SOUTH AFRICAN PHARMACISTS' KNOWLEDGE AND ATTITUDES, TOWARDS CONTINUING PROFESSIONAL DEVELOPMENT IN THE GAUTENG PROVINCE OF SOUTH AFRICA

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

A research report presented by

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Johannesburg, 2025

Declaration

I, Ruvimbo Tina Tariro Kateera declare that this research report is my own, unaided work. It is being submitted in partial fulfilment of the requirements of the degree Master of Science in Medicine (Pharmaceutical Affairs) in the Department of Pharmacy and Pharmacology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

…….

(Signature of candidate)

09 May 2025

Declaration: Student's contribution to article(s) and agreement of co-author(s)

I, Ruvimbo Tina Tariro Kateera, student number 541222, declare that this Research Report is my own work and that I contributed adequately towards research findings published in the article(s) stated below which are included in my Research Report.

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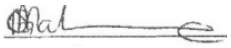
Signature of Primary Supervisor: 

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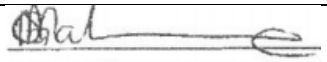
2nd author	Gillian Dumsile Mahumane		09/05/2025
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The manuscript entitled "South African pharmacists' knowledge and attitudes towards Continuing Professional Development in the Gauteng province of South Africa" is a significant contribution to the field of pharmacy practice and education, addressing the critical need for ongoing professional development among pharmacists in Gauteng Province. As the primary investigator, Ms. Kateera has substantially contributed to all aspects of this research, from literature review and data collection to analysis and manuscript preparation. The work provides valuable insights into the knowledge gaps and attitudes affecting pharmacists' engagement in CPD, making this research pertinent for inclusion in her Research Report for degree completion purposes.

Dedication

This research is wholeheartedly dedicated to my beloved parents, my dad, Mr Christopher C Kateera and my mom, Dr. Judith Kateera, whose unwavering support, endless patience, and unconditional love have been my guiding light. From the earliest days of my academic journey, they have stood by my side, encouraging me to pursue my dreams and providing me with the strength to overcome any obstacle. Their belief in my potential has been a constant source of inspiration and motivation. Dad, your guidance, and steadfast support has been instrumental in my growth and development. Your unwavering faith in my abilities has given me the confidence to strive for excellence in all my endeavours. I admire your strength, integrity, and dedication to our family. Your lessons on the importance of education and responsibility have left an indelible mark on my character. You have been my pillar and source of emotional support, and you have given me strength and hope each time I thought of giving up. Mom, your nurturing spirit, and tireless efforts have shaped the person I am today. Your wisdom, kindness, and resilience have taught me the value of hard work and perseverance. You are my role model and your grandiose accomplishments and contributions to society has inspired me and shown me by example what true success looks like. You encourage me to think big and love big while being my biggest cheerleader, celebrating my successes, and comforting me in times of failure. Your sacrifices and dedication have not gone unnoticed, and I am forever grateful for everything you have done for me. Moreover, I specially dedicate this research to my husband, Tafadzwa I Mudara, who has been my unwavering pillar of support throughout this journey. Your boundless encouragement, patience, and understanding nature have been the bedrock upon which I have built this work. Your belief in my abilities, and my crazy ideas even when I doubt myself is remarkable, and your open-minded view of the world has made me confident and audacious. To you, I owe my deepest gratitude for the countless sacrifices you have made, and the many times you took on extra responsibilities so that I could focus on my research. Your love and companionship have not only made this endeavour possible but have also enriched my life in immeasurable ways. Thank you for walking this path with me, for sharing in my triumphs and comforting me in my setbacks. This accomplishment is as much yours as it is mine, and I am forever grateful for your unwavering support and love. This dedication is a testament to our partnership and the incredible person you are. Lastly, I dedicate this research to the Almighty God, for all things were made possible by him. I am who I am today because of him, and to him I give all the Glory.

Abstract

In 2019 the South African Pharmacy Council (SAPC) mandated the formal documentation and submission of Continuing Professional Development (CPD). While CPD is essential for pharmacists to improve healthcare quality, data on their knowledge, attitudes, and perceived barriers is limited, particularly in Gauteng, South Africa. This study aimed to address this knowledge gap through a cross-sectional survey using self-administered electronic questionnaires, yielding a 10.5% response rate. CPD compliance was high at 94.3% for both 2022 and 2023. Knowledge of CPD processes was strong (79.9%), but only 22.0% felt confident in reflective practice. Attitudes were largely positive, with 89.9% reporting sufficient resources, though only 9.1% expressed strong motivation. Key barriers included time constraints (17.8%) and concerns about CPD content quality (28.1%). These findings highlight the need to improve CPD engagement by enhancing content relevance, supporting reflective practice, offering flexible learning formats, and boosting motivation through targeted campaigns. Insights from this study can inform policy, improve CPD systems, and guide future research.

Acknowledgments

This research report would not have been possible without the support and encouragement of many individuals and organizations, and I would like to extend my gratitude.

My deepest gratitude is to my supervisor, Dr Gillian D. Mahumane, for her patience, unwavering guidance, insightful feedback, and continuous encouragement throughout the research process. Her expertise and commitment to academic excellence have inspired me personally and have been instrumental in shaping the trajectory of this study. I am truly indebted to her for never giving up on me and for her continuous guidance in turbulent times.

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I would also like to extend my heartfelt gratitude to all the participants of this study. Their responses have made this report possible today, contributing to the betterment of the profession. Notably, I would like to express my gratitude to the facilities provided by the University of the Witwatersrand, these were indispensable in carrying out my research and data collection. I acknowledge their continuous commitment to fostering a conducive research environment.

Finally, to my family, whose encouragement and understanding were a constant source of strength, I express my deepest gratitude. Your unwavering belief in my abilities fuelled my perseverance. In conclusion, this research stands as a collaborative effort, and I am indebted to the individuals and institutions mentioned above. Their collective contributions have left an indelible mark on this work.

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Nomenclature

CE	Continuing Education
CPD	Continuing Professional Development
FIP	International Pharmaceutical Federation
SAPC	South African Pharmacy Council
PWDGs	Pharmaceutical Workforce Development Goals
NCD	Non-Communicable Diseases
TB	Tuberculosis
HIV	Human Immunodeficiency Virus
AIDS	Acquired Immunodeficiency Syndrome
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

CHAPTER 1: Introduction and background

1.1 Introduction

Background

Continuing Professional Development (CPD) is defined as a self-directed, ongoing, systematic, and outcomes-focused process of learning that maintains and enhances a health professional's competence throughout their career (FIP, 2014). It emphasizes reflective practice and integration into daily professional responsibilities, ensuring that pharmacists remain responsive to evolving healthcare needs and professional standards (FIP, 2022).

Globally, CPD has gained increasing recognition as a strategic tool for improving healthcare delivery (WHO and UNICEF, 2018). The World Health Organization (WHO) in partnership with United Nations Children's Fund (UNICEF) identified CPD as a key strategy for enhancing the quality of primary healthcare delivery and improving overall standards of health care (WHO and UNICEF, 2018). In response the International Pharmaceutical Federation (FIP) has launched several initiatives to improve pharmacy education and professional development worldwide (FIP, 2024).

A notable initiative is the FIP Global Advanced Development Framework (GADF), introduced in 2020 to guide pharmacists in career progression and professional growth through structured CPD (FIP, 2020). It encourages pharmacists to build professional portfolios to track their skills and identify areas for improvement. This was supported by the FIP Development Goals (FIP, 2024), which offers a clear and structured way to promote global collaboration in improving pharmacy education.

Building on these global frameworks, there has been a growing call for national-level implementation of CPD-related strategies (FIP, 2017). Government leaders, along with stakeholders in pharmacy education and practice, have been urged to prioritize and support the implementation of the Pharmaceutical Workforce Development Goals (PWDGs) and the Nanjing Statements (FIP, 2017). The PWDGs offer a structured plan for improving pharmacy workforce capacity, helping health systems meet the changing needs of society through clear goals and national accountability (FIP, 2017). Similarly, the Nanjing Statements set out key principles for strengthening pharmacy education and professional standards, guiding schools and policymakers to align with international best practice (FIP, 2017). At the core of both

frameworks is the recognition that sustainable workforce development depends on lifelong learning and continuous skills enhancement (FIP, 2017). This positions CPD not only as a professional obligation but as a strategic priority in ensuring pharmacists remain competent, responsive, and equipped to meet evolving healthcare demands (FIP, 2017). The FIP underscores the importance of CPD, defining it as "the responsibility of individual pharmacists for systematic maintenance, development and broadening of knowledge, skills and attitudes to ensure continuing competence as a professional, throughout their careers (FIP, 2022). Today, CPD continues to play a key role in advancing pharmacy practice, encouraging lifelong learning, and helping pharmacists stay competent in a changing healthcare environment (Murry et al., 2024).

CPD in Global Context

Globally, CPD frameworks endorsed by the WHO and FIP emphasize the importance of lifelong, competency-based learning that is reflective, self-directed, and integrated within national regulatory systems (FIP, 2022). These frameworks advocate for CPD models that not only enhance professional competence but also contribute to broader health system performance and workforce resilience (FIP, 2022).

Several high-income countries have developed robust and mature CPD systems that exemplify these principles and offer valuable benchmarks for countries still evolving their frameworks. In the United Kingdom, the General Pharmaceutical Council (GPhC) requires pharmacists to engage in regular CPD through a revalidation process, which includes maintaining a portfolio linked to defined professional standards (GPhC, 2024). In Canada, pharmacists complete self-assessments and structured learning plans that are reviewed by provincial regulatory bodies to ensure alignment with practice needs and competency frameworks (PEBC, 2020). Similarly, in Australia, the Pharmacy Board mandates CPD planning, documentation and reflection as part of annual registration, with a strong emphasis on practice relevance and outcomes (Pharmacy Board of Australia, 2021b).

These national models illustrate how CPD can be effectively integrated into regulatory systems to enhance professional accountability and improve health outcomes (PEBC, 2020; Pharmacy Board of Australia, 2021b; GPhC, 2024). They also serve as important comparative frameworks for South Africa, which is in the process of strengthening its own CPD systems under the leadership of the South African Pharmacy Council (SAPC).

CPD in South Africa

In line with these international efforts and drawing from these global models, South Africa has also taken steps to regulate and strengthen pharmacy practice through legislative frameworks aimed at ensuring professional competence and accountability (SAPC, 2019b). The evolution of pharmacists' responsibilities and global expectations demanded the establishment of enforceable regulations to support continuous professional growth through the South African Pharmacy Act, to ensure continued professional growth and competence from pharmacists (South African Ministry of Health, 2019). The pharmacy profession in South Africa is regulated by the South African Pharmacy Council (SAPC), initiated through the Pharmacy Act 53 of 1974 (SAPC, 2024). The SAPC ensures the availability of quality pharmaceutical services for all South Africans and is officially required to protect, promote, and maintain the health, safety, and wellbeing of patients and the public (SAPC, 2024). Registration with the SAPC is compulsory for an individual to practice as a pharmacy professional in South Africa (South African Department of Health, 2020b).

As of 2019, the FIP CPD procedure had not been fully enforced as yet in South Africa (SAPC, 2019a). It is thus important to note in emphasis that South African pharmacists are transitioning from continuing education to formally submitted CPD activities as mandated by Board Notice 201 of 2019 (SAPC, 2019b, 2019d; South African Ministry of Health, 2019). In 2019 the SAPC mandated pharmacists to formally record and submit CPD activities (South African Ministry of Health, 2019). This requirement was published for implementation on the 17th of May 2019 in terms of section 33(1) of the Pharmacy Act, 1974 (SAPC, 2019b). The Good Pharmacy Practice (GPP) Guidelines (SAPC, 2018b) further reinforce this mandate by positioning CPD as a professional obligation embedded within the ethical and operational standards of pharmaceutical care and patient safety. Compliance with CPD is therefore not merely a regulatory expectation, but a core component of maintaining professional integrity and delivering quality healthcare services.

South Africa pharmacists are required to participate in a minimum of six annual CPD activities (SAPC, 2019b). To aid pharmacists in this transition, the SAPC developed a guidance document as a reference source for pharmacy personnel in completing their CPD entries (SAPC, 2020). The CPD submissions are assessed by SAPC which then determines the

pharmacist's compliance with the regulation relating to CPD (South African Ministry of Health, 2019). A CPD activity is structured as a four-step process that involves reflection, planning, implementation, and evaluation of the educational or learning activity undertaken by the pharmacist to maintain competence (SAPC, 2019c). The importance of CPD for pharmacists is further emphasized within broader national health policies. The National Health Insurance (NHI) White Paper (Department of Health SA, 2017), identifies a competent healthcare workforce as critical for achieving Universal Health Coverage (UHC), explicitly recognizing the role of pharmacists in ensuring accessible and quality pharmaceutical care. Similarly, the Human Resources for Health Strategy 2030 highlights CPD as a key component of ongoing capacity-building efforts aimed at strengthening the health system and improving service delivery (Department of Health SA, 2020). These policies underscore that pharmacist development through CPD is not only a professional obligation but a national priority aligned with broader healthcare reform objectives.

The implementation of CPD in South Africa has been recognized as essential for enhancing pharmacists' knowledge, competence, and ability to provide high-quality pharmaceutical care (SAPC, 2019d). According to the South African Pharmacy Council (SAPC), CPD interventions play a crucial role in ensuring pharmacists remain knowledgeable and skilled in an evolving healthcare landscape, ultimately leading to improved patient outcomes (SAPC, 2019c). These activities help maintain the standard of care while reinforcing the link between continuous professional learning and positive health outcomes (SAPC, 2021).

Despite its recognized value, CPD implementation is not without challenges. Pharmacists often face barriers such as time constraints, limited access to learning opportunities, insufficient resources, and activities that lack practical relevance, all of which may hinder active participation and compromise sustained professional competence (Gumede, Helberg and Bezuidenhout, 2021).

1.2 Problem Statement

Despite the SAPC's 2019 mandate requiring the formal submission of CPD activities, there remains limited empirical data on how pharmacists, particularly those in Gauteng, engage with this requirement. While CPD is widely recognized as essential for maintaining professional competence and improving healthcare quality, the extent of pharmacists' knowledge, their

attitudes toward CPD, and the barriers they face remain underexplored in the post-pandemic regulatory context. Few studies have examined South African pharmacists' ability to competently complete and submit CPD activities, particularly after SAPC's policy adjustments. This post-pandemic transition period presents an opportunity to assess how policy shifts have affected real-world CPD engagement and pharmacist responsiveness. Identifying gaps in knowledge and confidence, can inform the development of targeted training and support mechanisms. This study therefore seeks to document pharmacists' knowledge, attitudes, and perceived barriers in relation to CPD completion, with the goal of informing strategies that support compliance, enhance professional development, and ultimately improve pharmacy practice in South Africa.

1.3 Research questions

Based on the problem identified and the need for updated evidence post-mandate, the following research questions were formulated to guide the study:

- To what extent do South African pharmacists participate in and comply with the mandatory CPD requirements during 2022 and 2023?
- What are South African pharmacists' attitudes, both positive and negative, toward the mandatory CPD activities required by the SAPC?
- How proficient are South African pharmacists in understanding and fulfilling the mandatory CPD requirements set by the SAPC?
- What barriers prevent South African pharmacists from fully participating in and complying with mandatory CPD activities?

1.4 Study rationale

Studies on knowledge and attitude toward CPD

A study done in Kuwait discovered that despite a good attitude towards continuing education (CE), there was little participation by pharmacists in completing CE activities (Aldosari, Alsairafi and Waheedi, 2020). The main barriers to CE were demotivation, insufficient personal time, and lack of resources (Aldosari, Alsairafi and Waheedi, 2020). Recommendations from this study included, targeting young pharmacists with less experience and lower qualifications to improve pharmacists' involvement in CE activities, while requesting the development of policies that help pharmacists participate in CE (Aldosari, Alsairafi and Waheedi, 2020).

Recent studies continue to affirm that pharmacists' attitudes towards Continuing Professional Development (CPD) are influenced by a combination of personal, professional, and systemic factors (Darwish *et al.*, 2023). A 2018 study conducted in Lebanon revealed that workplace support, availability of time, access to learning resources, and intrinsic motivation play critical roles in pharmacists' engagement with CPD (Saade *et al.*, 2018) Similarly, a 2023 qualitative study from the United Arab Emirates found that pharmacists often view CPD as a procedural obligation rather than an opportunity for meaningful learning, largely due to institutional barriers, lack of encouragement, and limited flexibility within the workplace(Al-Kubaisi, Elnour and Sadeq, 2023). These findings echo earlier observations and highlight the persistent need for a cultural shift in how CPD is perceived, transforming it from a compliance-driven task into an integrated component of lifelong professional development.

In North Ireland, pharmacists' attitude and experiences with respect to introduction of mandatory CPD activities showed a positive attitude towards CPD, however, there were inconsistencies in the level of participation (Haughey *et al.*, 2015). This study concluded that there is a need for a shift in the overall culture and perception of CPD activities within the North Ireland pharmacy profession to promote a more meaningful and effective approach to professional development (Haughey *et al.*, 2015).

Similarly, a study conducted in Lebanon revealed that pharmacists generally held positive attitudes and motivation toward CPD activities. However, participation levels varied across different sectors of practice (Saade *et al.*, 2018). The study's bivariate analysis showed that motivation was significantly and positively correlated with attitude, but negatively associated with barriers to participation, years of experience, and age (Saade *et al.*, 2018). Differences in CPD participation were also observed across professional roles, salary levels, and residential areas (Saade *et al.*, 2018). These variations may reflect the differing demands of each sector. For instance, 42.9% of community pharmacists felt that CPD activities did not meet their professional needs. This perception was partly influenced by the frustration they experienced with the pace and intensity of community pharmacy practice, which in turn hindered their full engagement with CPD (Saade *et al.*, 2018).

In a recent study conducted in Jordan, community pharmacists expressed a strong appreciation for the importance of Continuing Professional Development (CPD) activities. However, several barriers to participation were identified, including heavy workloads, limited time, lack of financial resources, and insufficient support from employers (Hijazen *et al.*, 2023). The study emphasized the critical role employers play in facilitating or hindering CPD engagement. Pharmacists also reported that a lack of motivation, limited access to relevant CPD opportunities, and challenges in understanding the CPD process further contributed to low participation rates (Hijazen *et al.*, 2023).

In relation to South Africa, in Mpumalanga province, a study was conducted with the aim of assessing the extent to which pharmacists voluntarily participated in recording their CPD activities and identify associated challenges (Gumede, Helberg and Bezuidenhout, 2021). This study established that most pharmacists (87%) agreed on the necessity of CPD activities and 64% claimed to participate in CPD activities, yet only 24.8% voluntarily documented these activities (Gumede, Helberg and Bezuidenhout, 2021). This was before South Africa had mandated CPD and some of the reasons for non-documentation of CPD activities were, lack of information, non-mandatory, lack of interest and time constraints (Gumede, Helberg and Bezuidenhout, 2021).

In contrast to the countries above, in Japan majority of pharmacists do believe that CPD is necessary, and majority of pharmacists engage in CPD in several ways despite it not being mandatory (Mamiya *et al.*, 2023). The Japanese pharmacists recognize that engaging in CPD is crucial for staying current with new technologies, therapies, and evolving healthcare practices. This shows that Japanese pharmacists are committed to self-improvement and view CPD as an integral part of their professional life, reflecting a proactive approach to lifelong learning in the pharmacy field (Mamiya *et al.*, 2023). Similarly in Jordan, a study found that 98% of pharmacists believe CPD is essential for improving professional practice and enhancing the profession's status among healthcare providers and the public (Darwish *et al.*, 2023). While 82.4% of participants think CPD should be mandatory, many still engage in CPD activities regardless of its non-mandatory status. The study also revealed that motivation to participate in CPD is generally high among pharmacists, even when it is not required (Darwish *et al.*, 2023).

