function, only a minority of nursing managers (12.5%) and pharmacy managers (15.8%) expressed neutral responses. This variability may stem from a lack of consistent role implementation or limited exposure to clinical pharmacists actively engaging in formulary and cost-control initiatives (de Villiers, 2021).

The observed neutrality could also be explained by operational overlap in roles, pharmacists in some settings may be required to perform multiple duties, including cost management, dispensing, and administrative support. As Crafford (2021) note, such variability may lead to inconsistent expectations across facilities, depending on staffing, resources, and leadership support.

4.3 Objective 2: Knowledge

There were no statistically significant differences in the knowledge across different job roles.

A statistically significant difference (results in bold) was found in knowledge regarding the role of the clinical pharmacist in SOPs, guidance documents, and risk assessments, based on respondents' years of experience.

A Kruskal-Wallis statistic (H=12.32) indicates that there is a substantial variability on the respondents knowledge across the various experience groups.

This result indicates that respondents' knowledge about the involvement of clinical pharmacists in Standard Operating Procedures (SOP) s, guidance documentation, and risk assessments varies significantly depending on their length of experience in their current role. Specifically, respondents with different durations of experience might differ substantially in their understanding or awareness of the role of the clinical pharmacist in administrative or procedural functions. Respondents who had less experience were less informed on this topic and may need more training or information regarding the job role of clinical pharmacist (SAPC, 2025).

Table 4.7 Perceptions of Managers Based on Knowledge

Perception Statement	Knowledge (Job Role)		Knowledge (Years of Experience)		Knowledge (Qualifications)		Knowledge (Work Sector Experience)	
	F	**p-Value**	**F**	**p-Value**	**F**	**p-Value**	**F**	**p-Value**
Pharmacy manager's responsibility to implement clinical services	1.31	0.52	6.31	0.18	**9.82** [a]	**0.02** [a]	0.64	0.73
Recommendations irrespective of cost implications	3.64	0.16	2.23	0.69	**8.44** [a]	**0.04** [a]	0.67	0.72
Develop and monitor pharmaceutical care plans	3.08	0.21	7.76	0.1	**11.08** [a]	**0.01** [a]	5.38 [b]	0.07 [b]
Responsibility for evaluating prescriptions and dispensing medications	0.41	0.82	4.97	0.21	4.71	0.19	2.05	0.36
Role in SOPs, guidance documents, and risk assessments	2.42	0.3	**12.32** [a]	**0.02** [a]	2.38	0.58	0.95	0.62
Implementation and management of clinical pharmacy monitoring system	0.54	0.76	4.14	0.39	0.93	0.41	2.4	0.31
Only member to provide training	2.0	0.37	2.25	0.69	1.79	0.62	1.57	0.45
Only members demonstrating drug action knowledge	2.0	0.37	2.25	0.69	1.62	0.67	1.47	0.5
Not responsible for patient/caregiver training	2.35	0.14	1.01	0.42	6.05	0.07	3.08	0.08
Participation as clinical trial team member	0.54	0.76	4.62	0.33	4.43	0.15	3.2	0.2
Conduct research, interpret, and analyse data	0.54	0.76	4.62	0.33	0.43	0.93	3.2	0.2

a- Statistically significant data

b- Borderline significant data

There was a statistically significant differences between the knowledge regarding qualification and development and monitoring of pharmaceutical care plans by clinical pharmacists. Individuals with B. Pharm qualifications were most likely to have the highest knowledge scores, as this is a core clinical pharmacy function. Medical and nursing professionals had moderate knowledge, depending on their interprofessional exposure and training (Dey *et al*. 2025).

Most respondents correctly identified key aspects of the job role of a clinical pharmacist and many focused on the pharmacist's role in antimicrobial stewardship and training. The average score for the knowledge section of the survey was 84%. There was no statistical difference between variables such as job role, years of experience or qualification. Sector experience showed a near-significant trend (ANOVA $p = 0.065$), suggesting possible influence of work context on knowledge.