Findings from a study on the community pharmacists in Gondar, Northwest Ethiopia, discovered a lack of awareness of the concept of CPD (Gelayee, Mekonnen and Birarra, 2018). The main barriers being lack of opportunities related to CPD, lack of relevant learning opportunities, inaccessibility of group learning activities, lack of time, and insufficient resources (Gelayee, Mekonnen and Birarra, 2018). However, despite this circumstance, these pharmacists expressed an interest in being more involved in CPD activities (Gelayee, Mekonnen and Birarra, 2018). It is important to note that Ethiopia has not implemented or used the recommendations of the 2002 FIP Statement on CPD.

These studies highlight the importance of themes surrounding perception, attitude, knowledge, and perceived barriers to CE and CPD. They discovered the need for policy interventions, need for time and resources for CPD activities in pharmacy practice in their countries. Pharmacist have shown to have a positive attitude towards the principle of CPD activities, however they are barriers that stand in the way of CPD compliance in each country, resulting in varied participation in CPD activities by pharmacists.

Studies on strategies to improve CPD compliance

Malaysian community pharmacists were found to have a positive perception and appreciation of CPD and the implementation of mandatory CPD policy resulted in a significant increase in CPD compliance by respondents (Elsayed *et al.*, 2015). This study highlighted the need for exploring different strategies to improve CPD compliance.

In a global research review on the factors influencing pharmacists' participation in professional development activities (Alhaqan, Smith and Bates, 2021). The conclusion exhibited that pharmacists had a positive view towards CE and CPD activities, and that there is a connection between needs-based learning, systems of support, and policies (Alhaqan, Smith and Bates, 2021). Being aware of these three elements was found to help inform leaders and policy makers to make better resolutions for pharmacists' CPD compliance and career development.

A systemic review of models used and preference of CPD and CE activities was done in 2019 (Micallef and Kayyali, 2019). This review gave an insight of pharmacists' preferences on how CPDs should be conducted and based on these insights, different strategies to improve CPD compliance were formed (Micallef and Kayyali, 2019), these include:

- Increasing face-to-face learning because it was found to be preferred by pharmacists, although technology-based learning options are increasing.
- Personalising CPD activities as different demographics were found to have different preferences for learning formats. This indicated that a one-size-fits-all approach may not be effective.
- Mandating CPD activities in government policy. This is because it was determined that CPD activities have a positive outcome on practice compared to CE, including better interactions with healthcare colleagues, improved patient care, and enhanced professional knowledge and skills.
- Practicing a learning need-based learning that is initiated by reflection on lacking knowledge and completed by documentation of the final evaluation of the CPD activity. This is because clear outcomes and relevance to practice are key factors in determining the effectiveness of CPD activities.

In Indonesia, time, permission barriers, and lack of recognition for certain CPD activities, are major challenges for pharmacists in CPD compliance (Marjadi *et al.*, 2022). Suggestions for improvement of CPD compliance included (Marjadi *et al.*, 2022):

- Focusing on evidencing learning activities,
- Establishing regional CPD centres
- Utilizing online platforms for learning
- Implementation of policies and regulations to support and guide the practice of pharmacists.
- Encouraging collaborative research and co-production of knowledge with teachers and healthcare professionals.

In the Middle Eastern countries, a study established that pharmacists who were aware of CPD had a positive attitude to CPD, however, job constraints, lack of time and lack of relevant learning opportunities were identified as major barriers to CPD participation (Darwish *et al.*, 2023). Recommendations were made by this study for policymakers to address these barriers and develop strategies to promote CPD participation (Darwish *et al.*, 2023). These recommendations include implementing mandatory CPD and targeted education on CPD to young pharmacists with less experience and qualifications.

Concluding rationale on studying the knowledge and attitude towards CPD within South Africa

This study addresses a critical knowledge gap regarding pharmacists' compliance with CPD requirements in Gauteng, South Africa. Although CPD was formally mandated by the SAPC in 2019, limited research has explored pharmacists' knowledge, attitudes, and barriers in the post-mandate context. This gap is particularly significant considering SAPC's regulatory adjustments during 2022 and 2023, which aimed to streamline CPD documentation. These years also coincide with South Africa's broader recovery from the COVID-19 pandemic, making it a pivotal period to assess how pharmacists are navigating both systemic reforms and practical challenges. The years 2022 and 2023 were chosen as they align with SAPC's post-pandemic policy adjustments to CPD documentation, offering a relevant window to assess pharmacists' adaptation to the evolving regulatory framework.

While international studies have examined CPD engagement and strategies to enhance compliance, similar research within the South African context remains scarce. This study seeks to provide an updated understanding of pharmacist experiences, identify challenges influencing CPD participation, and generate insights to guide capacity-building efforts, policy development, and the design of more accessible, relevant CPD systems.

1.5 Study aim

This study aimed to document the knowledge and attitudes, towards mandatory CPD activities by pharmacists practicing in the Gauteng province of South Africa.

1.6 Study objectives

The objectives of this study are to:

- Evaluate the extent of participation in and compliance with mandatory CPD requirements among pharmacists practicing in the Gauteng province during 2022 and 2023.
- Assess the knowledge and proficiency of South African pharmacists in understanding and fulfilling the mandatory CPD requirements set by the South African Pharmacy Council (SAPC).
- Explore the attitudes, both positive and negative, of South African pharmacists toward mandatory CPD activities.
- Identify and analyse the barriers preventing pharmacists in the Gauteng province from fully participating in and complying with mandatory CPD activities.

1.7 Conceptual Framework

This study is guided by the Knowledge–Attitude–Practice (KAP) model, which posits that knowledge informs attitudes, which in turn influence behaviour (Salas-Zapata, Ríos-Osorio and Cardona-Arias, 2018). This framework is appropriate for exploring CPD engagement, as it allows for the assessment of educational awareness (knowledge), perceptions and beliefs (attitudes), and behavioural responses (practice). The KAP model was selected as the guiding framework for this study because it enables a structured examination of how knowledge and attitudes are interconnected in shaping professional behaviours. While alternative models such as the Theory of Planned Behaviour (TPB) focus more on predicting future intentions and perceived behavioural control, the KAP model offers a simpler and more descriptive approach suitable for cross-sectional assessments (Bosnjak, Ajzen and Schmidt, 2020). Given that the aim of this study was to document pharmacists' knowledge and attitudes towards mandatory CPD activities in the Gauteng province, the KAP model provided an appropriate framework to capture existing knowledge levels, attitudes, and general engagement trends without requiring predictive modelling of future behaviour.

The study is also informed by the FIP's CPD model, which emphasizes lifelong learning, reflective practice, and regulatory integration (FIP, 2022). The FIP CPD model follows a cyclical, four-step process that includes reflection, planning, implementation and evaluation (FIP, 2014). This process is iterative and continuous, reinforcing the idea that CPD is not a one-time event, but an ongoing responsibility integrated into everyday practice (FIP, 2017). In this study, the FIP CPD Cycle served as a conceptual guide for understanding how pharmacists engage with CPD activities. The survey questions were designed to align with key stages of the CPD Cycle, such as assessing learning needs, planning and engaging in CPD activities, and reflecting on professional growth. This allowed the study to map pharmacists' knowledge and attitudes not only to CPD participation, but also to their awareness and application of the CPD process itself.

1.8 Definition of Key Terms

For the purposes of this study:

- Actively practicing pharmacists are those registered with SAPC and currently working in any pharmacy-related setting.
- Compliance refers to adherence to SAPC's CPD submission requirements for 2022 and 2023.
- Barriers include any personal, institutional, or systemic obstacles to CPD participation.

1.9. Overview of chapters

Chapter 1: Introduction and Background

This chapter introduces the study by providing a comprehensive overview of the significance of Continuing Professional Development (CPD) in the pharmacy profession, particularly within the South African context. It outlines and presents the research questions and objectives, highlighting the rationale and importance of the study in addressing gaps in existing knowledge regarding pharmacists' participation, attitudes, and barriers to CPD compliance.

Chapter 2: The importance of CPDs in South African pharmacy practice: addressing emerging challenges and advancements

This chapter reviews relevant literature on CPD, focusing on international and local studies that explore pharmacists' knowledge, attitudes, and compliance with CPD activities. It examines the several factors that influence CPD participation, including motivational and structural barriers, and compares CPD practices across different countries. The chapter also identifies gaps in the existing literature, which this study aims to address, particularly in the South African context.

Chapter 3: Evaluating Pharmacists' Knowledge, Attitudes, and Barriers Toward Continuing Professional Development: a cross-sectional survey in Gauteng province South Africa.

This chapter outlines the research design, including the cross-sectional survey approach, sampling methods, data collection instruments, data analysis techniques, and ethical considerations. It presents the findings based on responses from pharmacists in Gauteng, highlighting participation levels, knowledge, attitudes, and barriers to CPD compliance. Results are detailed through statistical analyses, tables, and graphs, and are discussed in relation to existing literature.

Chapter 4: Conclusion and Recommendations

This chapter summarizes the key findings of the study and their implications for pharmacy practice and CPD policy. It offers recommendations for improving CPD compliance among South African pharmacists, including potential strategies to overcome identified barriers. The chapter also suggests areas for future research to further explore and address the challenges related to CPD in the pharmacy profession.

CHAPTER 2: Literature review

The importance of CPDs in South African pharmacy practice: addressing emerging challenges and advancements

2.1 Introduction

This chapter reviews literature on the structured CPD framework within the pharmacy profession, its application in South Africa's healthcare system, and its alignment with international models. It follows the CPD cycle, reflection, planning, implementation, and evaluation, while addressing systemic barriers and emerging opportunities.

2.2 Literature Search Strategy

A structured literature search was conducted to identify relevant sources on Continuing Professional Development (CPD) in pharmacy. The search was performed using the University of the Witwatersrand (Wits) Library portal, accessing key academic databases including PubMed, Scopus, and Google Scholar, as well as targeted searches of regulatory and professional organization websites such as the South African Pharmacy Council (SAPC), the International Pharmaceutical Federation (FIP), and the World Health Organization (WHO).

Search terms included combinations of keywords such as "Continuing Professional Development", "CPD in pharmacy", "pharmacist learning barriers", and "South Africa". Filters were applied to limit results to peer-reviewed articles published between 2015 and 2024, written in English, and focused specifically on health professionals, with an emphasis on pharmacists. Studies not directly related to pharmacy or CPD, not available in English, or published before the 2019 SAPC CPD mandate were excluded unless they provided essential background or conceptual clarity. An initial yield of 419 articles was retrieved, of which 239 met inclusion criteria after title and abstract screening

To enhance the breadth of the search, reference chaining was used by reviewing bibliographies of key articles to identify additional sources. In some cases, manual screening of discipline-specific journals related to pharmacy education, regulation, and workforce development was conducted to capture relevant studies not retrieved through database queries.

This strategy allowed for the inclusion of both scholarly literature and grey literature (e.g., policy documents and frameworks), ensuring a comprehensive overview of CPD implementation, challenges, and pharmacist perceptions, with specific attention to the South African context and global benchmarks.

2.3. The Role of a Structured CPD Framework in South Africa's Evolving Healthcare Context

The pharmacy profession has evolved from a traditional focus on medication compounding and dispensing to a more comprehensive, integrated, patient-centred approach within the healthcare system (FIP, 2022; Almontashiri, 2024) . This global shift, mirrored in South Africa, recognizes pharmacists as integral healthcare providers engaged in patient care, medication safety, and clinical management (Meyer *et al.*, 2017; SAPC, 2019b). The expanding responsibilities of pharmacists in this dynamic healthcare landscape underscore the necessity of continuous professional development (CPD) to meet modern healthcare challenges (Al-Haqan *et al.*, 2020).

Rapid advancements in pharmacy require professionals to maintain and update their competencies regularly to remain effective (Dickerson *et al.*, 2017). With the constant emergence of new medications, evolving treatment protocols, and regulatory updates, pharmacists face increasing pressure to apply new knowledge in practice (Darwish *et al.*, 2023). These pressures make CPD not only beneficial but essential for maintaining safe, evidence-based, and effective patient care.

Studies have shown that CPD frameworks tailored to pharmacists' specific practice needs significantly improve both the quality of learning documentation and professional behaviours (King *et al.*, 2021). This highlights the importance of structured CPD systems that support reflective learning and provide pharmacists with the tools to engage meaningfully in professional development.(King *et al.*, 2021).

In South Africa, the South African Pharmacy Council (SAPC) mandates a structured CPD system that requires pharmacists to complete at least six CPD activities annually, submitted through an online portal (SAPC, 2019a, 2019d). This system promotes targeted, practice-relevant learning that meets defined competency standards (SAPC, 2018a). The framework follows a four-step cycle, reflection, planning, implementation, and evaluation, which, although similar to the FIP CPD model, was independently developed and tailored to the South African context (SAPC, 2019d). While SAPC developed its framework independently, it was informed by FIP and adapted contextually to South Africa. To illustrate the alignment between

South Africa's CPD model and international standards, table 2.1 compares the SAPC CPD cycle with the FIP CPD framework.

Table 2.1: Comparison of CPD Cycle Stages: SAPC vs FIP

Stage	SAPC CPD Cycle (South Africa)	FIP CPD Cycle (Global)
Reflection	Identify personal learning needs	Reflect on practice to identify learning gaps
Planning	Plan CPD activities aligned to identified needs	Develop a learning plan based on reflections
Implementation	Engage in CPD activities (courses, practice changes)	Participate in activities to address needs
Evaluation	Evaluate outcomes and impact on professional practice	Assess effectiveness of learning on practice
Documentation (ongoing)	Submit records to SAPC for compliance auditing	Maintain records for self and regulatory review

Pharmacists are expected to submit evidence of learning outcomes, reinforcing accountability and alignment with national competency standards (SAPC, 2019a, 2019b). According to the Good Pharmacy Practice (GPP) Guidelines (SAPC, 2018b), CPD is integral to maintaining the professional competence, ethical standards, and quality of pharmaceutical care expected of pharmacists in South Africa. The GPP Guidelines position CPD not merely as a regulatory requirement, but as a fundamental professional duty aimed at ensuring patient safety, promoting effective healthcare delivery, and advancing the pharmacy profession within the broader health system

While this structured framework holds significant potential, its effectiveness is influenced by practical challenges such as limited time, insufficient institutional support, resource constraints, and the perceived irrelevance of some CPD activities (Gumede, Helberg and Bezuidenhout, 2021; Aldakhil *et al.*, 2024). Addressing these barriers is critical to fully realizing the transformative potential of CPD in strengthening pharmacy practice within South Africa's evolving healthcare system.

2.4 The CPD Cycle: Reflection to Evaluation

2.4.1 Reflection: Identifying gaps in practice

In the reflection stage, pharmacists critically evaluate their current competencies by examining their professional experiences, patient outcomes, and learning needs (SAPC, 2019d). Reflective practice forms the foundation of effective CPD, enabling pharmacists to align their learning with real-world clinical challenges and personal development goals (FIP, 2022). In South Africa's rapidly evolving healthcare landscape, characterized by rising non-communicable diseases (NCDs), persistent burdens of HIV/AIDS and tuberculosis (TB), and emerging diseases, reflection is especially crucial for ensuring pharmacists remain equipped to respond to changing health priorities (Meyer *et al.*, 2017; Modisakeng *et al.*, 2020).

Structured reflection empowers pharmacists to identify knowledge and skill gaps, thereby guiding their CPD activities toward competencies that are most relevant to local and national healthcare needs (Mantzourani *et al.*, 2019). The evolution of pharmacy in South Africa, including the integration of clinical pharmacy, patient-centred care, and medication management, has expanded pharmacists' responsibilities, making continuous self-assessment and reflection indispensable (Bronkhorst, Gous and Schellack, 2020; Crafford *et al.*, 2023).

South Africa's dual healthcare system, encompassing both public and private sectors, presents unique challenges. Public facilities are often under-resourced, increasing the demand on pharmacists to perform at the highest levels under pressure (Willie, Iyaloo and Masekela, 2024). In such environments, reflective CPD practices become a valuable tool for identifying context-specific competencies needed to improve health outcomes (Briceland, Caimano Tackes and Veselov, 2022; Carletti, 2024). Pharmacists are particularly crucial in ensuring access to essential medicines and delivering healthcare education, especially in underserved and rural settings where they often serve as frontline providers (Morris-Paxton, Reid and Ewing, 2020; Mitha, 2024).

Given their accessibility, pharmacists are frequently the first point of contact for healthcare advice, making it essential for them to reflect regularly on their practice to ensure they can deliver accurate, relevant, and up-to-date care (Nyamuzihwa *et al.*, 2023). However, pharmacists in under-resourced settings often face barriers to effective reflection, such as time constraints, limited access to self-assessment tools, and lack of institutional support (Samuel *et al.*, 2021). These challenges can hinder meaningful engagement in CPD, ultimately limiting

their ability to recognize and address critical skill gaps. Supporting pharmacists with the time, resources, and tools necessary for reflection is vital to strengthening the impact of CPD and enhancing patient care across South Africa's diverse healthcare landscape.

2.4.2 Planning: Crafting a personal learning strategy

Once gaps in knowledge and skills are identified through reflection, the next step in the CPD cycle is to develop a structured personal learning plan to guide their CPD activities (SAPC, 2020). This planning phase allows pharmacists to prioritize learning objectives based on relevance and urgency, tailoring activities to their practice environments whether it is community pharmacy, hospital pharmacy, industrial pharmacy, or regulatory roles (SAPC, 2018a). An example of this would be planned patient counselling workshops or immunisation training for community pharmacists, regulatory updates and compliance training for industrial pharmacists or even legislative and policy update briefings for regulatory affairs pharmacists (SAPC, 2020).

In South Africa, where pharmacists often work in under-resourced settings or serve as primary healthcare providers, a strategic learning plan helps ensure that CPD efforts are directly relevant to local healthcare challenges (Morris-Paxton, Reid and Ewing, 2020). For example, pharmacists in rural areas may focus on gaining expertise in managing prevalent conditions like TB or NCDs, while those in clinical pharmacy settings may prioritize advancements in medication therapy management. By setting clear goals, identifying suitable resources, and scheduling regular assessments, pharmacists can engage in CPD that is not only comprehensive but also directly applicable to their roles (Wheeler and Chisholm-Burns, 2018).

Planning a personal learning strategy is essential for pharmacists managing the growing burden of non-communicable diseases (NCDs) in South Africa, such as hypertension, diabetes, and cardiovascular conditions (Stats SA, 2023). Given their role in optimizing pharmacotherapy, educating patients, and offering lifestyle guidance (Sonday, Bheekie and Huyssteen, 2022), pharmacists need a strategic learning plan to stay updated on new treatments and enhance their skills in these areas. This planning phase allows them to target CPD activities, such as specialized modules in medication therapy management and advanced patient counselling, which are crucial for effectively integrating new medications and approaches into patient care plans (Gray, Riddin and Jugathpal, 2016; Mabotja, Meyer and Summers, 2018). By developing

a focused strategy, pharmacists can prioritize learning that directly supports the complexities of NCD management, ensuring they continue to improve patient outcomes in a rapidly evolving healthcare landscape (Modisakeng *et al.*, 2020).

To manage time effectively, pharmacists in busy or high-demand environments could plan to integrate CPD into their daily routines by leveraging micro-learning techniques, such as dedicating brief moments between patient interactions to review clinical guidelines or using mobile learning apps during breaks (Roskowski *et al.*, 2024). This approach allows for continuous learning without overwhelming their schedule, making CPD more achievable on a regular basis. Planning a personal learning strategy is particularly important for pharmacists in resource-limited areas who face unique challenges in aligning CPD with their local practice needs (Willie, Iyaloo and Masekela, 2024). In rural and under-resourced urban areas of South Africa, pharmacists often work with limited resources (Morris-Paxton, Reid and Ewing, 2020; Mahomed and Lehmann, 2021). Developing a targeted CPD plan allows them to focus on skills crucial for managing these limitations, such as optimizing the use of generic medications, handling drug shortages, and creating effective contingency plans for supply disruptions (Matlala *et al.*, 2017). Through CPD, pharmacists also acquire innovative problem-solving skills, enabling them to deliver equitable care despite disparities in resources (Wheeler and Chisholm-Burns, 2018). For instance, planning CPD activities that emphasize interprofessional collaboration and cost-effective decision-making equips pharmacists to improve patient access to essential medicines while upholding safety (Morris-Paxton, Reid and Ewing, 2020; Pretorius, Nienaber and Gous, 2020).

Additionally, CPD planning can incorporate creative initiatives like participating in programs supported by the South African Department of Health, such as the Transnet Phelophepa healthcare trains, where pharmacists play a key role in expanding healthcare access to underserved communities (South African Government, 2024). By crafting a CPD strategy that addresses local needs, pharmacists can continuously enhance their capacity to provide effective, resourceful care in even the most challenging settings.

Peer networks and collaborative learning opportunities, such as study groups or mentorship programs, are invaluable for making CPD planning more engaging and effective (Al-Worafi, 2023). These strategies foster a supportive environment where pharmacists can share

knowledge, discuss challenges, and develop practical solutions together (Miller, 2015). In rural or resource-constrained areas, these connections become especially crucial, providing access to diverse perspectives and collective expertise that might otherwise be limited. Such collaborative approaches not only enhance learning but also help pharmacists stay motivated and accountable, ultimately strengthening the quality of care in underserved communities (Al-Worafi, 2023).

The planning phase enables pharmacists to create targeted, personalised learning strategy that are comprehensive of the context in which they operate to address the identified gaps (SAPC, 2020). This strategy is customized to fit their practice area. Developing a strategy that includes online courses, professional networks, and local workshops can make ongoing education more feasible (Janis, 2024). Through planning a tailored approach, pharmacists can maximize the impact of their CPD efforts, ultimately enhancing their ability to provide informed, effective care within South Africa's diverse healthcare landscape.

2.4.3 Implementation: Engaging in learning activities

After planning a personal learning strategy, the next step in CPD is actively engaging in selected learning activities (SAPC, 2020). This implementation phase is where pharmacists put their plans into action, participating in targeted CPD activities that address their identified skill gaps and professional needs. In the Implementation stage, pharmacists actively participate in CPD activities such as workshops, e-Learning, seminars, or short courses (Unni, Le and Whittaker, 2019). These activities translate learning plans into practice, allowing pharmacists to enhance their skills (Al-Omary *et al.*, 2024). For instance, a pharmacist might enrol in an online course on managing polypharmacy in elderly patients, an issue prevalent in South Africa due to its growing burden of non-communicable diseases (Modisakeng *et al.*, 2020; Stats SA, 2023).

Digital learning platforms provide a flexible solution for CPD implementation, particularly for pharmacists in rural or high-demand environments where in-person training may be impractical (Commonwealth Pharmacists Association, 2021). This flexibility supports the implementation phase of CPD by enabling pharmacists to engage in learning activities at their own pace (Salter *et al.*, 2015). However, many rural pharmacists face limited internet connectivity, which restricts their access to these e-learning opportunities (Gillwald, Mothobi and Rademan, 2018).

Additionally, those working in busy public hospitals often struggle to allocate time for CPD due to heavy workloads (Baugh, 2024). These challenges highlight the need for tailored digital solutions, such as offline modules or mobile-accessible resources, that enable pharmacists to effectively implement their CPD plans despite connectivity and time constraints (Baugh, 2024).

The implementation phase of CPD is significantly enhanced by the rise of digital platforms, which offer pharmacists greater flexibility and accessibility in engaging with educational content, especially for those in rural or resource-constrained settings (Ramsden *et al.*, 2022). An example of a successful digital CPD programs in South Africa that has successfully improved pharmacist engagement is the Pharmaceutical Society of South Africa (PSSA)/Alpha Pharm Distance Learning Programme (Pharmaceutical Society of South Africa, 2024). This is a digital platform that offers webinars, interactive case studies, and expert-led discussions on topics relevant to South African pharmacists. By hosting live sessions and recording them for later access, PSSA ensures that pharmacists in different time zones or with busy schedules can still participate. This approach has been particularly effective in keeping pharmacists engaged with real-world, locally relevant issues (Pharmaceutical Society of South Africa, 2024). This flexibility is crucial in South Africa, where attending in-person events can be challenging for pharmacists in remote areas. By leveraging technology, CPD becomes more adaptable to individual needs, supporting lifelong learning and allowing pharmacists to pursue courses relevant to their specific practice areas (Salter *et al.*, 2015).

Additionally, digital platforms support a more personalized approach to CPD, enabling pharmacists to select topics that align with their day-to-day roles and unique challenges, such as hospital, production, or academic pharmacy (Micallef and Kayyali, 2019). Studies indicate that tailored CPD content increases engagement and relevance, particularly when aligned with pharmacists' professional interests and specific practice environments (Al-Kubaisi, Elnour and Sadeq, 2023). This adaptability makes CPD more meaningful and impactful, bridging gaps in accessibility and allowing pharmacists in diverse South African settings to effectively implement learning activities that drive professional growth and improved patient care outcomes.

To support pharmacists who face barriers like poor internet connectivity or high workloads, various strategies and resources can be implemented to ensure they have equal access to CPD and professional growth opportunities (Lawson, 2024). Lawson (2024) notes that partnerships with healthcare organizations could provide mobile internet hotspots or low-cost data vouchers, enabling stable access to digital CPD resources in rural areas (Lawson, 2024). Offline learning options, such as downloadable modules and on-demand recordings, allow pharmacists to engage in CPD without relying on constant internet access (Gagne *et al.*, 2019). Time management workshops tailored for healthcare professionals, along with peer support networks, can provide practical strategies to balance CPD with daily responsibilities. Additionally, offering printed CPD materials, hosting in-person workshops, and creating a shared resource platform encourage learning in areas with connectivity challenges (Aldakhil *et al.*, 2024). These approaches make CPD more accessible and manageable, ensuring all pharmacists can pursue professional growth.

2.4.4 Evaluation: Assessing the impact of learning

After engaging in CPD activities, the evaluation phase is essential for assessing how effectively the learning has impacted pharmacists' knowledge, skills, and overall professional practice (FIP, 2021). This stage involves reflecting on the outcomes of learning activities, measuring improvements in competencies, and determining whether specific goals have been met (SAPC, 2020). Evaluation allows pharmacists to identify which aspects of their CPD were successful and which areas may require further development, enabling a cycle of continuous improvement (SAPC, 2020). Evaluation also aligns with SAPC's regulatory function in monitoring pharmacist competence via structured portfolio reviews audit systems, although these mechanisms remain underdeveloped (SAPC, 2020).

The evaluation phase of CPD is crucial for assessing pharmacists' ability to apply newly acquired knowledge, such as pharmacovigilance skills, directly in practice (FIP, 2021). This stage allows pharmacists to gauge the impact of their CPD activities by measuring their effectiveness in identifying and reporting adverse drug reactions (ADRs), which plays a critical role in improving patient safety (SAHPRA, 2020). Given South Africa's high burden of diseases (Stats SA, 2023), pharmacovigilance becomes essential for safeguarding patients who may be on multiple medications or complex therapies.

Through evaluation, pharmacists can determine whether CPD has adequately prepared them to handle their responsibilities under regulatory mandates, such as the South African Medicines and Related Substances Control Act, which requires ADR reporting (Mehta *et al.*, 2017). Pharmacists, particularly those serving diverse and often under-resourced communities, are in a prime position to monitor drug safety and report ADRs to the National Pharmacovigilance Centre, helping to maintain high standards of care (Hamid, Rahim and Teo, 2022).

In evaluating CPD, pharmacists can reflect on their preparedness to detect ADRs and drug interactions and manage polypharmacy, especially for treatments like antiretrovirals or multi-drug-resistant TB therapies (Ismail and Moultrie, 2020). The evaluation stage also allows pharmacists to consider areas for improvement if they face challenges in ADR reporting due to complex patient cases or the socio-economic factors impacting medication adherence (Gray, Riddin and Jugathpal, 2016). By assessing how well CPD equips them for these responsibilities, pharmacists can continuously refine their approach to pharmacovigilance, ensuring alignment with SAPC and global standards, thereby strengthening patient safety outcomes and maintaining professional accountability (WHO, 2016; SAPC, 2018b).

The evaluation phase is vital for assessing how CPD enables pharmacists to apply knowledge and skills effectively in managing chronic conditions, particularly in resource-limited areas (Beckman *et al.*, 2019). CPD equips pharmacists with the knowledge to implement standardized treatment algorithms for various health conditions, ensuring continuity of care even when pharmaceutical options are limited (Beckman *et al.*, 2019). This is especially relevant in rural South African settings, where pharmacists often step into roles traditionally held by physicians, managing chronic illness with minimal resources and maximizing patient support through medication management and lifestyle counselling (Mahomed and Lehmann, 2021; Pillay, Adam and Krishna, 2022).

However, evaluating the impact of CPD in these settings can be challenging due to a lack of formalized feedback mechanisms, such as peer evaluations or performance reviews, which are essential for gauging how well CPD learning translates into practice (SAPC, 2023). In rural and underserved areas, pharmacists may miss out on structured evaluations that would provide valuable insights into their application of CPD training and its real-world impact on patient outcomes (Radwan and Salameh, 2023). This absence of consistent evaluation tools may limit

opportunities for pharmacists to refine their approach to chronic disease management and ensure that CPD remains aligned with the needs of their specific practice environments. Thus, implementing formal evaluation mechanisms could enhance the feedback loop, supporting pharmacists in consistently improving their care for chronic disease patients and adapting to the demands of their unique contexts (Radwan and Salameh, 2023).

To understand the impact of CPD on pharmacy practice, combining quantitative and qualitative metrics offers a more comprehensive evaluation of learning effectiveness (Kang *et al.*, 2015). Quantitative metrics, such as tracking the number of HIV-positive patients receiving prescribed HIV-related medication refills after a CPD training in chronic disease management of HIV as conducted by Kang (2015), provide objective evidence of improved skills and vigilance in clinical practice. Similarly, metrics such as the rate of medication errors, the accuracy of dosage calculations, or improvements in patient adherence rates can reveal clear, measurable outcomes directly influenced by CPD activities (Frenzel, Eukel and Brynjulson, 2020). This quantitative data highlights changes in performance that can be directly attributed to specific skills or knowledge acquired during CPD.

On the other hand, qualitative feedback from patients and peers offers valuable insight into the interpersonal and practical applications of CPD (O'Loan, 2019). Patient feedback can indicate improvements in communication, counselling effectiveness, and overall satisfaction with care, while peer evaluations can reflect increased competence in clinical decision-making, collaboration, and adherence to best practices as shown by a study done in Kuwait (Al-Haqan *et al.*, 2020). Such feedback provides context and depth, showing not only what has improved but also how CPD influences the quality of care and professional relationships within the pharmacy team.

By combining quantitative outcomes with qualitative experiences, CPD evaluation can capture both the technical and relational impact of learning activities (Al-Omary *et al.*, 2024). For example, an increase in ADR reporting may be quantitatively significant, but patient feedback showing greater confidence in pharmacist consultations underscores the broader value of CPD. This dual approach ultimately provides a holistic view, demonstrating how CPD not only boosts practical knowledge but also enriches patient interactions and team dynamics, creating a well-rounded improvement in pharmacy practice (Urban and Turner, 2016).

In rural or under-resourced settings, the lack of formal CPD evaluation tools can hinder pharmacists' ability to measure and improve the impact of their learning activities. Without access to traditional resources like online tracking systems or regular feedback from CPD facilitators, pharmacists may struggle to gauge their progress effectively (Gillwald, Mothobi and Rademan, 2018). Practical solutions, such as community-based workshops and mobile apps, could help bridge this gap by providing accessible and adaptable evaluation options.

Community-based workshops could serve as periodic checkpoints where pharmacists can gather to discuss their learning experiences, share practical applications, and receive constructive feedback from peers (Alnahar *et al.*, 2024). These workshops could be organized quarterly by local health departments or pharmacy associations, allowing participants to reflect on their CPD activities in a collaborative, supportive setting (Connolly, Rutter and Cardiff, 2016). Through role-playing scenarios, case study discussions, and group feedback sessions, pharmacists can collectively assess how their CPD has influenced their practice, addressing challenges unique to their shared environment.

Additionally, mobile apps designed for peer assessment and CPD tracking can offer a flexible, low-cost evaluation tool (Dowdall, Leeson and Knights, 2018). Apps could be customized to include prompts for self-assessment, goal tracking, and peer feedback, making it possible for pharmacists to log their progress and receive input from colleagues, even when formal evaluations are unavailable (*SwipeRx*, 2025). By enabling rural pharmacists to track their learning milestones and access peer feedback on mobile devices, these apps make CPD evaluation more convenient and foster accountability among peers.

2.5 Barriers and Opportunities in CPD Participation

2.5.1 Accessibility and Infrastructure Barriers

Access to CPD resources remains a significant challenge, particularly for pharmacists in rural and under-resourced areas. Limited internet connectivity, poor infrastructure, and a lack of professional development facilities restrict participation in CPD programs (Gillwald, Mothobi and Rademan, 2018; Morris-Paxton, Reid and Ewing, 2020; Pillay, Adam and Krishna, 2022). Studies confirm that rural pharmacists often face compounded challenges, including unreliable digital infrastructure, scarce libraries, limited access to current medical databases, and fewer

networking opportunities (Gray, Riddin and Jugathpal, 2016; Gumede, Helberg and Bezuidenhout, 2021; Mahomed and Lehmann, 2021). Although SAPC mandates CPD participation, geographic disparities continue to limit equitable access.

2.5.2 Time constraints

Pharmacists in high-demand settings, especially public hospitals, often struggle to allocate time for CPD activities due to demanding workloads (Matlala *et al.*, 2017; Gumede, Helberg and Bezuidenhout, 2021). Similarly, healthcare professionals in rural areas face logistical barriers such as long travel distances to attend CPD sessions and staff shortages that make it difficult to leave their posts (Feldacker *et al.*, 2017; Nyelisani, Makhado and Luhalima, 2023). These conditions exacerbate time-related barriers, limiting regular engagement with CPD.

2.5.3 Financial barriers

Financial barriers further restrict access to CPD opportunities, especially within the public healthcare sector. Costs associated with registration, travel, and online course access can be prohibitive for pharmacists, particularly those in rural or underfunded areas (Pretorius, Nienaber and Gous, 2020; Gumede, Helberg and Bezuidenhout, 2021). The prioritization of immediate healthcare needs over professional development funding in national budgets exacerbates these disparities (Modisakeng *et al.*, 2020; National Treasury, Republic of South Africa, 2021).

2.5.4 Lack of formalized evaluation

The current CPD evaluation systems remain underdeveloped, with limited use of structured feedback tools such as peer reviews, supervisor assessments, and clinical audits (Schindel *et al.*, 2019; Stewart, 2019). Without formalized evaluation processes, pharmacists struggle to assess the real-world impact of CPD activities and identify areas for improvement. Strengthening competency frameworks and performance feedback systems could enhance compliance and quality outcomes (Donyai *et al.*, 2015; Al-Haqan *et al.*, 2020).

2.5.5 Lack of personalised CPD activities

Current CPD programs often lack sector-specific tailoring to meet the needs of pharmacists in community, hospital, and production settings (Matlala *et al.*, 2017; Magwenya, Ross and Ngatiane, 2023). Rural pharmacists, for example, require CPD addressing resource-constrained

environments, chronic disease management, and drug shortages (Steeb and Ramaswamy, 2019).Moreover, while technology-based CPD options are expanding, many pharmacists still prefer face-to-face learning formats, reflecting broader global trends (Berndt *et al.*, 2017; Driesen *et al.*, 2017; Micallef and Kayyali, 2019).

South Africa's unique healthcare challenges, including a dual burden of communicable and non-communicable diseases, further highlight the need for localized CPD content (Ismail and Moultrie, 2020; FIP, 2021; Stats SA, 2023). Additionally, pharmacists require training on integrating traditional medicine into pharmaceutical care, given the high reliance on complementary and alternative therapies among the population (WHO, 2019; Booth, 2023).

2.5.6 Managing the Rapid Growth of Medical Knowledge.

Pharmacists must navigate an ever-expanding volume of medical information, including evolving clinical guidelines, new therapies, and emerging health threats (Summit, Greiner and Knebel, 2003; Stats SA, 2023). This is particularly challenging in South Africa, where pharmacists must balance local health priorities such as HIV, TB, and NCDs with global advances (Naidoo, Ncube and Archary, 2019). Effective CPD systems must support pharmacists in staying current amidst the growing complexity of pharmaceutical knowledge.

2.6 Global Comparisons and Critique of CPD Models

2.6.1 SAPC (South African Pharmacy Council)

South Africa’s CPD model, regulated by the South African Pharmacy Council (SAPC), adopts a four-step cycle, reflection, planning, implementation, and evaluation, and mandates annual CPD submissions through an online portal (SAPC, 2020). While this structured approach aligns with global trends in professional development, the framework remains in its early stages of maturity (SAPC, 2020; FIP, 2022). Key limitations include a lack of outcome-based assessment mechanisms, limited guidance on reflective practice, and minimal support for sector-specific learning needs (SAPC, 2018a, 2020).

Unlike systems in countries such as the UK and Canada, the SAPC framework does not yet incorporate peer review, formal learning portfolios, or tailored CPD pathways (PEBC, 2020; SAPC, 2020; GPhC, 2024). Compliance is currently measured by the quantity of submissions rather than the depth or relevance of the learning undertaken (SAPC, 2019a).

2.6.2 GPhC (UK)

The General Pharmaceutical Council (GPhC), which regulates pharmacists in Great Britain, operates a robust CPD system that emphasizes reflective learning, outcome measurement, and professional accountability (GPhC, 2021). The GPhC framework mandates revalidation, which includes the submission of four CPD records, one peer discussion, and one reflective account annually (GPhC, 2021). These requirements are reviewed randomly by the Council, enhancing compliance monitoring and encouraging deeper engagement with CPD activities.

Unlike South Africa's SAPC system, which currently lacks formal review of CPD quality or learning impact, the GPhC integrates structured feedback and audit mechanisms to ensure that CPD is not merely a checkbox exercise (SAPC, 2020; GPhC, 2021). Peer discussion supports reflective practice by allowing pharmacists to assess their professional development through dialogue, fostering critical thinking and self-assessment (Mantzourani, Desselle and Lucas, 2022). This approach has been shown to improve learning retention and translate more effectively into workplace improvements.