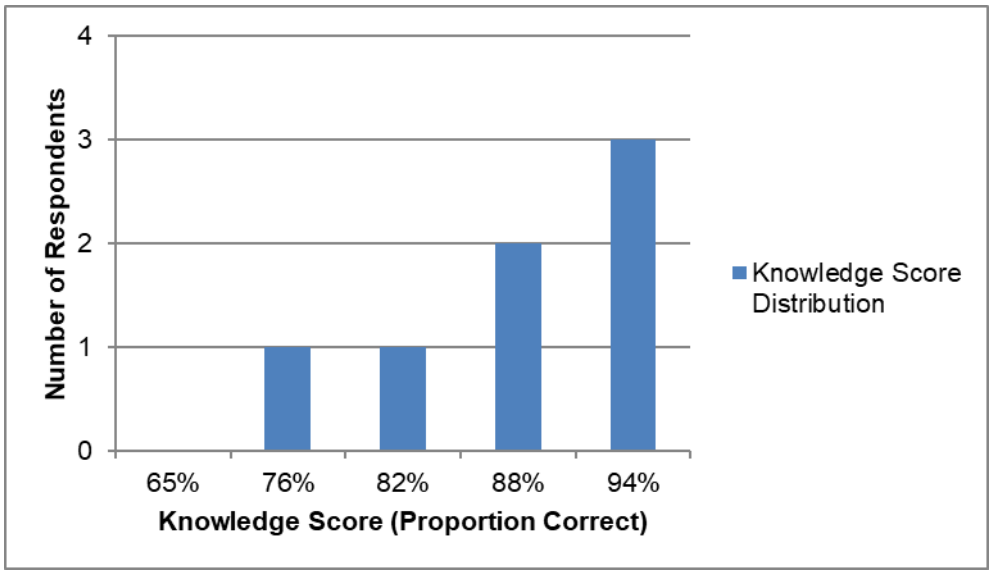

Figure 4.2 Distribution of Knowledge Scores (Clinical Manager)

All participants were asked to briefly explain their understanding of the term clinical pharmacist. The responses cannot be quantified numerically however some trends were identified. The Clinical managers focused largely on postgraduate training and best educating other professionals on best practice. One clinical manager stated:

'*A clinical pharmacist is a pharmacist with an M degree in Clinical Pharmacy*.'

While another gave the response:

'*The relationship with doctors and clinical pharmacists is essential. A clinical pharmacist's impact can be nullified if there are poor relationship skills and low EQ*'.

This can be interpreted as the emphasis on the building of good professional relationships with other members of the healthcare team, management and the patient by the clinical pharmacist. Ultimately the patient should always be the focus of care but without the ability to communicate effectively to other members of the healthcare team and the patient, the clinical pharmacist is a less effective member of this team (Wolters *et al*. 2017).

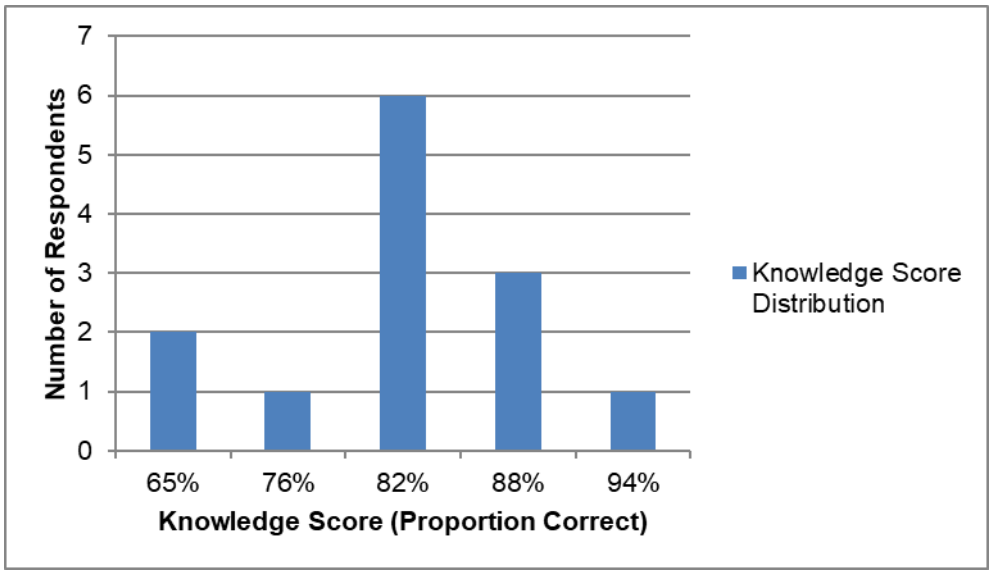

Figure 4.3 Distribution of Knowledge Scores (Nursing Manager)