Another notable feature of the GPhC model is its personalisation (GPhC, 2021). Pharmacists are encouraged to tailor their CPD to their specific roles, settings, and identified learning needs. This is supported by publicly available guidance and templates, which help practitioners link their learning to the GPhC's Standards for Pharmacy Professionals (GPhC, 2024). In contrast, South Africa's framework does not currently provide sector-specific learning pathways or structured support tools to guide individualised learning (SAPC, 2020).

2.6.3 OCP (Canada)

The Ontario College of Pharmacists (OCP), which regulates pharmacy practice in Ontario, Canada, implements a comprehensive Quality Assurance (QA) Program that embeds CPD within a broader competency-based framework (OCP, 2022). Pharmacists are required to maintain a Self-Assessment Tool, develop a Learning Portfolio, and participate in practice assessments every five years (OCP, 2022). This model emphasizes both ongoing reflection and periodic external evaluation, ensuring CPD is integrated into daily practice and aligned with professional standards.

Unlike SAPC's model, which relies heavily on self-submission and does not currently include formal assessments or competency evaluations, the OCP system is underpinned by mandatory peer-reviewed assessments conducted by trained pharmacists (SAPC, 2020; OCP, 2022). The Canadian approach also offers flexibility through its Learning Portfolio system, allowing pharmacists to document learning in formats that best suit their practice setting. Learning goals must align with OCP's Standards of Practice, ensuring relevance and impact (OCP, 2022). Additionally, the OCP provides a Learning Design Tool to support pharmacists in crafting structured, needs-based learning plans, a support mechanism currently lacking in the SAPC system (SAPC, 2020; OCP, 2022).

2.6.4 Pharmacy Board of Australia

The Pharmacy Board of Australia (PBA), under the Australian Health Practitioner Regulation Agency (AHPRA), enforces a competency-based CPD model that is both flexible and outcomes-focused (AHPRA, 2021). Australian pharmacists are required to complete a minimum of 40 CPD credits annually, with at least 25 credits involving interactive learning and at least one activity focused on reflective practice (PBA, 2020). Activities must be linked to the National Competency Standards Framework for Pharmacists , promoting professional growth that is aligned with the evolving scope of pharmacy practice (PBA, 2020).

One distinguishing feature of the Australian system is its emphasis on self-directed learning complemented by structured, high-quality CPD offerings from accredited providers. Pharmacists are not required to submit CPD records annually; however, they must maintain a CPD plan and portfolio for random audits conducted by AHPRA (AHPRA, 2021). This audit-based approach allows for flexibility while maintaining regulatory oversight.

Compared to South Africa's SAPC model, the Australian approach demonstrates greater autonomy and personalization (SAPC, 2020; AHPRA, 2021). Pharmacists are expected to identify learning needs based on their scope of practice and use self-reflection to ensure relevance and depth. Moreover, interactive CPD, such as workshops, case-based learning, and peer discussion, is strongly encouraged, whereas SAPC's framework does not distinguish between interactive and passive learning modes, nor does it provide a structured credit system to guide learning intensity or diversity (SAPC, 2020; AHPRA, 2021).

2.7 Summary of Key Gaps in the Literature

The reviewed literature highlights a growing emphasis on structured CPD systems in pharmacy practice globally, with countries like the UK, Canada, and Australia adopting competency-based, reflective, and peer-reviewed models (AHPRA, 2021; GPhC, 2021; OCP, 2022). In contrast, South Africa's CPD framework, though aligned with international standards in structure, remains limited in its depth of implementation and monitoring mechanisms (SAPC, 2018a, 2020).

A significant gap exists in the evaluation of CPD effectiveness within the South African context. While compliance rates are tracked, there is insufficient evidence on whether CPD activities lead to measurable improvements in professional competence or patient care outcomes. Similarly, the reflective component, a cornerstone of meaningful CPD, is underutilized, with limited support or training available to help pharmacists engage in critical self-assessment.

The literature also lacks comprehensive quantitative and qualitative data on South African pharmacists' attitudes, motivation, and perceived barriers to CPD participation, particularly post-implementation of SAPC's 2019 mandate. Most existing studies focus on descriptive accounts rather than evaluative or impact-based research.

Furthermore, there is limited context-specific analysis comparing SAPC's CPD framework to global models, especially in terms of sectoral customization, quality assurance, and learner engagement strategies. These gaps highlight the need for updated, locally relevant research to inform policy, enhance participation, and promote meaningful professional development within pharmacy practice in South Africa. Gaps particularly around sectoral responsiveness, impact measurement, and participation disparities, underscore the urgency of updated, empirical research such as the current study

2.8 Conclusion

This chapter explored the current state of Continuing Professional Development (CPD) within pharmacy, beginning with its significance in South Africa's evolving healthcare context. The SAPC's structured CPD framework, formally implemented in 2019 and updated in subsequent years, represents a shift toward more accountable, lifelong learning for pharmacists. However, challenges remain, particularly in evaluating the effectiveness of CPD on actual professional

performance. The lack of national audits, outcome tracking, and sector-specific guidance limits the framework's practical impact.

The chapter also examined the CPD cycle, reflection, planning, implementation, and evaluation, as outlined in SAPC policy and international literature. While this model provides a comprehensive structure, literature suggests that practical tools and support for each phase, especially in low-resource contexts, are limited. For instance, implementation is often constrained by digital access, limited CPD offerings, and insufficient funding for participation in quality learning activities. Evaluation mechanisms remain underdeveloped, with few systems in place to measure whether CPD contributes meaningfully to practice improvement.

Key barriers to CPD participation identified in the literature include access inequality (particularly between urban and rural pharmacists), time constraints due to workload and staffing issues, and financial burdens such as course fees or internet costs. Additionally, the need for more personalized CPD opportunities, aligned to individual scopes of practice, and curated content to manage the rapid expansion of medical knowledge, was consistently highlighted.

Finally, a global comparison of CPD systems demonstrated that while South Africa's framework is aligned with international trends in structure, it lacks several critical features present in countries such as the UK, Canada, and Australia. These include peer review, learning portfolios, accredited providers, and systems that emphasize interactivity, competency, and quality assurance. Such models offer valuable insights for strengthening CPD delivery and monitoring in South Africa. Strengthening pharmacist CPD is also essential for advancing national health priorities, as emphasized in the Human Resources for Health Strategy 2030 and the National Digital Health Strategy, which both recognize continuous professional development and digital competency as critical for building a resilient and competent healthcare workforce (Department of Health SA, 2020).

Overall, this chapter identified significant gaps in implementation, quality assurance, and equitable access to CPD in South Africa, alongside a lack of literature evaluating the system's effectiveness and alignment with global standards. These findings provide the foundation for the current study, which investigates pharmacists' understanding of and engagement with CPD within this evolving policy framework. The next chapter outlines the research methodology used to address this aim.

Chapter 3: South African pharmacists' knowledge and attitudes, towards Continuing Professional Development in the Gauteng province of South Africa (submitted manuscript format)

South African pharmacists' knowledge and attitudes, towards Continuing Professional Development in the Gauteng province of South Africa

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Abstract

Continuing Professional Development (CPD) is mandated by the South African Pharmacy Council (SAPC) to ensure pharmacists maintain competency and deliver quality healthcare. This study explored pharmacists' knowledge, attitudes, and perceived barriers to CPD participation in Gauteng, South Africa. A cross-sectional survey was conducted with self-administered questionnaires distributed to pharmacists, yielding 597 responses. A convergent mixed-methods approach integrated quantitative and qualitative insights to contextualize participation barriers and CPD engagement patterns. Descriptive statistics and one-sample t-tests were used to evaluate the data. Results showed that 94.30% of respondents were CPD compliant in 2022 and 2023, reflecting strong engagement. Pharmacists demonstrated substantial knowledge of CPD processes, 79.88% acknowledging an understanding of CPD activities, and 47.00% expressing awareness of required resources. However, reflective practice emerged as an area for improvement, with 22.02% strongly agreeing they could identify learning needs. While compliance with CPD submissions was high (94.30%), enthusiasm for undertaking CPD was lower, with just 28.08% showing strong enthusiasm. Key

barriers identified included time constraints (17.78%) and concerns about CPD quality (28.08%).
The findings highlight the need for improved CPD engagement and program design to enhance reflective practice and enthusiasm. These insights can inform future CPD initiatives, making them more accessible and relevant to the pharmacy profession.

Keywords: Continuing Professional Development (CPD), Pharmacists, Barriers to CPD, Professional competency, Lifelong learning, Reflective practice, CPD compliance

3.1. Introduction

Continuous professional development (CPD) is essential for healthcare providers, including pharmacists to maintain competency and keep up with the rapid advancements in medical science and patient care (FIP, 2014; Aldosari, Alsairafi and Waheedi, 2020). For pharmacists, CPD is a vital component that ensures they remain knowledgeable and competent in delivering safe and effective pharmaceutical care (Austin, 2013). In South Africa, CPD is mandated by the South African Pharmacy Council (SAPC) as a regulatory requirement to maintain professional registration, enhance and maintain the highest standards of practice (SAPC, 2019a). Despite this mandate, there is limited empirical data on the actual engagement of pharmacists with CPD, particularly their knowledge, attitudes, and the barriers they face in fulfilling these requirements.

Globally, CPD has been shown to improve healthcare outcomes by ensuring that healthcare professionals remain up to date with the latest practices and innovations (FIP, 2014). However, studies from low-middle income countries suggest that healthcare providers, including pharmacists, often face significant challenges in accessing CPD, such as time constraints, resource limitations, and inadequate access to quality CPD activities (FIP, 2014; Gelayee, Mekonnen and Birarra, 2018). In South Africa, where pharmacists play a critical role in supporting health initiatives – such as the National Health Insurance (NHI) and the management of the countries HIV and tuberculosis epidemics (Gray and Vawda, 2014; Kokane and Avhad, 2016). Engagement in CPD is crucial to ensuring pharmacists are equipped to meet the countries growing healthcare demands (South African Department of Health, 2020a).

The pharmacy profession in South Africa faces an evolving set of responsibilities, and pharmacists are increasingly involved in clinical care, public health, and chronic disease management (Council on Credentialing in Pharmacy, Albanese and Rouse, 2010). While CPD offers a mechanism to update knowledge and skills, the extent to which South African pharmacists, particularly in Gauteng Province, engage with CPD has not been thoroughly investigated. Gauteng, as the economic hub of South Africa (Stats SA's Census, 2022), includes a high concentration of both public and private healthcare facilities, making it an ideal setting to explore CPD participation.

While CPD is mandated by the South African Pharmacy Council (SAPC) (SAPC, 2019b), there is limited evidence on how well pharmacists comprehend CPD requirements, their perceptions of its importance, and the specific challenges they encounter in fulfilling these obligations. This lack of understanding poses a significant challenge to optimizing CPD engagement (Alhaqan, Smith and Bates, 2021), which is crucial for maintaining professional competency and ensuring the consistent delivery of high-quality pharmaceutical care. Without a clear picture of these factors, it becomes difficult to design effective interventions that enhance CPD participation and address the obstacles pharmacists face in accessing relevant learning opportunities (Donyai *et al.*, 2015). This research aims to fill these gaps by assessing pharmacists' knowledge of CPD requirements, their attitudes towards CPD, and the specific challenges they encounter in completing CPD activities.

This study hypothesizes that while South African pharmacists acknowledge the importance of CPD, barriers such as time constraints, limited resources, and concerns about the quality of CPD activities hinder their full participation. Research indicates that common challenges, including financial limitations and the perceived relevance of CPD programs, affect pharmacists' engagement in continuing education (Aldakhil *et al.*, 2024).

Even though compliance with CPD requirements is mandated (SAPC, 2019a), studies suggest that systemic and individual-level challenges make adherence difficult (Al-Omary *et al.*, 2024). Understanding these barriers is essential, as inadequate CPD participation may compromise professional competency and negatively impact patient care (Soklaridis *et al.*, 2024). This study aims to evaluate pharmacists' participation and compliance with CPD requirements, assess their knowledge and proficiency in CPD activities, explore their attitudes towards CPD, and

identify barriers to engagement. By identifying these challenges, the study contributes to the broader discussion on enhancing continuing development opportunities and improving professional competency in the pharmacy profession.

The primary objectives of this research are to assess the level of knowledge pharmacists in Gauteng Province possess about CPD requirements and processes, and to identify barriers to CPD participation, such as time constraints, resource limitations, and restricted access to high-quality CPD activities. Based on the findings, the study seeks to provide evidence-based recommendations for improving CPD engagement in South Africa, focusing on policy reforms, resource allocation, and program development.

The significance of this research lies in its potential to provide empirical data on pharmacists' (in the Gauteng province) CPD engagement. The findings will be valuable for policymakers, the South African Pharmacy Council, and pharmacy education providers, enabling them to better understand the challenges pharmacists face and how to address them effectively. As South Africa moves toward implementing universal health coverage through the National Health Insurance (NHI), ensuring that pharmacists are continuously engaged in CPD is crucial for improving healthcare outcomes and addressing the nation's pressing healthcare challenges. By identifying the specific barriers that hinder CPD participation and offering targeted recommendations, this study aims to support the professional development of pharmacists, ultimately leading to enhanced patient care and better health outcomes across South Africa. Additionally, the findings may contribute to discussions within the profession on CPD in low- and middle-income countries, offering insights that could be applicable to similar healthcare contexts.

Furthermore, this research aligns with South Africa's broader national priorities articulated in the Human Resources for Health Strategy 2030, which emphasizes CPD as essential for building a resilient, equitable, and skilled healthcare workforce (Department of Health SA, 2020). By enhancing CPD participation among pharmacists, the study supports strategic efforts to strengthen the country's human resources for health, improve service delivery, and advance the objectives of universal health coverage under the National Health Insurance (NHI) framework.

3.2. Research design

This study employed a cross-sectional survey design with a quantitative, descriptive approach to assess the knowledge, attitudes, and perceived barriers related to Continuing Professional Development among pharmacists in Gauteng, South Africa. A self-administered structured questionnaire was distributed electronically to registered pharmacists across various practice settings. The questionnaire was adapted with permission from a similar study conducted in Lebanon (Saade *et al.*, 2018) with modification to suit the South African context (Appendix B). This research design was selected as it is efficient in capturing data from a large and diverse sample at a single point in time.

3.3. Selection criteria

3.3.1. Inclusion criteria

This study targeted qualified, practicing pharmacists from a variety of sectors, including community, hospital, industrial, and academic settings, within the Gauteng Province. Participants were required to have access to the internet, as the survey was conducted electronically on an online platform.

3.3.2. Sampling method

A convenience sampling method was utilized due to its practicality in reaching a broad and diverse group of pharmacists within a constrained timeframe. Participants were selected based on their availability, accessibility, or ease of contact via email. Although convenience sampling has potential limitations related to selection bias, steps were taken to mitigate this risk. The survey was distributed via the South African Pharmacy Council official email database (Appendix C), ensuring that a wide audience of pharmacists across different sectors and geographic regions within Gauteng was reached. This method helped reduce reliance on personal networks or local contacts, thereby improving the representativeness of the sample.

3.3.3. Sample size determination:

The number of registered pharmacists (as indicated by the SAPC in Appendix C) in Gauteng as of 23 June 2022, was 5895. The target sample size was determined using the Raosoft online sample size calculator (Raosoft, 2004), applying a confidence level of 95%, a margin of error of 5%, and a population proportion of 50%. The following equation was applied to calculate the sample size:

Equation 1: Sample size

The sample size n and margin of error E

are given by:

$$z = \left(\frac{Z\left(\frac{c}{100}\right)^2 \times r \times (100 - r)}{n} \right)$$

$$n = \frac{N \times z}{(N - 1) \times E^2 + z)}$$

$$E = \sqrt{\left(\frac{(N - n) \times z}{n \times (N - 1)}\right)}$$

Where N is the population size (5,895), r is the fraction of responses, and $Z(c/100)$ is the critical value for the confidence level c, and E is the margin of error

The calculated sample size was 361, with an additional 30% contingency added to account for potential non-responses or incomplete data, resulting in a target sample size of 469 participants. The contingency was a proactive measure to ensure a robust analysis, even if some data were lost to non-responses. While the sample size was appropriately calculated, the study employed a convenience sampling method, which may introduce bias due to non-random participant selection. As participation was voluntary and based on accessibility, the sample may not be fully representative of the broader population of registered pharmacists in Gauteng. Moreover, the actual response rate was 10.5%, which is considerably lower than anticipated. This low response rate limits the generalizability of the findings and raises the potential for non-response bias, as those who chose to participate may differ in important ways from those who did not. These limitations are acknowledged and should be considered when interpreting the study's results.

3.4. Exclusion criteria

Pharmacists who did not complete the entire survey were excluded from the analysis. This ensured that only fully completed responses were included in the final dataset, thereby maintaining the integrity and reliability of the results.

3.5. Ethical clearance

Ethical approval was obtained from the University of the Witwatersrand Human Research Ethics Committee on December 13, 2023 (Reference Number: M230516 M231213-A-0001) (Appendix A). Detailed information about the study was provided to all participants before they accessed the questionnaire, and informed consent was obtained prior to their access to the questionnaire. Participants were made aware of their right to withdraw at any stage without penalty, and data security and confidentiality were prioritized using REDCap®, a secure web application designed for managing online surveys and ensuring the privacy of participants.

3.6. Data collection

Data collection was conducted electronically through REDCap®, a robust and secure platform for online surveys and databases. Participants were sent personalized survey links via email, allowing them to access the questionnaire securely (Appendix D).

The survey was open for a period of two months. Follow-up emails were sent every two weeks to non-respondents to encourage participation and reassure them about the confidentiality of their responses (Appendix E). Reminders were sent in compliance with ethical standards, and participants were informed that their participation was voluntary and could be withdrawn at any time.

The questionnaire had four categories: demographics, knowledge of CPD, attitudes toward CPD, and perceived barriers to CPD participation. Responses were measured using a Likert scale (Table 3.1), where each answer carried a numerical score. In the barriers category, high scores indicated more significant barriers to CPD participation (Table 3.2).

Table 3.1: Likert scale: CPD knowledge, attitude, and barrier measurement scale

Response	**Score**
Strongly Agree	5
Agree	4
Neutral	3
Disagree	2
Strongly Disagree	1

Table 3.2: Perceived barrier to CPD participation

Response	Score
The time was insufficient	5
Resources were unavailable	5
CPD activities were of poor quality	5
The time was sufficient	1
Resources were available	1
CPD activities were of high quality	1

The final score for each category was calculated by adding up the scores of each question in each category. This score was compared to the maximum possible score in that category. Higher scores indicated elevated levels of knowledge and a positive attitude. In the case of barriers to CPD participation category, high scores indicated a high number of barriers. The opposite held true.

Additionally, a qualitative component was included to explore the barriers and facilitators of CPD participation in greater depth. Following the close-ended questions in Table 3.2, participants were asked to elaborate on their responses. The questions covered the following areas:

- Their thoughts on the time required to complete CPD activities,
- Their perspectives on the availability of CPD learning opportunities,
- Their views on the availability of resources necessary to engage in CPD,
- Their opinions on the quality of CPD activities available to them.

These open-ended responses provided valuable context to the quantitative data, allowing the study to explore the nuanced factors influencing pharmacists' engagement with CPD activities. By prompting participants to elaborate on their responses, this approach enabled a deeper understanding of the barriers and facilitators that influence CPD participation

3.6.1 Data Collection Instrument (Questionnaire Design and Validation)

The data collection tool was a structured self-administered questionnaire consisting of both closed-ended and open-ended questions. The questionnaire was adapted with permission from a study conducted by Saade et al. (2018) in Lebanon, which explored pharmacists' knowledge and attitudes towards CPD. Adaptation was done to reflect the South African context, including

local terminology, regulatory references (SAPC), and relevant CPD structures and resources. The rationale for using this tool was its established alignment with the study objectives and its prior use in similar settings.

The questionnaire comprised four main sections:

- Demographics – captured age, gender, education level, practice setting, SAPC registration status, and CPD submission history.
- Knowledge – included five Likert-scale items assessing pharmacists' ability to identify learning needs, plan and implement CPD activities, and assess outcomes (e.g., "I can assess and apply what I have learned from my CPD activities").
- Attitudes – included six Likert-scale items measuring perceptions of CPD relevance, motivation, time and resource availability (e.g., "I feel positive that CPD activities are developing me in my practice as a pharmacist").
- Barriers – included both multiple-choice and open-ended questions regarding time constraints, access to learning opportunities and resources, and perceived quality of CPD activities.

To ensure content validity, the questionnaire was reviewed by three academic supervisors with expertise in pharmacy education and CPD. Their feedback informed modifications to question wording, clarity, and relevance. Although a formal pilot study was not conducted, iterative revisions based on expert input helped to refine the final version of the instrument. Although internal consistency testing, such as Cronbach's alpha, was considered to strengthen psychometric validity, it was ultimately not conducted due to the exploratory design and descriptive focus of the study.

3.7. Data analysis

After data collection, the responses were exported from RedCap® in Microsoft Excel CSV format, a commonly used file format for data analysis. This format was chosen for its compatibility with various statistical analysis software. The data were then imported into STATA and NVivo, software programs used for data analysis. The quantitative analysis done using STATA followed these steps:

- Descriptive statistics were computed for all variables, including means, frequencies, standard deviations, and percentages. These measures provided an overview of participants' characteristics, knowledge, attitudes, and the perceived barriers they faced.
- A one-sample t-test was applied to the knowledge and attitude questions. The student t-test was used to determine whether the average scores for knowledge and attitudes, as measured on the Likert scale, were significantly different from a neutral value of 3. This allowed for an assessment of whether pharmacists' knowledge and attitudes toward CPD were generally positive or negative.
- For barrier related questions, quantitative data were analysed using statistical percentages, while thematic analysis was employed for qualitative data because each question required elaboration.

For the qualitative data, thematic analysis was conducted using NVivo software to identify key themes related to barriers and facilitators of CPD participation. The analysis followed a systematic approach, outlined as follows:

- Data Preparation: The qualitative data, obtained from the open-ended responses in RedCap, were extracted and saved as a Microsoft Excel CSV file. The file was then imported into NVivo for analysis.
- Familiarization and Initial Coding: The researcher familiarized herself with the data by reading through the responses. Relevant segments of text were then coded using NVivo's coding function to identify initial concepts, ideas, and recurring themes.
- Theme Development: The initial codes were grouped into broader themes by reviewing the data, identifying patterns, and utilizing NVivo's tools to visualize relationships between codes. For example, themes related to the availability of resources, time constraints, and the quality of CPD opportunities emerged during the analysis.
- Refinement and Final Themes: The identified themes were refined for consistency and relevance. This step involved reviewing the themes to ensure they accurately reflected the data and captured the nuances of the barriers and facilitators to CPD participation.

The qualitative responses provided by participants were examined for recurring patterns or themes, derived specifically from their elaborations on barriers faced when engaging in

CPD activities. Thematic analysis allowed for a detailed understanding of the specific challenges pharmacists face in relation to CPD activities.

3.7.1. Handling of missing data

Missing data were handled by excluding incomplete responses from the final analysis. This process was done in RedCap® before exporting the results into a Microsoft Excel CVS file for data analysis.

3.7.2 Scoring Logic and Interpretation of Likert Scale Responses

The Likert scale used in this study varied in scoring logic across different sections of the questionnaire. For the knowledge and attitude sections, a 5-point Likert scale was used, where higher scores (e.g., "Strongly Agree" = 5) reflected a greater degree of knowledge or more positive attitudes towards CPD.

However, for the barriers section, higher scores (e.g., "Insufficient" or "Unavailable" = 2) reflected a greater perception of barriers to participating in CPD. In this section, responses were not assigned on a 5-point scale but were dichotomous (e.g., "Sufficient" vs. "Insufficient"), and open-ended responses were also included.

To ensure clarity and consistency in interpretation, scores were analysed within each domain separately. Mean scores for knowledge and attitude were interpreted such that higher scores indicated more positive outcomes, while in the barriers section, higher frequencies of negative responses were considered indicative of greater barriers.

The table 3.3 below summarizes the scoring logic:

Table 3.3: Scoring Logic

Section	Question Type	Scale	High Score Meaning
Knowledge	Likert (1–5)	Strongly Disagree to Strongly Agree	High knowledge
Attitude	Likert (1–5)	Strongly Disagree to Strongly Agree	Positive attitude
Barriers	Multiple-choice + open-ended	Available/Unavailable, Sufficient/Insufficient	Higher frequency = More barriers

3.7.3 Qualitative Data Analysis of Barrier Questions

The questionnaire included four open-ended questions within the barriers section, designed to capture pharmacists' perceptions of the time, availability, and quality of CPD resources. The open-ended questions were:

- "Please elaborate your thoughts on the time required to do CPD activities."
- "Please elaborate your thoughts on the availability of CPD learning opportunities."
- "Please elaborate your thoughts on the availability of resources required to address CPD activities."
- "Please elaborate on your opinion on the quality of CPD activities available to you."

A thematic content analysis approach was applied to the open-ended responses. Responses were first reviewed for familiarity, and then inductively coded using manually identified recurring words, phrases, or ideas. These initial codes were grouped into overarching themes that represented common experiences or views. Examples of emerging themes included "Sufficient Opportunities "Sufficient time," "Quality /Relevance issues," "Technology related issues "and "No Response." Coding was conducted manually by the researcher, and the resulting thematic categories were reviewed by one of the academic supervisors during sessions at the Health Sciences Research Office Writing Room to enhance the credibility of the analysis. Verbatim participant responses were included in the results chapter to support and illustrate key themes. Additionally, themes were reported alongside frequency counts to indicate how commonly each barrier was identified across responses.

3.7.4 Integration of Quantitative and Qualitative Data

This study employed a convergent mixed-methods design, where both quantitative and qualitative data were collected simultaneously through a single survey instrument. The quantitative data, obtained from Likert-scale questions on knowledge and attitudes, were analysed to assess general trends in CPD participation and perceptions. The qualitative data, collected via open-ended questions on barriers, were analysed thematically to explore deeper, contextual explanations behind these trends.

Analysis revealed high levels of CPD participation, yet relatively low levels of enthusiasm and confidence. The qualitative data complemented these findings by highlighting systemic barriers such as time constraints, limited access to CPD resources, and perceived low quality of CPD offerings. This integration of findings allowed for a richer understanding of the gap between compliance and motivation.

According to Creswell and Plano Clark (2018), the convergent design is particularly useful in health research for providing a comprehensive perspective by merging numeric trends with narrative insights. This approach strengthened the study's ability to interpret pharmacists' attitudes and behaviours within their practical contexts.

3.8. Results

3.8.1. Response rate and sampling considerations

A total of 597 responses were received from the 5681 emails disseminated, resulting in a response rate of 10.5%. Although relatively low, this response rate is typical of email-based surveys within professional groups such as pharmacists.

A total of 102 incomplete responses were excluded from the analysis, yielding a final dataset of 495 fully completed responses. The exclusion of incomplete surveys ensured high data completeness, which is essential for reducing potential analytical errors caused by missing values.

3.8.2. Demographic characteristics

Table 3.4 presents the demographic characteristics of respondents. The study sample reflected diversity in age, gender, sector of practice, weekly working hours, and years of professional experience.

- Age: Respondents were distributed across age groups, with 36.6% aged 20–39 years, 41.0% aged 40–59 years, and 22.4% aged 60 years and above.
- Gender: The majority of respondents identified as female (70.3%), followed by male (28.1%), while 1.6% preferred not to disclose their gender.
- Sector of Practice: Most pharmacists worked in the private sector (71.5%), while 16.4% were employed in the public sector.
- Weekly Working Hours: Approximately 42.6% reported working more than 40 hours per week, 38.2% worked exactly 40 hours, and 19.2% worked fewer than 40 hours per week.
- Years of Professional Experience: The majority (72.7%) had over 10 years of experience. A smaller proportion (7.7%) reported less than 5 years of experience.

Table 3.4. Demographic characteristics of the participants (N=495).

Demographics	Frequency (n)	Percentage (%)
Age (Years)		
20-39	181	36.57
40-59	203	41.01
60 and above	111	22.42
Gender		
Male	139	28.08
Female	348	70.30
I do not wish to Disclose	8	1.62
Other	0	0
Highest degree obtained		
Bachelor of Pharmacy	331	66.87
Master's Degree	141	28.48
PhD	23	4.65
Marital status		
Single (Never Married)	88	17.78
Married/Domestic partnership	322	65.05
Widowed	19	3.84
Divorced	36	7.27
Separated	9	1.82
I do not wish to disclose	19	3.84
Other	2	0.40
Pharmacy Practice Location		
In Gauteng Province	466	94.14
Outside Gauteng Province	29	5.86
Practice Sector		
Public	81	16.36
Private	354	71.52
Other	60	12.12
Working hours		
Below 40Hrs / Week	95	19.19
40Hrs / Week	189	38.18

Demographics	Frequency (n)	Percentage (%)
Above 40Hrs / Week	211	42.63
Years practicing		
Below 5yrs	38	7.68
Between 5yrs and 10yrs	97	19.60
Above 10yrs	360	72.73
Registration 2022		
Practicing	470	95
Non-Practicing	25	5.05
Registration 2023		
Practicing	467	94.34
Non-Practicing	28	5.66
CPD Compliance 2022		
No	28	5.66
Yes	467	94.34
CPD Compliance 2023		
No	28	5.66
Yes	467	94.34

3.8.3. Pharmacist compliance with CPD

The survey revealed high rates of CPD compliance. A total of 94.3% of respondents indicated that they had submitted CPD entries in both 2022 and 2023. Additionally, 95.0% of respondents were registered as practicing pharmacists in 2022, and 94.3% in 2023. Table 3.5 provides a demographic breakdown of CPD-compliant pharmacists in 2023.

Table 3.5. Demographic characteristics of the participants compliant with CPD in 2023 (N=495).

Demographics	Frequency (n)	Percentage (%)
Age		
20-39	178	38.12
40-59	191	40.90
60 and above	98	20.99
Gender		

Demographics	Frequency (n)	Percentage (%)
Male	128	27.41
Female	332	71.09
I do not wish to Disclose	7	1.50
Other	0	0
Highest degree obtained		
Bachelor of Pharmacy	314	67.24
Master's Degree	133	28.48
PhD	20	4.28
Marital status		
Single (Never Married)	85	18.20
Married/Domestic partnership	306	65.52
Widowed	18	3.85
Divorced	30	6.42
Separated	8	1.71
I do not wish to disclose	18	3.85
Other	2	0.43
Pharmacy Practice Location		
In Gauteng Province	440	94.22
Outside Gauteng Province	27	5.78
Practice Sector		
Public	76	16.27
Private	339	72.59
Other	52	11.13
Working hours		
Below 40Hrs / Week	87	18.63
40Hrs / Week	183	39.19
Above 40Hrs / Week	197	42.18
Years practicing		
Below 5yrs	37	7.92
Between 5yrs and 10yrs	96	20.56

Demographics	Frequency (n)	Percentage (%)
Above 10yrs	334	71.52
Registration 2022		
Practicing	450	96.36
Non-practicing	17	3.64
Registration 2023		
Practicing	453	97.00
Non-practicing	14	3.00

3.8.4. Knowledge of CPD activities

Pharmacists displayed a solid knowledge of the CPD processes, with the majority agreeing or strongly agreeing with statements about their understanding of CPD requirements. Table 3.6 shows that 49.6% of respondents agreed, and 30.3% strongly agreed, indicating that many pharmacists feel well-informed about CPD activities. These findings are supported by the results of the one-sample t-test (Table 3.7), which revealed that means scores for all knowledge-related questions were significantly below the neutral value of 3 ($p < 0.001$ for all tests), suggesting that pharmacists possess a high level of knowledge in this area.

Areas of particularly strong knowledge included resource awareness ($M = 1.84$, $t = -32.136$, $p < 0.001$), and CPD planning ($M = 1.857$, $t = -30.901$, $p < 0.001$). This indicates that pharmacists are well-equipped to access the necessary resources and plan their CPD activities ($M = 1.905$, $t = -26.341$, $p < 0.001$), and the application of learning ($M = 2.17$, $t = -18.33$, $p < 0.001$) also showed strong results.

However, the highest mean score ($M = 2.234$, $t = -16.918$, $p < 0.001$) was associated with identifying areas for improvement (CPD reflection), suggesting that this could be an area for further development in CPD programs. Reflective practice is crucial for meaningful professional growth, and efforts to enhance pharmacists' abilities in this area could improve the overall impact of CPD. The overall knowledge score ($M = 2.0$, $t = -inf$, $p < 0.001$) confirms a generally high level of understanding across all areas. These findings suggest that South African pharmacists possess a robust knowledge base in various aspects of their CPD practices, particularly in planning and implementation, with opportunities for enhancement in identification and reflection of CPD activities to perform.

Table 3.6: The knowledge of pharmacists in conducting CPD activities (total N=495).

Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
I can identify areas that I require improvement on, with regard to my learning needs and CPD activities.	22.02	47.88	18.99	6.87	4.24
I am fully aware of the resources needed to address my CPD requirements (resources such as (but not limited to) computer access, internet access, SAPC tutorials, and SAPC guidance manual)	34.95	51.52	9.09	3.43	1.01
I can plan and access resources needed to fulfill CPD activities (requirements such as (but not limited to) computer access, internet access, SAPC Tutorials, SAPC Guidance manual).	33.33	54.75	6.46	3.84	1.62
I can implement my CPD activities and submit them to SAPC successfully.	34.95	49.49	8.69	3.84	3.03
I can assess and apply what I have learned from my CPD activities.	26.26	44.24	19.39	6.46	3.64
Mean	30.30	49,58	12.52	4.89	2.71

Table 3.7: T-test for knowledge-related questions (M = 2.0, t = -inf, p < 0.001)

Question	Mean	T-Statistic	P-Value
I can identify areas that I require improvement on, with regard to my learning needs and CPD activities.	2.234	-16.918	5.52e -51

I am fully aware of the resources needed to address my CPD requirements (resources such as (but not limited to) computer access, internet access, SAPC tutorials, and SAPC guidance manual)	1.84	-32.136	3.99e -123
I can plan and access resources needed to fulfill CPD activities (requirements such as (but not limited to) computer access, internet access, SAPC Tutorials, SAPC Guidance manual).	1.857	-30.901	1.66e -117
I can implement my CPD activities and submit them to SAPC successfully.	1.905	-26.341	3.61e -96
I can assess and apply what I have learned from my CPD activities.	2.17	-18.33	1.23e -57

3.8.5 Attitudes toward CPD

Pharmacists' attitudes toward CPD were generally positive. As shown in Table 3.8, 36.7% agreed and 24.8% strongly agreed with positive statements regarding CPD participation. The one-sample t-test (Table 3.9) further supports this, with an overall mean score of 2.0 ($p < 0.001$), indicating a favourable attitude across all measured aspects.

Pharmacists expressed strong compliance with CPD requirements (M 1.754, $t = -28.254$ ($p < 0.001$)), indicating a clear commitment to adhering to regulatory standards. However, enthusiasm for CPD was somewhat lower, with a mean score of 3.4, suggesting that while pharmacists recognize the importance of CPD, they may not be fully motivated or enthusiastic about participating. Research by (Al-Kubaisi, Elnour and Sadeq, 2023) suggests that improving engagement through interactive and tailored CPD opportunities can enhance participation and motivation.

The confidence pharmacist displayed in managing their time for CPD ($M = 2.463$, $t = -10.05$, $p < 0.001$)), and in accessing necessary resources ($M = 1.998$, $t = -23.281$, $p < 0.001$)) reflects a high level of self-sufficiency in fulfilling CPD obligations. These findings underscore the importance of ensuring that sufficient resources continue to be made available to pharmacists to maintain this positive attitude.

Table 3.8: The Attitude of pharmacists in conducting CPD activities (N=495).

Question	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
I have been consistently compliant with the submission of my annual CPD activities to the SAPC throughout my professional registration record within the profession.	50.91	33.54	6.67	7.07	1.82
I feel positive that CPD activities are developing me in my practice as a pharmacist.	14.14	26.67	24.85	19.60	14.75
I believe I have sufficient time to achieve my CPD goals as set out by the SAPC.	18.99	46.06	13.54	12.53	8.89
I believe I have sufficient resources (computer access, internet access, conferences, tutorials) to complete the minimum requirement number (six) of CPD activities.	30.71	50.71	9.90	5.45	3.23
I have the enthusiasm to do CPD activities.	9.09	18.99	25.25	20.81	25.86
I am confident in conducting and submitting my CPD activities.	20.61	44.04	19.19	9.90	6.26
Mean	24.08	36.67	16.57	12.56	10.14

Table 3.9: T-test for Attitude-related questions (Mean = 2.0, t = -inf, p = 0.001)

Question	Mean	Standard deviation	T-Test	p-Value

I have been consistently compliant with the submission of my annual CPD activities to the SAPC throughout my professional registration record within the Neutral profession.	1.754	0.982	-28.254	3.20e -105
I feel positive that CPD activities are developing me in my practice as a pharmacist.	2.941	1.272	-1.025	3.06e -01
I believe I have sufficient time to achieve my CPD goals as set out by the SAPC.	2.463	1.19	-10.05	9.52e -22
I believe I have sufficient resources (computer access, internet access, conferences, tutorials) to complete the minimum requirement number (six) of CPD activities.	1.998	0.958	-23.281	1.79e -81
I have the enthusiasm to do CPD activities.	3.354	1.294	6.079	2.43e -09
I am confident in conducting and submitting my CPD activities.	2.372	1.105	-12.646	5.95e -32

3.8.6 Pharmacists' perceived barriers to CPD participation.

Despite the generally positive attitudes, barriers to CPD participation were identified. As shown in Table 3.10, 82% of participants felt they had sufficient time for CPD, while 17,8% reported time constraints as a barrier. Technology-related issues also emerged as a notable challenge, particularly in accessing digital CPD resources. With an increasing reliance on digital platforms for CPD, improving pharmacists' digital literacy could alleviate these barriers.

Moreover, 25% of participants indicated that CPD learning opportunities were not readily available, and 10% noted a lack of necessary resources, such as internet access or relevant CPD activities. The findings suggest that while most pharmacists are well-equipped to engage in CPD, a significant minority face challenges that need to be addressed to ensure broader participation.

The responses in the "Other" category were prevalent across various themes, underscoring that many pharmacists face nuanced challenges that are not easily captured by predefined categories. This observation indicates a need for more detailed qualitative research to better understand these diverse barriers and develop tailored interventions that address specific concerns faced by pharmacists. The inclusion of such qualitative data could enrich the understanding of CPD challenges and provide a broader perspective on how pharmacists perceive CPD activities, especially in the context of time management, resources, and quality.