While clinical managers focused on training, nursing managers provided responses that focused more on the integration of the clinical pharmacist as part of the healthcare team. A Nursing Manager noted:

'*Due to the complex and ever-changing nature of medication and related health risks and interactions, the clinical pharmacist is the liaison between the Doctor, Patient and staff to ensure the best possible medication is used for each patient and situation. They also form a cornerstone in antimicrobial stewardship'*

Due to the involvement of the nursing managers in the wards and the multidisciplinary team, it is fitting that they focused on the importance of AMS and achieving positive patient outcomes (Fowler *et al.* 2021). Nursing has acknowledged that clinical pharmacists alleviate some of the clinical burden by providing direct patient care and reducing adverse events (Appiah-Num Safo *et al*. 2022).

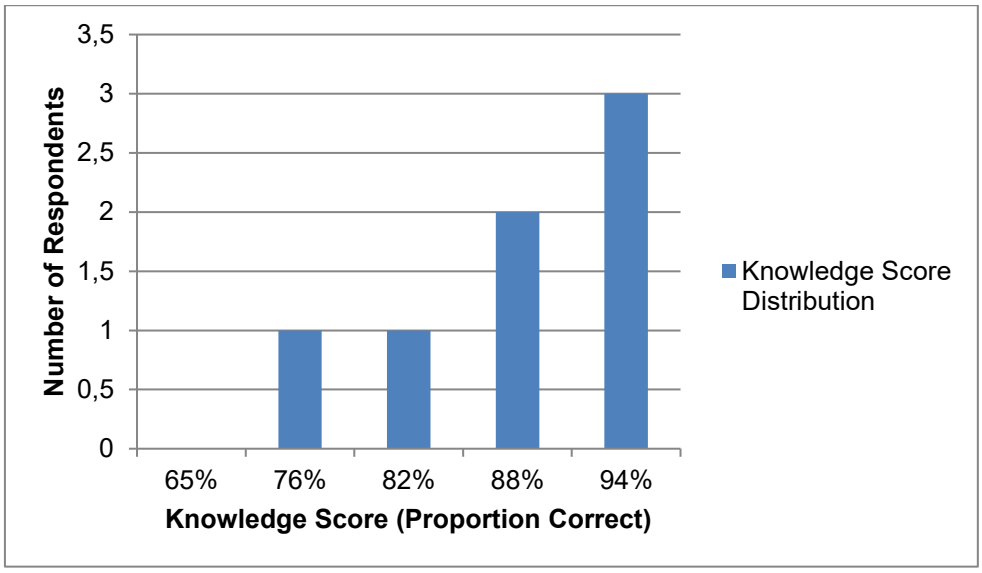

Figure 4.4 Distribution of Knowledge Scores (Pharmacy Manager)

Pharmacy managers highlighted both aspects of clinical pharmacy practice that were expressed by the nursing and clinical managers. They stressed the need for further education as well as the importance of presence within the ward as part of a multidisciplinary team and within the AMS program. As one Pharmacy Manager noted:

'*A Pharmacist that has clinical background and qualifications to assist with the interpretation of a patient's disease, clinical diagnosis, treatment and diagnostic results, which enables the pharmacist to assist with optimizing medication treatment for that patient too.*'

Another theme that was highlighted throughout was the focus on patient centred care:

'*A pharmacist that specializes in clinical best practice, that serves in a consultancy capacity to ensure efficient clinical outcomes*.'

Although the knowledge scores are high for pharmacy managers it has been previously established that a clear scope of practice that has been established can improve overall understanding of all members within the healthcare team and this group reflected similarly (Crafford *et al.* 2023).

4.4 Objective 3: Attitudes

Initial T-tests comparing respondents grouped by Attitudes Category (Positive vs. Neutral/Negative) could not be reliably performed due to limited variability in responses across groups. This lack of variability suggests a strong consensus among participants regarding the value of clinical pharmacists.