Despite the existence of several barriers, most pharmacists do not appear to find these obstacles insurmountable. The data provide valuable insights into the ongoing challenges pharmacists in Gauteng face regarding CPD participation. However, the findings also highlight the importance of further research to delve into these barriers, allowing for a more comprehensive understanding and facilitating the development of strategies to mitigate these challenges effectively.

Table 3.10: Barriers pharmacists face when conducting CPD activities (N=495).

Question	**Sufficient (%)**	**Insufficient (%)**
How do you feel about the time required to do CPD activities?	82.22	17.78
	Available (%)	**Unavailable (%)**
What are your thoughts on the availability of CPD learning opportunities?	75.15	24.85
What are your thoughts on the availability of resources required to address CPD activities? (Examples include computer access, internet access, SAPC Tutorials, SAPC Guidance manual)	89.90	10.10

	High Quality %	Poor Quality %
What is your opinion on the quality of CPD activities available to you, do they help enrich your knowledge?	71.92	28.08

Below are the major themes observed in qualitative questions that required elaboration, the thematic analysis to these questions is shown in Figure 3.1, Figure 3.2, Figure 3.3 and Figure 3.4.

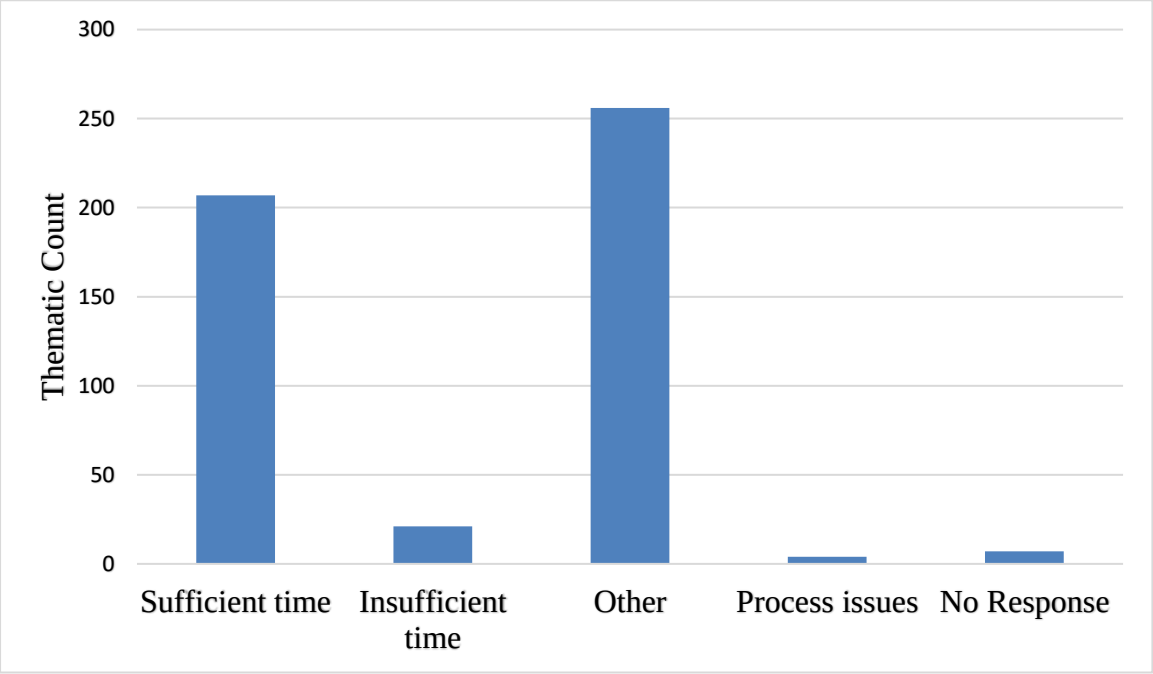

Figure 3.1: Themes of participants' thoughts on the time required to do CPD activities.

3.8.7. Key themes in barriers to CPD participation

3.8.7.1. Time constraints

Many respondents (82%) in figure 3.1, indicated that they have sufficient time to complete their CPD activities. However, a notable minority (17.8%) expressed concerns about time insufficiency. Majority of pharmacists in the "Other", cited a variety of time-related challenges, including difficulties in balancing heavy workloads with CPD requirements. Specific responses highlighted the lack of time during working hours for CPD engagement, and several responses suggested reducing the number of mandatory CPD activities from six to four per year. These are some example responses: "It is easy to get it done."; "There is time to do it but frankly is a

waste of time to continuously submit to SAPC. We are autonomous and continuously learn as required in terms of our practice as a profession..."; "I would prefer the opportunity to do CPD activities during working hours, e.g., when we used to do breakfast meetings/ trainings with reps..."; and "We are very pressurized in the work we do daily and still pressurized to submit six CPD learning. I wish it can be reduced to four a year (one per quarter)." These insights suggest that while time management is a challenge for some, many pharmacists are managing to allocate the necessary time for CPD.

Notably, a subset of respondents raised concerns about the CPD process itself. Responses categorized under "Process issues" revealed frustrations with the perceived complexity and administrative burden of CPD submissions. For example, some participants found the submission process cumbersome and suggested streamlining it by shortening the process for allowing for simpler documentation such as conference certificates. These are some example responses: “The CPDs are exhaustive and unnecessary. the CPD point system makes more sense. I do not believe the current system makes sense"; "I feel the submission process is too cumbersome. If I attend a conference, why do I need to identify a training gap first? I am attending the conference to learn more about the area I am working in. I would propose a much shorter process for all activities, not just two out of the six."; "The format of the CPD is not at all geared towards pharmacists in industry. it is thus not user friendly, cumbersome and a water of time"; "Doing the CPDs is easy, uploading the CPDs is not easy - it takes very long and is very cumbersome".

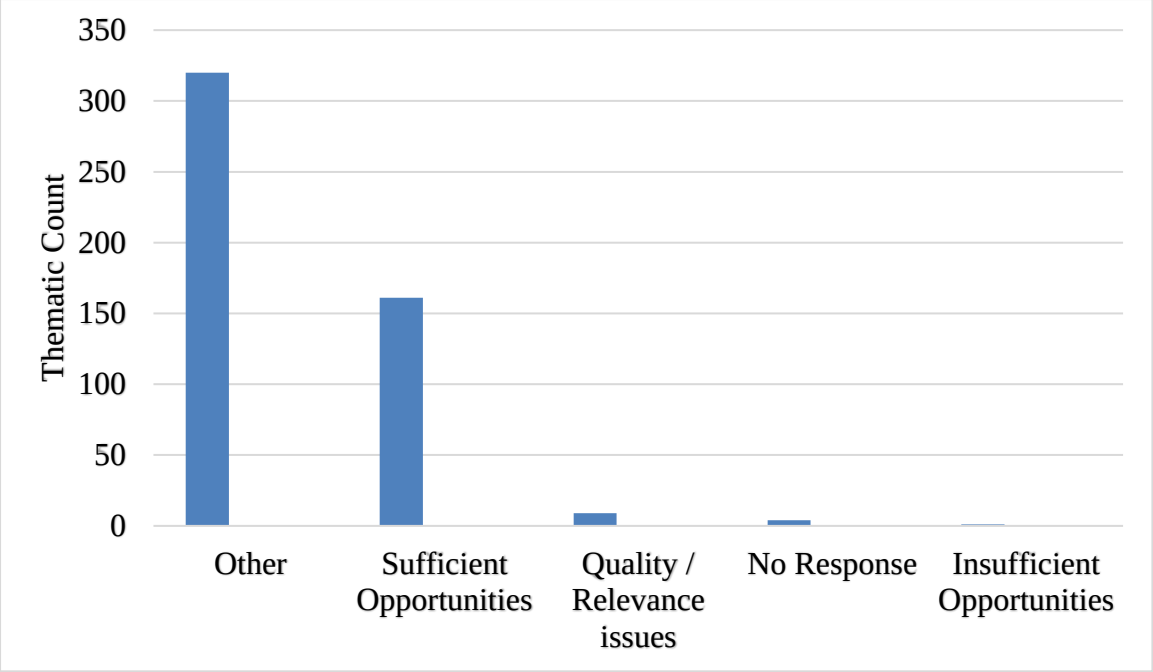

Figure 3.2: Themes on participants' thoughts on the availability of CPD learning opportunities.

3.8.7.2. Availability of CPD learning opportunities

Figure 3.2 showcases themes on participants' thoughts on the availability of CPD learning opportunities. A total of 75.1% of respondents agreed that CPD learning opportunities are generally available, while 24.9% felt that they lacked sufficient access to such opportunities. The dominant "Other" responses revealed diverse opinions on the types of CPD opportunities available. Some pharmacists expressed satisfaction with the range of online webinars and resources that could be accessed remotely, while others desired more flexible or shorter learning sessions to accommodate their busy schedules. Additionally, a few pharmacists suggested improvements in the CPD credit system, such as earning points for attending learning activities instead of being required to complete lengthy submissions. These are some example responses: "There are many online webinars that are about an hour long that can be done at home"; "different organizations offer CPDs however having access to short 15-minute sessions with a certificate would be beneficial considering work and family commitments."; "We should get points for CPD activities which make us exempt from doing online submissions"; "There are plenty of opportunities to do CPDs and this is not the issue its more the uploading to SAPC which is annoying. Uploading a certificate would be much simpler"; and "There are numerous free CPD providers and numerous CPD opportunities."

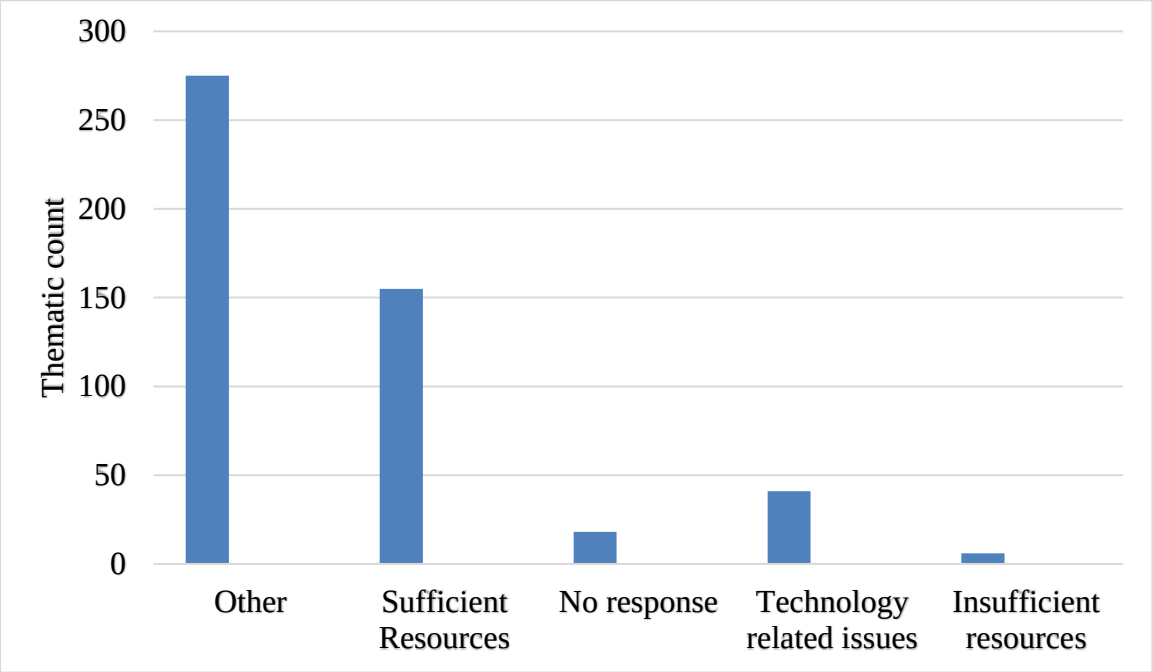

Figure 3.3: Themes on participants' thoughts on the availability of resources required to address CPD.

3.8.7.3. Availability of CPD Resources

Nearly 90% of respondents in figure 3.3, indicated that they had adequate resources to engage in CPD activities, such as internet access, computer facilities, and SAPC-provided tutorials and guidance. This high rate of satisfaction reflects that technological and logistical resources are not significant barriers for most pharmacists. Nevertheless, a small group (10.1%) indicated challenges related to access to these resources, underscoring the need for continued support in ensuring equitable access, particularly for pharmacists in underserved or rural area.. Some of the responses were: "Sufficient"; "As above"; "They are adequate."; "On EMGuidance are a lot of lectures and articles in various categories and that is just one resource to mention."; and "Ditto at above"

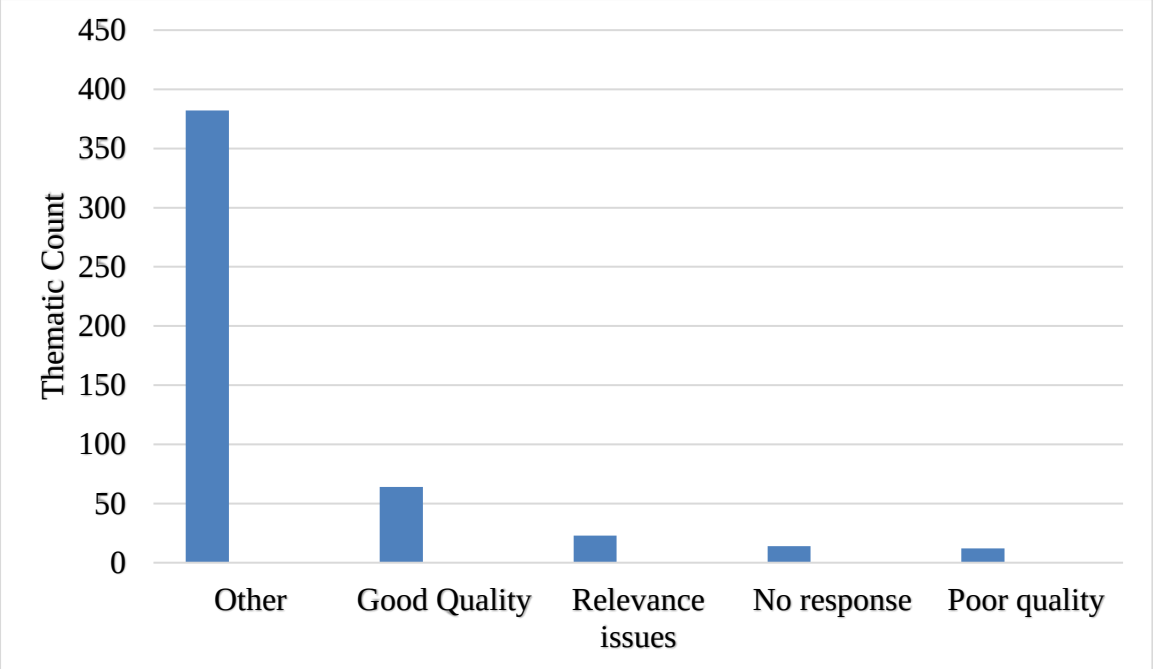

Figure 3.4: Themes on participants' opinion on the quality of CPD activities available.

3.8.7.4. Perceived quality of CPD activities

Figure 3.4 showcases the themes on participants' opinion on the quality of CPD activities available. The quality of available CPD activities were generally perceived positively by 71.9% of respondents, who agreed that the activities helped enrich their knowledge. However, 28.1% of respondents indicated dissatisfaction, citing poor quality or lack of relevance to their practice. This feedback suggests that while many pharmacists benefit from the available CPD content, a notable proportion finds the quality or applicability lacking. These perceptions likely contribute to the overall attitude toward CPD participation and may impact engagement levels. Some of the responses included in this category are: "I submit on every learning experience of value and find it insightful."; "MOST ARE OF HIGH QUALITY"; "I am getting the latest data on current treatment guidelines, new drug development and clinical trials articles from reputable scientific research institutions..."; "There are some presenters that maybe aren't as great as others, but it doesn't mean that the content of the CPD is not high quality."; and "they do"

3.9. Limitations

This study faced several methodological limitations that could impact the generalizability and robustness of the findings.

3.9.1. Categorical data

Most variables were categorical rather than continuous, limiting the depth of statistical analysis. Although categorical data are useful for summarizing responses, future studies may benefit from incorporating more continuous variables to allow for advanced statistical testing

3.9.2. Selection bias

The use of convenience sampling, while practical, it may not represent the broader population of pharmacists. The sample may have been skewed towards those pharmacists who were more engaged or had more time to participate. To mitigate this in future research, stratified or random sampling could be employed to ensure a more representative sample.

3.9.3. Limited data on non-participants

There was no information available on participants who were unable to participate due to lack of internet access or other logistical constraints. This raises concerns about the inclusivity of this study, as it may have excluded certain demographics, such as those in underserved or rural areas. Future studies could offer alternative methods of participation, such as paper-based surveys or phone interviews, to accommodate broader participation.

3.9.4. Small sample size

The sample size relative to the total number of registered pharmacists in Gauteng was small. This limits the statistical power of the study and increases the margin of error. Expanding the sample size in future research would improve the robustness of the findings and enhance generalizability to the broader population.

3.9.5. Participant understanding

This study lacked a mechanism to monitor how well participants understood the survey questions. Misinterpretation could have led to inaccurate responses, introducing information bias. In future research follow-up questions or validation checks could be incorporated to assess participant comprehension.

3.9.6. Information bias

There was no control for information bias, where participants might have provided socially desirable answers. Future studies could use mixed-method approaches, combining surveys with

interviews, to cross-check the accuracy of responses and gain a deeper understanding of participants' perspectives.

3.9.7 Low response rate

One of the limitations of this study is the low response rate. Research by (Sinclair *et al.*, 2012) which explored various survey methods, suggests that email surveys, while often associated with lower response rates, tend to be more effective when dealing with specialized groups such as pharmacists (Sinclair *et al.*, 2012). Similarly, (Meterko *et al.*, 2015) highlight that low responses do not necessarily imply data quality issues, provided that efforts are made to minimize bias, such as follow-up with non-respondents. (Meterko *et al.*, 2015). In this study, several follow-up emails were sent to reduce non-response bias, which likely improved the response rate. Although the overall response rate remains low, these efforts contribute to the reliability of the findings (Appendix E).

3.9.8 Instrument reliability and validity

One limitation of the study is the absence of formal reliability testing, such as Cronbach's alpha, to assess the internal consistency of the questionnaire. While the instrument underwent expert review to ensure content validity, future studies could strengthen psychometric robustness by incorporating pilot testing and internal consistency measures.

By addressing these limitations in future studies, the validity and reliability of findings in this area of research can be improved.

3.10 Conclusion

This study provides valuable insights into the current state of CPD engagement among pharmacists in Gauteng, South Africa, highlighting both strengths and areas for improvement. The findings reveal a strong self-reported commitment to professional development, with 94.3% of pharmacists consistently complying with CPD requirements in 2022 and 2023, reflecting their dedication to maintaining high professional standards. Pharmacists demonstrated robust knowledge in CPD planning ($M = 1.857$, $t = -30.901$, $p < 0.001$) and accessing CPD resources ($M = 1.84$, $t = -32.136$, $p < 0.001$), though reflective practice was identified as an area needing further development ($M = 2.234$, $t = -16.918$, $p < 0.001$).

Attitudes towards CPD were generally positive, particularly in terms of compliance and resource availability, with 36.7% agreed and 24.8% strongly agreed with positive statements regarding CPD participation. However, the lack of enthusiasm (M= 3.4), for CPD activities indicates that the current system may not fully engage pharmacists, suggesting the need for more relevant, stimulating CPD content that better addresses their professional needs. The barriers identified where primarily time constraints and concerns about the relevance and quality of CPD activities, highlighting the need for targeted interventions to enhance the effectiveness and accessibility of CPD programs.