Subsequently, T-tests were conducted based on Knowledge Category (High vs. Medium/Low), with results summarized in Table 4.8.

Table 4.8 Perceived Impact by Knowledge Category

Impact Statement	T	p-value
Medication information accessibility	-1.00	0.34
Improved pharmacy-ward communication	-1.00	0.34
Clinical pharmacist as valuable team member	NaN [a]	NaN [a]
Helpful in AMS ward rounds	NaN [a]	NaN [a]
Difference between hospital and clinical pharmacists	-0.18	0.86
Facility benefits from clinical pharmacist	1.00	.033

a- no information available

The analysis revealed no statistically significant differences in impact perceptions based on respondents' knowledge levels. This outcome reinforces the broader finding of this research: across clinical, nursing, and pharmacy management, there is widespread agreement regarding the positive role of clinical pharmacists in enhancing patient outcomes, improving interdisciplinary collaboration, and supporting workload management.

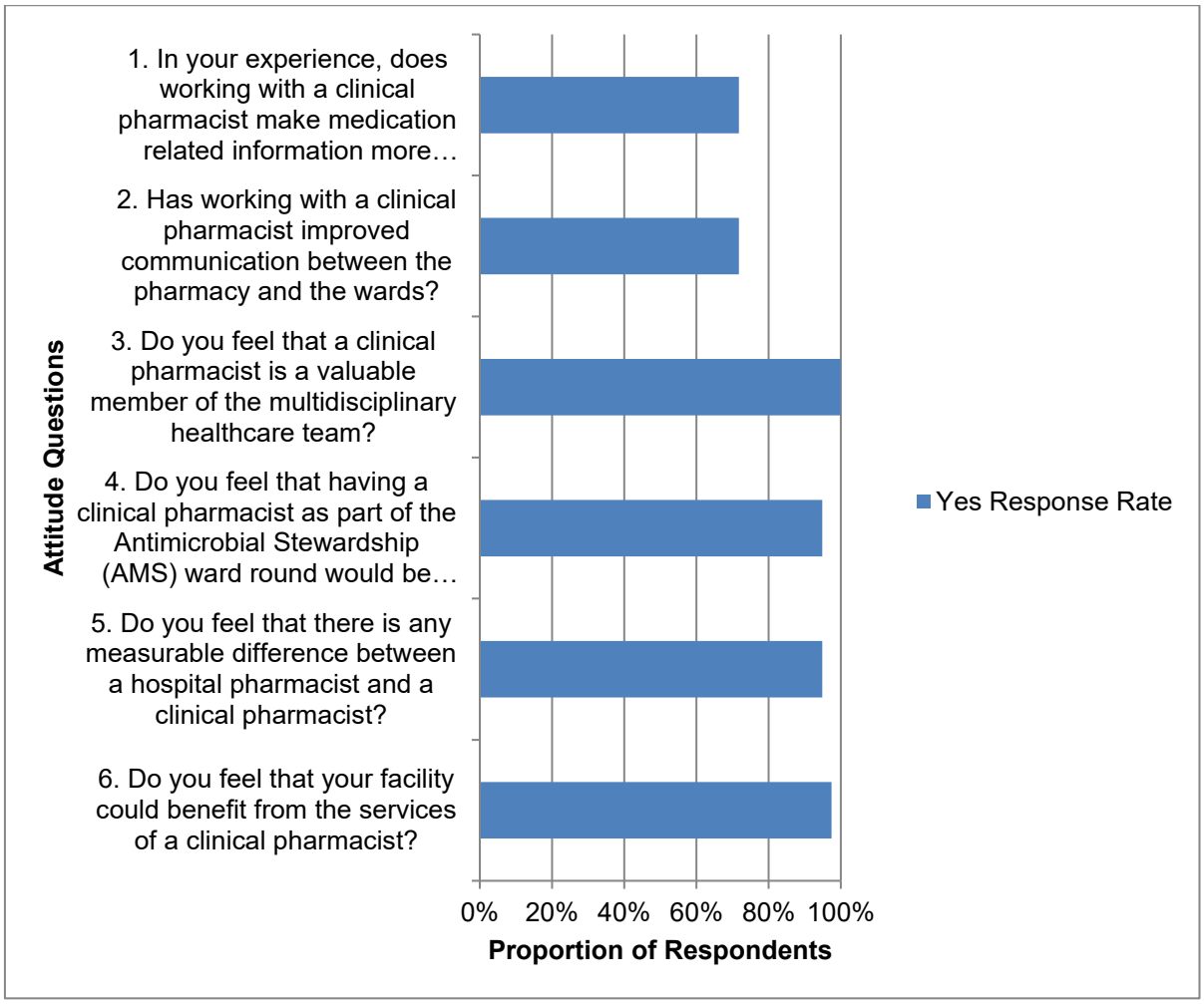

Figure 4.5 Proportion of "Yes" Responses

All participating managers (100%) recognized clinical pharmacists as valuable members of the multidisciplinary healthcare team. As one Clinical Manager noted:

"Though I am a regional clinical manager, no more at a hospital set up, I pick and see benefits of hospitals who have some clinical pharmacy hours. If the position is utilised well and the team dynamics are managed, patients, doctors, nurses and pharmacists will see better outcomes through rounds, checking of prescriptions regularly, supporting with ICU prescriptions which are complex."

This aligns with literature demonstrating that the integration of clinical pharmacists into healthcare teams—particularly in ICU settings—has improved patient outcomes (Arredondo *et al.* 2021). Furthermore, 100% of Clinical Managers, 100% of Nursing Managers, and 91.7% of Pharmacy Managers agreed that working with a clinical pharmacist improves communication between pharmacy and ward staff. Additionally, all respondents (100%) supported the inclusion of clinical pharmacists in Antimicrobial

Stewardship (AMS) ward rounds. As one Pharmacy Manager shared:

“AMS is essential, and the antibiotic use become more limited as the resistance of bacteria and fungi advance and become problematic. The role of a Clinical Pharmacist in the Hospital becomes more and more a must in the treating environment.”

This is consistent with findings that clinical pharmacists play a key role in optimizing antimicrobial use and leading AMS programs—critical in combating antimicrobial resistance (Chetty, 2022). Despite these overwhelmingly positive attitudes, some barriers to the uptake and sustainability of clinical pharmacy services were raised. A Pharmacy Manager reflected on a key concern:

“Clinical pharmacist interventions need to be quantified and translated into a monetary value to ensure feasibility and sustainability of the discipline in private healthcare settings.”

This highlights a common reality: financial feasibility remains a key driver for staffing decisions in hospital environments. As noted by Pickette (2010), all roles must demonstrate return on investment. Clinical pharmacists contribute through medication error detection and cost reductions, but these contributions must be well-defined and consistently captured (Arredondo *et al.* 2021).

Across all management roles and healthcare sectors, clinical pharmacy is highly valued. There is widespread recognition of the clinical pharmacist's importance within the multidisciplinary team. While knowledge of the role is generally good, exposure to different healthcare sectors may influence depth of understanding. Ultimately, this study reveals a broad and unified agreement on the potential of clinical pharmacists to improve healthcare delivery.

Chapter 5: Conclusion

Clinical pharmacists are well-integrated members of the healthcare team in many high-income countries, such as America and Australia and continue to become more well recognised in several low-to-middle income countries, including India and Brazil (Alonso *et al.* 2024). Clinical pharmacists have been shown to improve patient outcomes when integrated as part of multidisciplinary teams (Crafford *et al.* 2023). In the South African healthcare setting, hospital management plays a pivotal role in facilitating this integration and enabling the expansion of the clinical pharmacist's role (Densen, 2011). Despite their importance, few studies have explored the knowledge and perceptions of healthcare management regarding the need for clinical pharmacists in South African hospitals.

This study revealed a strong consensus among participants that clinical pharmacists are essential contributors to antimicrobial stewardship and improve access to medication-related information within hospital wards. Notably, 97% of respondents indicated that their facility could benefit from the services of a clinical pharmacist. There was also a generally strong understanding of the clinical pharmacist's role, reflecting both awareness and support.

However, some concerns were raised regarding the financial implications of integrating clinical pharmacists into healthcare teams. These concerns, while relatively limited, highlight the need to balance perceived clinical value with financial feasibility in resource-limited settings.