These findings have important implications for the future of CPD in South Africa, particularly in the context of the country's broader healthcare reforms, such as the implementation National Health Insurance (NHI). Ensuring that pharmacists remain engaged in meaningful CPD activities will be crucial for sustaining high standards of healthcare delivery. By addressing the barriers and areas of improvement identified in this study, CPD programs can be optimized to better support pharmacists' professional growth, ultimately enhancing the quality of healthcare in South Africa. Additionally, these results contribute to the global discourse on CPD, particularly in low- and middle-income countries, providing a framework for improving CPD participation and healthcare outcomes in similar settings.

Author contributions

Ruvimbo Tina Tariro Kateera, Gillian Dumsile Mahumane, Zelna Booth, Rubina Shaikh, conceived and designed the experiments; Ruvimbo T.T Kateera performed the experiments. Gillian D. Mahumane, Zelna Booth and Rubina Shaikh supervised the research work. Ruvimbo T.T Kateera, Gillian D. Mahumane, Zelna Booth, Rubina Shaikh, analysed the data; and wrote the paper. All authors have read and agreed to the published version of the manuscript.

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Conflicts of interest

The authors declare no conflict of interest. No funders had a role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

3.11 Discussion

This section discusses the findings of the study in relation to existing literature and the broader context of pharmacy practice in South Africa. The discussion is organized according to the key themes identified in the results. These include, response rate and sampling considerations, demographic characteristics of respondents, CPD compliance levels, knowledge of CPD activities, attitudes towards CPD, pharmacists' perceived barriers to CPD participation, and key qualitative themes in barriers to CPD engagement.

Each section explores how the findings compare with local and international literature, highlights emerging trends, and identifies implications for professional development, regulatory policy, and the future of pharmacy education in South Africa.

3.11.1 Response rate and sample characteristics

The study achieved a response rate of 10.5%, which is substantially lower than the average online survey response rate of 44.1% (Wu, Zhao and Fils-Aime, 2022). While this discrepancy may initially raise concerns, it aligns with established challenges in reaching specialized professional groups through email-based surveys. Sinclair et al. (2012) similarly observed lower engagement among pharmacists, suggesting that conventional benchmarks may not be entirely applicable in such contexts. Rather than indicating disinterest, the lower response rate may reflect survey fatigue, demanding work environments, or limited digital engagement among certain segments of the profession. Moreover, Lindemann et al. (2019) emphasize that response rate alone does not determine data quality; what matters more is how researchers address potential non-response bias. In line with this, the present study employed multiple follow-up emails to enhance participation and mitigate bias. This approach supports the view that methodological rigor, rather than sheer response volume, plays a more critical role in ensuring data reliability and representativeness in professional surveys.

3.11.2 Demographic profile and CPD engagement

The diversity in age, gender, sector, and experience among respondents reflects the varied composition of the pharmacy workforce in Gauteng. Many respondents were aged 40–59 (41.0%), with lower representation from those aged 60 and above (22.4%). This may reflect broader trends in survey participation, as willingness to engage in digital or app-based research tends to decline from around age 50 (Mulder and Bruijne, 2019). Such a trend suggests not only generational preferences but also potential digital exclusion that may affect older pharmacists' access to CPD platforms, especially those that are fully online. Older pharmacists may prefer traditional methods such as face-to-face interviews, implying that exclusive reliance on digital tools for CPD may inadvertently exclude this cohort. Therefore, future studies and CPD initiatives should consider mixed method approaches to ensure inclusivity.

Many pharmacists (72.7%) had over 10 years of professional experience. This may indicate that seasoned professionals are more inclined to engage with CPD, possibly due to stronger alignment between CPD and career advancement or professional identity. However, the low representation of early-career pharmacists (only 7.7% had under 5 years of experience) raises concerns about whether younger professionals are adequately supported or motivated to engage with CPD early in their careers. This trend is concerning as it may signal a disconnect between CPD frameworks and the developmental needs of emerging professionals. Targeted onboarding strategies or mentorship models could help bridge this gap.

The predominance of female respondents (70.3%) aligns with South African Pharmacy Council (SAPC) statistics (SAPC, 2025a) confirming the feminization of the profession. While this reflects the actual distribution, it also presents an opportunity to examine how gendered experiences such as caregiving responsibilities or part-time work, might influence CPD access and participation. Future research could explore these dynamics to inform more equitable CPD policy design.

The sectoral distribution revealed that most participants (71.5%) were from the private sector. This is noteworthy, as it is inconsistent with SAPC data, which indicates that a larger proportion of pharmacists in South Africa are employed in the public sector (SAPC, 2025b). This mismatch suggests possible structural or contextual barriers, such as limited internet access, heavier workloads, or a lack of institutional support for CPD, in the public sector. It also raises questions about systemic inequities in professional development access between sectors. These factors may also influence CPD participation and should be considered when designing CPD strategies or interventions.

Furthermore, the high proportion of respondents working more than 40 hours per week (42.6%) highlights the potential impact of workload on CPD engagement, reinforcing international findings that time constraints are among the most significant barriers to CPD participation (Hijazen *et al.*, 2023; Aldakhil *et al.*, 2024). This underlines the need for flexible CPD delivery models that accommodate demanding work schedules.

3.11.3 CPD Compliance

The study found high CPD compliance rates, with 94.3% of respondents reporting that they submitted CPD entries in both 2022 and 2023. This suggests a strong professional commitment among Gauteng pharmacists to meet regulatory requirements. These findings represent a substantial improvement compared to earlier data from Mpumalanga, where only 24.8% of pharmacists voluntarily recorded their CPD activities prior to the implementation of mandatory CPD (Gumede, Helberg and Bezuidenhout, 2021). Although 64% of pharmacists in that study participated in CPD activities, the majority did not formally record them. Reasons cited included the non-mandatory nature of CPD at the time (27.3%), lack of information (27.3%), lack of interest (27.3%), time constraints (39.1%), and challenges with the recording system (26.1%). The markedly higher compliance observed in the present study may be attributed to the South African Pharmacy Council's structured CPD framework, which links CPD participation directly to annual professional registration (SAPC, 2019a) thereby encouraging consistent engagement and accountability. This link between regulation and behavior underscores a broader trend: external enforcement mechanisms can successfully drive compliance, even in contexts where intrinsic motivation may be lacking. The strong compliance among practicing pharmacists reinforces the idea that regulatory enforcement, when implemented clearly and consistently, can play a pivotal role in shaping professional behaviour (Merry *et al.*, 2023). However, it is also important to note that compliance does not necessarily imply meaningful engagement. Literature suggests that many professionals complete CPD activities to meet mandatory requirements (Main and Anderson, 2023). This highlights the need for deeper evaluation of the quality and reflective value of CPD submissions, not just quantity or frequency. In this context, the present findings should be interpreted as a positive step toward systemic accountability, but one that still requires complementary strategies (e.g., reflective tools, mentorship) to foster genuine engagement with lifelong learning.

3.11.4 Knowledge of CPD activities

The findings of this study reveal that pharmacists in Gauteng possess a high level of knowledge regarding CPD processes and requirements. Many respondents either agreed (49.6%) or strongly agreed (30.3%) that they understood CPD activities and expectations, indicating that pharmacists feel well-informed in this area. These perceptions were supported by one-sample t-test results, which showed that the mean scores for all knowledge-related items were significantly below the neutral midpoint of 3 ($p < 0.001$), further confirming a generally strong understanding of CPD among respondents.

Notable, areas of particularly strong knowledge included awareness of CPD resources ($M = 1.84$, $t = -32.136$, $p < 0.001$) and CPD planning ($M = 1.857$, $t = -30.901$, $p < 0.001$). These findings suggest that pharmacists are well-equipped to identify, access, and utilize resources relevant to their ongoing professional development. Similarly, high confidence in planning and implementing CPD activities ($M = 1.905$, $t = -26.341$, $p < 0.001$) reflects an encouraging trend in the professional maturity and self-directed learning habits of participants. Furthermore, respondents demonstrated strong awareness of how to apply learning from CPD to their practice ($M = 2.17$, $t = -18.33$, $p < 0.001$), reinforcing the practical value pharmacists attach to CPD.

However, the area with the highest mean score ($M = 2.234$, $t = -16.918$, $p < 0.001$) was related to identifying areas for improvement, which reflects the reflective component of CPD. Although scores in this area still indicated strong knowledge overall, the relatively higher value suggests that pharmacists may be less confident in engaging with reflective practice, a key aspect of effective CPD. This finding aligns with international literature, which often cites reflective capacity as a weaker point in CPD engagement, particularly when CPD is completed primarily for compliance rather than professional growth (Main and Anderson, 2023).

The overall knowledge score ($M = 2.0$, $t = -\infty$, $p < 0.001$) confirms a comprehensive understanding of CPD among respondents, particularly in terms of planning and implementation. Nevertheless, targeted interventions to strengthen reflective practice, such as guided self-assessment tools, mentorship programs, or reflective writing workshops, may enhance the depth and transformative potential of CPD participation. Strengthening this area

could help shift CPD from a compliance-based activity to a more meaningful and professionally enriching process.

3.11.5 Attitudes towards CPD

The findings of this study indicate that pharmacists in Gauteng generally hold positive attitudes toward Continuing Professional Development (CPD). As shown in Table 3.8, a substantial proportion of respondents agreed (36.7%) or strongly agreed (24.8%) with positive statements about CPD participation, suggesting a widespread recognition of its value within the profession. These perceptions were reinforced by the results of the one-sample t-test (Table 3.9), which produced an overall mean score of 2.0 ($p < 0.001$), statistically confirming a favourable attitude across all measured components of CPD engagement.

One of the strongest indicators of positive attitude was pharmacists' commitment to complying with CPD requirements ($M = 1.754$, $t = -28.254$, $p < 0.001$). This suggests a high level of professional responsibility and alignment with regulatory expectations. Pharmacists appear to understand the necessity of CPD for maintaining registration and professional standing, and this compliance reflects a generally well-internalized awareness of its importance.

However, despite this compliance, pharmacists' enthusiasm for CPD was notably lower, with a mean score of 3.4, closer to the neutral midpoint. This discrepancy between compliance and motivation is significant, as it suggests that while pharmacists participate in CPD due to professional obligation, they may not be intrinsically motivated or emotionally engaged with the process. This aligns with the findings of Al-Kubaisi, Elnour, and Sadeq (2023), who reported that CPD participation often improves when activities are interactive, relevant to daily practice, and tailored to individual learning needs. These results point to a need for CPD programs that not only meet regulatory standards but also foster engagement and personal relevance.

The observed gap between compliance and intrinsic enthusiasm can be understood through the lens of Self-Determination Theory (SDT), which posits that optimal motivation arises when individuals experience autonomy, competence, and relatedness (Manninen *et al.*, 2022). In this study, while pharmacists demonstrated a strong sense of competence in accessing and completing CPD activities, the relatively lower enthusiasm scores suggest a lack of autonomy and intrinsic connection to the CPD process. SDT highlights that when participation is primarily driven by external pressures (e.g., regulatory requirements) rather than internalized values or personal interest, motivation tends to be controlled rather than autonomous. Future

CPD models that enhance choice, relevance, and professional identity alignment could promote more self-determined engagement, leading to deeper, more sustainable learning outcomes. Integrating motivational frameworks into CPD programme design could thus strengthen both participation and meaningful professional development.

Respondents also demonstrated a strong sense of self-efficacy in managing the practical aspects of CPD. Pharmacists reported high levels of confidence in accessing the necessary resources ($M = 1.998$, $t = -23.281$, $p < 0.001$) and managing their time effectively for CPD activities ($M = 2.463$, $t = -10.05$, $p < 0.001$). These findings indicate that structural or logistical barriers are not the primary limitations to CPD participation in this context. Instead, the challenge may lie more in maintaining sustained motivation, ensuring relevance of CPD content, and creating opportunities for pharmacists to engage in ways that are meaningful to their practice.

Overall, these results highlight a positive foundation of compliance and capability, but they also reveal an important area for growth in attitudinal engagement. To foster more enthusiastic participation, CPD frameworks should incorporate personalized learning paths, practical case-based activities, peer learning, and opportunities for reflection. Such approaches may shift CPD from being primarily compliance-driven to being seen as a genuinely valuable tool for professional growth and job satisfaction.

3.11.6 Pharmacists' perceived barriers to CPD participation

Despite the generally positive attitudes toward CPD and strong levels of compliance observed in this study, several barriers to participation were identified. While the majority of respondents (82%) reported having sufficient time for CPD, a notable 17.8% cited time constraints as a barrier (Table 3.10). Although this proportion may appear small, it remains significant, particularly in a profession where long working hours and staff shortages are common. Time-related barriers have consistently been highlighted in international literature as a primary impediment to CPD participation (Hijazen *et al.*, 2023; Aldakhil *et al.*, 2024), suggesting that even a modest percentage may indicate systemic challenges affecting pharmacists' ability to engage consistently.

Technology-related challenges also emerged, especially in accessing digital CPD resources. With the increasing shift toward online and remote learning formats, accelerated further by the COVID-19 pandemic, these challenges become particularly relevant. Barriers such as poor internet access, limited device availability, and insufficient digital literacy can hinder

meaningful engagement with CPD platforms. As such, improving digital access and competency should be seen as a priority in CPD programme design, especially for pharmacists in under-resourced or rural settings.

Further, 25% of participants reported that CPD learning opportunities were not readily available, and 10% indicated a lack of necessary resources, such as internet or relevant content. These findings highlight ongoing structural barriers that can prevent otherwise motivated professionals from accessing CPD. This suggests a potential disconnect between available CPD offerings and the practical needs of pharmacists, particularly in terms of topic relevance, language accessibility, and delivery format.

Interestingly, the responses captured in the "Other" category revealed a range of nuanced and context-specific barriers not accounted for in the predefined options. This points to the limitations of quantitative instruments in fully capturing the CPD experience and underscores the value of incorporating qualitative data to understand pharmacists' lived realities. Themes such as burnout, lack of employer support, or uncertainty about how to log CPD activities may all fall into this category, warranting further exploration.

Importantly, the presence of these barriers did not appear to significantly diminish overall CPD participation. Most pharmacists did not find the challenges insurmountable, which speaks to a strong underlying commitment to professional development. Nonetheless, the persistence of these obstacles, even among a minority, should not be overlooked. Addressing them could further enhance equity, inclusivity, and sustainability in CPD engagement across all practice settings.

These results highlight the need for a multi-pronged approach to CPD improvement, including expanding access to tailored, context-sensitive CPD activities, enhancing digital infrastructure, and conducting deeper qualitative research to inform policy and programme development. By doing so, stakeholders can better support the entire pharmacy workforce and ensure that CPD remains a meaningful, accessible, and empowering tool for professional growth.

3.11.7 Key qualitative themes in barriers to CPD engagement.

The study revealed a complex and nuanced understanding of the barriers pharmacists face in participating meaningfully in CPD, despite generally positive attitudes and high levels of compliance. Time constraints, while not universally experienced, continue to be a significant concern for a notable minority of pharmacists. Although 82% of respondents indicated that they had sufficient time to complete CPD activities, 17.8% reported otherwise. Responses in the "Other" category further unpacked this finding, revealing that challenges in balancing demanding workloads with CPD obligations remain a common theme. Specific concerns included the absence of protected time during work hours for CPD engagement, and suggestions were made to reduce the annual CPD submission requirement from six to four entries. These responses underscore the real-world pressures pharmacists face, even when they are committed to ongoing professional development.

The feedback also illuminated broader dissatisfaction with the CPD process itself, particularly in relation to its structure and user interface. Respondents expressed frustration over what they perceive as a cumbersome and inflexible system, especially for those in specialised fields such as industry. The requirement to frame learning activities around pre-identified gaps was viewed as impractical by some, particularly when engaging in opportunistic learning such as attending a professional conference. These findings suggest that while the intent of reflective CPD is valuable, the current process may

not align with the dynamic and diverse nature of pharmacists' learning experiences.

In terms of access, 75.1% of pharmacists agreed that CPD learning opportunities were available, yet 24.9% disagreed. Qualitative responses revealed a divide in perceptions, some pharmacists felt there were ample options, including short online webinars, while others preferred more flexible formats, such as bite-sized learning with certificates or a return to the CPD point system. These insights reflect varying learning preferences and point to the need for greater diversity in CPD formats, allowing pharmacists to choose methods that align with their time, professional focus, and preferred learning styles.

On a more positive note, nearly 90% of respondents reported having access to the resources required to complete CPD activities, including reliable internet, computer access, and support from platforms such as SAPC tutorials. This suggests that technological and logistical barriers are no longer major obstacles for most pharmacists in urban or well-resourced settings. However, the 10.1% of respondents who indicated otherwise, often working in rural or under-resourced areas, highlight the ongoing need for equitable access to CPD infrastructure.

The perceived quality of CPD activities was largely positive, with 71.9% of respondents reporting that the activities enhanced their knowledge. Yet nearly a third (28.1%) felt the content was of low quality or not relevant to their practice. These findings suggest that while the overall CPD ecosystem is functional and beneficial, there is room to improve content relevance, delivery methods, and presenter quality. If left unaddressed, this dissatisfaction could contribute to disengagement, even among those who consistently meet compliance standards.

Collectively, these findings reveal a dual narrative: pharmacists demonstrate strong professional commitment and are largely capable of meeting CPD requirements, yet many remain frustrated by the format, rigidity, or perceived inefficiencies in the system. The feedback suggests a clear appetite for more streamlined, flexible, and profession-specific CPD models, as well as more responsive platforms that acknowledge the realities of modern pharmacy practice.

3.11.8 Interrelation of compliance, knowledge, barriers and attitudes

The findings of this study indicate that while pharmacists in Gauteng demonstrate high levels of compliance, this does not always translate into intrinsic motivation or meaningful engagement with CPD. Instead, compliance appears closely linked to regulatory enforcement mechanisms, particularly the requirement to complete CPD activities for annual registration. At the same time, pharmacists reported strong knowledge of CPD processes, suggesting they are not only aware of expectations but also feel technically prepared to meet them. However, this cognitive readiness does not necessarily overcome attitudinal or structural barriers. For example, although pharmacists reported confidence in accessing resources and planning CPD, their enthusiasm scores were significantly lower, indicating that knowledge may enable participation, but does not guarantee motivation. Similarly, while barriers such as time constraints, digital access, and relevance of CPD content were only reported by a minority, their presence may still erode motivation over time and reduce the perceived value of CPD. These dynamics suggest that compliance is being maintained through external obligation rather than internal commitment, and that the full potential of CPD, as a tool for reflective, professional growth, remains underutilized. Addressing these issues will require an integrated

approach that not only simplifies access and improves content quality but also fosters personal relevance, reflection, and autonomy in learning.

Furthermore, the findings highlight the need to strengthen reflective practice within the CPD process. Tools such as Kolb's Experiential Learning Cycle, emphasizing concrete experience, reflective observation, abstract conceptualization, and active experimentation, could offer a structured framework for pharmacists to deepen their learning through CPD activities (Dong *et al.*, 2021). Similarly, Schön's model of reflection-in-action and reflection-on-action underscores the importance of integrating real-time learning into everyday professional practice, encouraging pharmacists to become more adaptive and self-critical learners (Dong *et al.*, 2021). Incorporating reflective models into CPD training could enhance the meaningfulness and transformative potential of CPD engagement beyond regulatory compliance.