While the overall sentiment toward clinical pharmacists was overwhelmingly positive, uptake of the role remains limited. This disconnect may be influenced by the study's sample limitations, which focused on a small, specific group within a single private hospital group. Expanding the scope of future research to include more hospitals—especially those in the public sector—could provide a more representative understanding. Furthermore, the inclusion of finance and human resources managers may shed light on the institutional and economic barriers to broader implementation.

Overall, the findings provide encouraging evidence of the growing respect and recognition for clinical pharmacy within hospital environments and its perceived

potential to enhance patient care through multidisciplinary collaboration.

5.1 Limitations

This study was conducted on a small sample population within a single private hospital group, limiting the generalizability of findings. The perceptions, knowledge, and attitudes of public sector hospital managers were not assessed, and the study was not designed to identify the root causes behind the limited uptake of clinical pharmacy in South Africa.

A potential limitation of this study is the variability in the educational background of clinical managers. Differences in formal training, particularly regarding pharmacotherapy and interdisciplinary care, may have influenced their understanding of the clinical pharmacist's role. Respondents with limited exposure to clinical pharmacy concepts may have provided less informed responses, potentially affecting the accuracy and consistency of the findings. This variability also limits the generalisability of results across all clinical management settings in South Africa. Management with qualifications in finance or management qualifications may be more cautious to implement new roles within a hospital and may portray a negative response to the implementation of clinical pharmacy into the hospital setting.

Additionally, the study period was limited to one week, restricting contact time with respondents and the opportunity for follow-up or clarification. These factors suggest that a larger-scale, multi-site study conducted over an extended period would yield more robust and generalizable insights.

5.2 Recommendations

The overwhelmingly positive response to the inclusion of clinical pharmacists suggests a compelling case for expanding this role within healthcare teams. However, to understand the underlying factors affecting implementation and uptake, qualitative interviews should be conducted with hospital managers and key decision-makers.

Future research should:

- Include multiple private and public hospital groups across various provinces.
- Involve finance and HR managers to evaluate economic feasibility and policy-related constraints.
- Engage other members of the multidisciplinary healthcare team, such as occupational therapists, physiotherapists, and dietitians, to gather broader perspectives on collaboration with clinical pharmacists.

These actions would contribute to a more comprehensive understanding of how clinical pharmacists can be effectively and sustainably integrated into South African healthcare systems.

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Appendix A: Survey

Participant Information Sheet

STUDY INFORMATION DOCUMENT

Study title: Perceptions, attitudes and knowledge of managers in clinical roles towards the addition of clinical pharmacists as part of the healthcare team.

Good day

My name is Danica Conway-Cleaves, I am a pharmacist and am currently completing a Masters Degree in Pharmacotherapy at the University of the Witwatersrand. As part of my studies, I am required to undertake a research project. I have chosen to investigate the perceptions around the need of clinical pharmacists within a private hospital group. The aim of the study is to determine whether the clinical, nursing and pharmacy management sees benefit in having input from a clinical pharmacist on site.

I would appreciate your participation in this study.

This project requires completion of a short questionnaire that should take approximately 10 minutes of your time. Once completed the data will be digitally stored on the REDCAP survey system under password protection and will only be available to the researcher and supervisors. The data will be compiled into a report that may be available online through the university website or can be sent directly to you upon your request.

This questionnaire will be anonymous and confidential, and no identifying personal information will be asked. 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 if you do not wish to complete the study.

Due to the confidentiality of the study no participant will be identified in any report or publication arising out of the study. All data collected during the study will be securely retained for two years, if a scientific publication arises from the study and six years, if there is no publication. Thereafter it will be destroyed accordingly.

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 (Medical), telephone +27(0) 11 717 1408, email HREC-Medical.ResearchOffice@wits.ac.za

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg ("Committee"). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Paul Ruff, who may be contacted via any one member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za, Rhulani.Mukansi@wits.ac.za, Mapula.Ramaila@wits.ac.za and Iain.Burns@wits.ac.za.

Thank you for reading this Study Information Sheet.

Researcher:

Danica Conway-Cleaves 2485569@students.wits.ac.za

Supervisors:

Dr. Ané Orchard ane.orchard@wits.ac.za
Miss Amber Cheng amber.cheng@wits.ac.za
Ms Razeeya Khan razeeya.khan@wits.ac.za

Date: February 2024

☐ By ticking this box to proceed to the survey you are declaring that you have understood the information presented you to and consent to taking part in this study

Demographics

1. What province are you located in?

    a. Gauteng
    b. KwaZulu-Natal
    c. Western Cape
    d. Northern Cape
    e. Free State
    f. North-West Province
    g. Limpopo
    h. Mpumalanga

2. What best describes your current job role?

    a. Clinical manager
    b. Nursing manager
    c. Pharmacy manager

3. What sectors have you worked in? (select all that apply)

    a. National Private
    b. International Private
    c. National Public
    d. International Public

4. What qualifications do you hold that are relevant to your current job title? (Please specify)

5. Did you complete your relevant qualification(s) in South Africa?

    a. Yes
    b. No

6. How long ago did you complete your qualification?

    a. 0 – 5 years
    b. 6 – 10 years
    c. 11 – 20 years
    d. 21 – 30 years
    e. More than 30 years

7. How long have you been in your current role?

    a. 0 – 2 years
    b. 3 – 5 years
    c. 6 – 10 years
    d. 11 – 15 years
    e. More than 15 years

8. Have you worked with a clinical pharmacist before?

    a. Yes
    b. No
    c. I don't know

9. Briefly explain your understanding of the term 'clinical pharmacist'.

Perceptions

10. Please select the answer that most accurately represents your view.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Clinical pharmacists can improve patient outcomes					
Clinical pharmacists can aid to prevent drug related side effects					
Clinical pharmacists play a role in detecting drug interactions					
Clinical pharmacists play a role in the ensuring appropriateness of drug dosing					
Clinical pharmacists play a role in appropriate drug selection					
Clinical pharmacists play a role in cost-effective use of medications					
A clinical pharmacist is an important member of the antimicrobial stewardship team					
Prescribing errors can be detected more easily by having a clinical pharmacist available at a facility					
A clinical pharmacist's primary function prescription evaluation and medication dispensing					
Clinical pharmacists are responsible for stock replenishment					

(Bronkhorst *et al*. 2020; Bronkhorst *et al*. 2021)

Knowledge

11. It is the responsibility of the pharmacy manager to implement and maintain clinical services within the hospital.

    a. True
    b. False

12. Clinical pharmacists will recommend the most appropriate medication irrespective of cost implications.

    a. True
    b. False

13. Clinical pharmacists develop, monitor, and review a patient's pharmaceutical care plan.

    a. True
    b. False

14. By monitoring and reporting therapeutic outcomes clinical pharmacists ensure safe and effective use of medication.

    a. True
    b. False

15. Infection, prevention, and control (IPC) programs can benefit from the integration of a clinical pharmacist into the IPC committee.

    a. True
    b. False

16. Clinical pharmacists may suggest dosing adjustments when patients' plasma amikacin levels fluctuate outside of the desired range?

    a. True
    b. False

17. Clinical pharmacists are responsible for evaluating prescriptions and dispensing accurate and appropriate medications.

    a. True
    b. False

18. Clinical pharmacists play a role in the implementation, development and maintenance of Standard operating procedures guidance documents and risk assessments.

    a. True
    b. False

19. Clinical pharmacists are responsible for implementation, and management of a clinical pharmacy monitoring system.

    a. True
    b. False

20. Clinical pharmacists are the only members of the pharmacy team to provide training to other members of staff.

    a. True
    b. False

21. Clinical pharmacists are the only members of the pharmacy team that demonstrate and apply knowledge of drug mechanisms of action, indications, adverse reactions, and interactions.

    a. True
    b. False

22. Clinical pharmacists must communicate effectively with the healthcare team.

    a. True
    b. False

23. Clinical pharmacists hold a responsibility to keep abreast of current guidelines and new clinical information.

    a. True
    b. False

24. Clinical pharmacists are not responsible for providing training and information to do with patients and caregivers.

    a. True
    b. False

25. Clinical pharmacists play a role in supporting and providing clinical pharmaceutical advice to other healthcare providers for example nursing, dieticians, or occupational therapists.

    a. True
    b. False

26. Clinical pharmacists must participate as a member of a clinical trial team.

    a. True
    b. False

27. Clinical pharmacists must be able to conduct research and interpret and analyse data.

    a. True
    b. False

(South African Pharmacy Council, 2023)

Attitudes

28. In your experience, does working with a clinical pharmacist make medication related information more easily accessible to the wards?

    a. Yes
    b. No
    c. I have not worked with a clinical pharmacist.

29. Has working with a clinical pharmacist improved communication between the pharmacy and the wards?

    a. Yes
    b. No
    c. I have not worked with a clinical pharmacist.

30. Do you feel that a clinical pharmacist is a valuable member of the multidisciplinary healthcare team?

    a. Yes
    b. No

31. Do you feel that having a clinical pharmacist as part of the Antimicrobial Stewardship (AMS) ward round would be helpful?

    a. I have a clinical pharmacist on my AMS rounds.
    b. Yes
    c. No

32. Do you feel that there is any measurable difference between a hospital pharmacist and a clinical pharmacy?
    a. Yes
    b. No

33. If you do not have a clinical pharmacist at your facility currently, do you feel that your facility could benefit from this role?

    a. I have a clinical pharmacist at my facility.
    b. Yes
    c. No

Appendix B: HREC Approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

REC-250208-004 Mrs Danica Conway-Cleaves M240616

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M240616

NAME: (**Principal Investigator**)	Mrs Danica Conway-Cleaves
DEGREE:	MMed (Pharmacy and Pharmacology)
DEPARTMENT:	Pharmacy and Pharmacology
STUDY SITE(S):	Mediclinic Private Hospital Group
TITLE:	Perceptions, attitudes and knowledge of managers in clinical roles towards the addition of clinical pharmacists as part of the healthcare team
DATE CONSIDERED:	21/06/2024
DECISION:	Approved unconditionally
CONDITIONS:	
NOTE:	Original Application Number MED24-05-496. Subsequent Online Application Number M241129-B-0001.
SUPERVISOR:	Ms A Cheng, Dr A Orchard and Mrs R Khan
APPROVED BY:	Professor P. Ruff, Chairperson, HREC (Medical)

DATE OF APPROVAL: 29/11/2024 **EXPIRY DATE:** 28/11/2029

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATOR(S)

I/we fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report** in the month date of convened meeting each year until study is closed. Failure to submit annual report will result in ethics clearance certificate suspension. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. Unreported changes to the application may invalidate the clearance given by the HREC (Medical). Email a signed copy of ethics clearance certificate to HREC-Medical.ResearchOffice@wits.ac.za.

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix C: Mediclinic Ethics Approval

MEDICLINIC

MEDICLINIC CORPORATE OFFICE
25 DU TOIT STREET
STELLENBOSCH
7600

PO BOX 456
STELLENBOSCH
7599

T +27 21 809 6500

www.mediclinic.co.za

Ref: 20240401 – Danica Conway-Cleaves
Date: 16 October 2024
Ms Conway Cleaves
Email: dconwaycleaves@gmail.com
Copies to: Research@mediclinic.co.za

Dear Ms Conway-Cleaves,

APPROVAL TO CONDUCT RESEARCH AT MEDICLINIC FACILITIES

Your research proposal titled "***Perceptions, attitudes and knowledge of managers in clinical role toward the addition of clinical pharmacists as part of the healthcare team.***" refers

1. **Degree level:** MSc Med Pharmacotherapy
2. **Study aim:** To determine the knowledge, perceptions and attitudes of clinical nursing and pharmacy managers in a hospital setting to the need for a clinical pharmacist as part of the patient care team in South Africa.
3. **Study design and methodology:** Cross-sectional study and electronic survey.
4. **Mediclinic contact person:** Ms. Olivia Adams, Research Administrator.
5. **Access conditions:**
   - Kindly be advised that you are permitted to directly send the research invitation to relevant prospective participants via email. Kindly include Research@mediclinic.co.za in the correspondence and attach this approval letter.
   - Please submit proof of ethics approval before commencing participant recruitment and data collection.
   - Finally, we request that you provide a written summary or close-out report to Research@mediclinic.co.za within 30 days of the study's end date as stipulated in the protocol. In the case your research period extends beyond the initial specified timeframe, you will be required to apply for an extension.

We wish you all the best with your research journey.

Kind regards,

NOMFUNDO MASEKO
Mediclinic Southern Africa: Research Coordinator