Looking forward, ensuring the long-term sustainability of CPD systems in South Africa will require the development of a CPD resilience model. Such a model would emphasize adaptability in CPD delivery methods (e.g., hybrid learning, microlearning modules), flexible timelines to accommodate workload pressures, localized content development to ensure relevance across diverse practice settings, and proactive support structures for pharmacists. Building CPD systems that are resilient to technological, policy, and workforce changes will be critical to maintaining pharmacist competence and supporting the evolving healthcare landscape.

Finally, the findings of this study offer important insights for regulatory bodies such as the SAPC. A stronger regulatory feedback loop could be established by using CPD submission audits not merely as compliance checks, but as tools for identifying sector-specific learning needs, gaps in reflective practice, and support requirements. SAPC could leverage audit data to design more tailored CPD interventions, differentiate CPD expectations across sectors (e.g., clinical vs. manufacturing pharmacists), and offer targeted practitioner support. This approach would move beyond a purely administrative model toward a developmental and quality-enhancing model of CPD governance.

3.11.9 Discussion summary

In summary, while pharmacists in Gauteng demonstrate strong compliance with CPD requirements and possess substantial knowledge of CPD processes, challenges related to

reflective engagement, motivational depth, access equity, and systemic support remain. Addressing these gaps through enhanced reflective practice models, resilient CPD delivery systems, and strategic regulatory feedback mechanisms will be critical to advancing the sustainability, quality, and transformative potential of CPD within South Africa's pharmacy profession. CPD is critical to the success of South Africa's National Health Insurance (NHI), which aims to strengthen the healthcare workforce for universal health coverage. Pharmacists play a key role in delivering primary care, managing medications, and promoting public health. Expanding access to targeted, high-quality CPD, especially in underserved area, will help equip pharmacists with the skills needed to meet the demands of the NHI and support broader health system resilience.

CHAPTER 4: Conclusion and future recommendations

4.1. Summary of key findings

CPD Compliance

A high CPD compliance rate of 94.3% was observed among respondents, indicating strong adherence to regulatory requirements. This compliance is significantly higher than previous findings in provinces like Mpumalanga, where only 24.8% of pharmacists voluntarily recorded CPD activities prior to CPD becoming mandatory. However, compliance appears to be driven primarily by regulatory obligation rather than intrinsic motivation or professional curiosity.

Knowledge of CPD

Pharmacists demonstrated a robust knowledge base regarding CPD, particularly in, resource awareness (88.1%), CPD planning (86.5%) and application of learning in practice. The overall knowledge score ($M = 2.0$, $p < 0.001$) reflects a solid understanding across key areas. $M = 2.0$ on a 5-point Likert scale is interpreted as positive due to reverse scoring. The weakest area of knowledge was reflective practice, suggesting a gap in self-assessment and deeper learning integration.

Attitudes toward CPD

Attitudes toward CPD were generally positive, with 84.4% indicating favourable views toward compliance and CPD value. Pharmacists displayed confidence in managing time and accessing resources for CPD. Only 28.1% expressed genuine enthusiasm, indicating a potential disconnect between compliance and active engagement. The discrepancy between high CPD compliance and lower enthusiasm among pharmacists may reflect a predominance of extrinsic over intrinsic motivation, as described by Self-Determination Theory. Future CPD strategies that enhance autonomy, relevance, and personal meaning could foster more self-driven engagement and deeper learning.

Barriers to CPD participation

Most pharmacists reported minimal barriers, but specific challenges were noted. Time constraints (17.8%), especially balancing CPD with high workloads, limited access to CPD opportunities (24.9%) and inadequate resources (10.1%) and frustration with the complexity and rigidity of the CPD submission process was a recurring theme in qualitative responses.

Pharmacists in non-clinical roles reported the current system as being misaligned with their learning needs.

Demographic insights

The sample was dominated by mid- to late-career pharmacists and those from the private sector. Early-career and public sector pharmacists were underrepresented, highlighting engagement gaps that require targeted strategies. The predominance of female respondents (70.3%) aligns with national workforce trends, though gender-specific CPD experiences warrant further exploration.

Perceptions of CPD content and resources

A total of 71.9% of respondents found CPD content valuable and relevant, though a notable 28.1% reported dissatisfaction with quality or applicability. Digital resources and tutorials were widely available, yet a minority of pharmacists still faced digital access and literacy challenges.

4.2 Implications for practice and policy

This study explored South African pharmacists' knowledge, attitudes, compliance, and perceived barriers related to Continuing Professional Development (CPD), with a focus on those practicing in the Gauteng province. The findings confirm that while compliance with CPD requirements is high, driven largely by regulatory mandates, meaningful engagement remains inconsistent and could benefit from targeted improvements in structure, content, and delivery.

The high compliance rate (94.3%) reflects a strong professional commitment and the success of the South African Pharmacy Council's mandatory CPD system. Pharmacists also demonstrated a solid understanding of CPD requirements, particularly in areas such as resource awareness and planning. These findings suggest that the current framework has successfully created a foundation for CPD awareness and administrative adherence.

However, the study revealed a disconnect between compliance and enthusiasm. While pharmacists were well-informed and capable of managing time and resources for CPD, many reported low levels of intrinsic motivation. Only 28.1% expressed enthusiasm for CPD, suggesting that participation is often obligation-driven rather than motivated by professional

curiosity or learning desire. This points to the need for CPD formats that are more engaging, relevant, and responsive to pharmacists' daily practice realities.

Despite the majority feeling they had sufficient time for CPD, 17.8% still reported time constraints, and qualitative responses pointed to the challenges of balancing heavy workloads with CPD expectations. It is important to recognize that mid-career pharmacists, who often carry significant clinical, managerial, and mentoring responsibilities, may be particularly vulnerable to professional burnout. While CPD has the potential to support career resilience by enhancing skills, professional identity, and job satisfaction, poorly structured or overly burdensome CPD requirements could inadvertently exacerbate stress and fatigue. Therefore, CPD frameworks must be designed with flexibility, relevance, and practitioner well-being in mind, ensuring that professional development activities serve as a source of empowerment rather than an additional administrative burden. These findings support the call for more flexible, modular, and practice-integrated CPD options, such as microlearning, in-service activities, or protected CPD time during work hours.

Perceived barriers to CPD were generally low, but concerns around accessibility of learning opportunities, digital platform usability, and relevance of content were recurrent themes. While 75.1% believed learning opportunities were available, nearly a quarter of respondents disagreed. Additionally, a small but important group (10.1%) reported inadequate access to necessary resources, particularly in under-resourced or rural areas, highlighting ongoing digital equity concerns.

The CPD submission process was a notable source of frustration. Many respondents found it cumbersome, repetitive, or poorly aligned with real-world learning, especially in non-clinical practice settings. This suggests that revisiting the format and expectations of the current system, particularly for pharmacists working in industry or academia, could improve usability and engagement.

Demographic analysis revealed that mid- to late-career pharmacists and those from the private sector were most represented, with underrepresentation of public sector and early-career pharmacists. These disparities point to potential access and engagement gaps that must be addressed through inclusive policies and tailored support strategies. The predominance of

female respondents was consistent with national workforce trends, but it may also be valuable to explore whether gender-specific challenges exist in CPD participation.

Overall, this study shows that this sample of South African pharmacists are knowledgeable, compliant, and committed, but often unenthusiastic and occasionally burdened by CPD processes. The key to enhancing CPD effectiveness lies in moving beyond compliance toward models that support personalized, reflective, and meaningful learning experiences. Regulatory bodies, CPD providers, and educational institutions must collaborate to make CPD more accessible, relevant, and empowering for all pharmacists, across all sectors and stages of their careers.

4.3 Recommendations

Based on the findings of this study, the following recommendations are proposed to improve the relevance, accessibility, and quality of Continuing Professional Development (CPD) for pharmacists in South Africa. These recommendations draw on international best practices and aim to support more reflective, inclusive, and sustainable CPD engagement.

Enhance reflective practice and meaningful engagement

Target audience includes South African Pharmacy Council (SAPC), CPD providers and professional bodies. Integrate guided reflection templates, learning portfolios, and self-assessment prompts into the SAPC online platform to support deeper engagement beyond task completion. This can be supported by periodic peer-coaching or mentor reviews, especially for early-career pharmacists, to reinforce critical reflection and dialogue. The UK General Pharmaceutical Council (GPhC) CPD model includes a reflective revalidation system that requires pharmacists to submit structured reflective accounts and peer discussions annually (GPhC, 2018). Similarly, the Pharmacy Board of Australia encourages reflective planning linked to performance feedback and practice review (Pharmacy Board of Australia, 2021a). SAPC can explore similar tools to promote reflective, personalized learning.

Streamline and simplify the CPD submission process

Target audience would be the SAPC and CPD platform developers. Redesign the SAPC platform to reduce administrative burden by allowing pharmacists to submit evidence of participation, such as certificates or automated logs for accredited webinars and offering pre-

approved group learning activities or conference attendance as CPD credits. SAPC could explore interoperability with CPD provider platforms, allowing verified attendance data to auto-populate CPD portfolios akin to learning management system integrations. In Canada, the Ontario College of Pharmacists allows pharmacists to upload evidence of learning and encourages integration of CPD into daily practice through outcome-based documentation (OCP, 2022). Such practices reduce duplication and support user-friendly systems that accommodate real-world learning contexts.

Promote CPD accessibility through work-integrated and modular learning

The target audience would be employers, the SAPC and academic partners. Encourage the development and accreditation of microlearning modules (e.g., 10–15-minute CPD units), which can be completed during short breaks. Promote on-the-job CPD models through employer-endorsed in-service sessions, product trainings, or clinical audits. The Australian model includes self-paced CPD, workplace-based learning, and professional development plans tailored to individuals' practice areas (Pharmacy Guild of Australia, 2020). Employers should allocate protected CPD time (e.g., one hour per month), a strategy widely adopted in UK NHS Trusts to support professional development.

Ensure equitable digital access and resource distribution

Target audience would be the SAPC, Department of Health, private and public employers. Invest in basic digital infrastructure for pharmacists in underserved settings and provide introductory digital skills training. Provide offline-accessible CPD materials, USB resources, or mobile-based learning for pharmacists in rural areas. Lessons from Canada’s rural CPD initiatives offered by The University of British Columbia (UBC), which include mail-based learning and hybrid online-offline models, could inform context-sensitive approaches in South Africa (UBC, 2020).

Align CPD content with practice-specific needs

Target audience: CPD providers, professional associations, regulatory bodies. Conduct annual needs assessments to identify evolving learning priorities across sectors (clinical, industry, academic, regulatory). Develop customisable CPD tracks aligned with pharmacists' specific practice roles. The Royal Pharmaceutical Society (UK) supports personal development plans and offers modular CPD learning based on individual scope and interests (RPS, 2022).

Strengthen early CPD engagement through curriculum integration

Target audience: Pharmacy schools, SAPC, academic regulators. Introduce CPD concepts and digital tools early in the undergraduate pharmacy curriculum. The Canadian National Association of Pharmacy Regulatory Authorities (NAPRA) recommends CPD education beginning in university to cultivate a lifelong learning mindset (NAPRA, 2019). South African institutions should consider integrating reflective writing, digital CPD navigation, and self-assessment tasks in final-year modules.

Improve CPD quality assurance systems

Target audience: SAPC, CPD accrediting bodies. Implement external audits to review CPD activity quality, with periodic pharmacist feedback surveys. Encourage peer-reviewed accreditation of CPD content, drawing on Australia's system where CPD activities are assessed by accrediting bodies like the Australian Pharmacy Council (ACP, 2021).

Expand CPD research nationally using mixed methods Approaches

Target audience: Academic institutions, SAPC, professional bodies. Conduct nationwide research using both quantitative and qualitative tools to explore variations in CPD access, motivation, and outcomes across regions and practice settings. Investigate motivational factors and psychosocial barriers, particularly in underserved sectors such as public health and early-career practice. International studies have emphasized the value of combining surveys with interviews or focus groups to explore context-specific CPD needs (Al-Kubaisi, Elnour and Sadeq, 2023).

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Appendices

Appendix A: Ethics clearance

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Miss Ruvimbo Tina Tariro Kateera

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M230516 M231213-A-0001

NAME: (Principal Investigator)	Miss Ruvimbo Tina Tariro Kateera
DEPARTMENT:	Pharmacy Practice Online - South African Pharmacy Council (SAPC)
DEGREE:	Master of Science in Medicine
PROJECT TITLE:	South African pharmacists' knowledge and attitudes, towards continuing professional development in the Gauteng Province of South Africa
DATE CONSIDERED:	26-May-2023
DECISION:	Approved unconditionally
CONDITIONS:	N/A
NOTE:	Application Number: MED23-04-248. If contact information regarding student study participants is required, please contact the Registrar's office: Nicoleen.Potgieter@wits.ac.za
SUPERVISORS:	Dr G. Mahumane, Mrs Z. Booth and Mrs R. Shaikh
APPROVED BY:	Prof P. Ruff, Chairperson, HREC (Medical)
DATE OF APPROVAL:	13-Dec-2023 **EXPIRY DATE:** 12-Dec-2028

This clearance certificate is valid for 5 years from data 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

Signature of Principal Investigator

13 December 2023
Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix B: Final structured questionnaire

Confidential

South African pharmacists' knowledge and attitudes, towards Continuing Professional Development (CPD) in Gauteng

Thank you for taking time out of your day to participate in this study.

This study aims to document the knowledge, and attitudes, towards mandatory continuing professional development activities by pharmacists practicing in the Gauteng province of South Africa. The study is being conducted at the Department of Pharmacy and Pharmacology, at the University of the Witwatersrand towards a Master's degree program. The study has been reviewed and received ethical clearance from the University of the Witwatersrand Human Research Ethics Committee (Medical) under Clearance Certificate Number M230516 M231213-A-0001.

Your participation in this study is voluntary and you may withdraw at any time. You will not be penalized if you decide not to participate. The procedure involves completing a self-administered online survey that will take approximately 5 to 10 minutes. All responses are confidential and no identifying information will be collected. The data collected will be used exclusively for the approved research project. Please note that this is an anonymous link.

Should you have queries about your rights as a study participant or queries about any aspect of the research, you may contact the HREC (Medical): the HREC (Medical) Nicoleen Potgieter of the Register's office at Nicoleen.Potgieter@wits.ac.za; the Committee secretariat on 0117172700 / 1234 or email Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za.

Should you have queries regarding the content of the study, contact: the Principal Investigator (PI) Tina Ruvimbo Kateera (541222@students.wits.ac.za); the supervisors Dr Gillian Mahumane (gillian.mahumane@wits.ac.za), Mrs Zelna Booth (zelna.booth@wits.ac.za) and Mrs Rubina Shaikh (rubina.shaikh@wits.ac.za).

Consent:

Your participation in the survey indicates that: you have read and agree to the information above, you voluntarily agree to participate in this study, and you are at least 18 years of age.

Please complete the survey below.
Thank you for participating in this study.

Age	◯ 20 - 39 ◯ 40 - 59 ◯ 60 and above
Gender	◯ Male ◯ Female ◯ I do not wish to disclose ◯ Other (please specify)
If other gender, specify here	_____
Highest degree obtained	◯ Bachelor of Pharmacy ◯ Master's degree ◯ PhD
Marital status	◯ Single (never married) ◯ Married, or in a domestic partnership. ◯ Widowed. ◯ Divorced. ◯ Separated. ◯ I do not wish to disclose ◯ Other (please specify)
	_____

Pharmacy Practice Location	◯ In Gauteng province ◯ Outside the Gauteng province
Practice sector	◯ Public sector ◯ Private sector ◯ Other (please specify)
If other practice sector, specify here	_____
Total average working hours per week	◯ Below 40 Hours weekly ◯ 40 Hours weekly ◯ Above 40 Hours weekly
Years practicing	◯ Below 5 years ◯ Between 5 and 10 years ◯ Above 10 years
SAPC registration status in the year 2022	◯ Practicing ◯ Non-practicing
SAPC registration status in the year 2023	◯ Practicing ◯ Non-practicing
Submitted and completed CPD requirements in 2022	◯ Yes ◯ No
Submitted and completed CPD requirements in 2023	◯ Yes ◯ No

25% Complete.

QUESTIONS ON THE KNOWLEDGE OF PHARMACISTS IN CONDUCTING CPD ACTIVITIES

I can identify areas that I require improvement on, with regard to my learning needs and CPD activities.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I am fully aware of the resources needed to address my CPD requirements (resources such as as (but not limited to) computer access, internet access, SAPC tutorials and SAPC guidance manual)	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I can plan and access resources needed to fulfil CPD activities (requirements such as (but not limited to) computer access, internet access, SAPC Tutorials, SAPC Guidance manual).	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I can implement my CPD activities and submit them to SAPC successfully.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I can assess and apply what I have learned from my CPD activities.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

50% Complete.

QUESTIONS ON THE ATTITUDE OF PHARMACISTS IN CONDUCTING CPD ACTIVITIES

I have been consistently compliant with the submission of my annual CPD activities to the SAPC throughout my professional registration record within the profession.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I feel positive that CPD activities are developing me in my practice as a pharmacist.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I believe I have sufficient time to achieve my CPD goals as set out by the SAPC.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I believe I have sufficient resources (computer access, internet access, conferences, tutorials) to complete the minimum requirement number (six) of CPD activities.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I have the enthusiasm to do CPD activities.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree
I am confident in conducting and submitting my CPD activities.	◯ Strongly Agree ◯ Agree ◯ Neutral ◯ Disagree ◯ Strongly Disagree

75% Complete.

QUESTIONS ON THE BARRIERS THAT PHARMACISTS FACE IN CONDUCTING CPD ACTIVITIES

How do you feel about the time required to do CPD activities?	◯ Sufficient ◯ Insufficient
Please elaborate your thoughts on the time required to do CPD activities.	_____
What are your thoughts on the availability of CPD learning opportunities?	◯ Available ◯ Unavailable
Please elaborate your thoughts on the availability of CPD learning opportunities?	_____
What are your thoughts on the availability of resources required to address CPD activities? (Examples include computer access, internet access, SAPC Tutorials, SAPC Guidance manual)	◯ Available ◯ Unavailable
Please elaborate your thoughts on the availability of resources required to address CPD activities.	_____
What is your opinion on the quality of CPD activities available to you, do they help enrich your knowledge?	◯ High Quality ◯ Poor Quality
Please elaborate on your opinion on the quality of CPD activities available to you.	_____

100% Completed! Submit your survey. .

Appendix C: South African pharmacy council letter

COMPANY SECRETARY & LEGAL SERVICES

MS RTT KATEERA

Email: 541222@students.wits.ac.za

Your Reference	Our Reference	Date
P43570	SAPCCL/DG HOFFMANN	31 January 2024

Dear Ms Kateera

MASTERS IN PHARMACY:
SA PHARMACISTS' KNOWLEDGE AND ATTITUDES TOWARDS CONTINUING PROFESSIONAL DEVELOPMENT IN GAUTENG

We refer to the abovementioned matter and in particular the request for contact details of pharmacists in Gauteng in order to conduct research by Ms Kateera for purposes of a Masters in Pharmacy, where the project is identified as:

"SA Pharmacists' Knowledge and Attitudes Towards Continuing Professional Development In Gauteng"

We confirm that the request for the information was accompanied by the appropriate ethics approval from the University of the Witwatersrand Human Research Ethics Committee (Medical) under Clearance Certificate Number M230516 M231213-A-0001.

Attached hereto please find the requested data, which is includes the details of pharmacists in Gauteng, which data includes only email addresses, as the South African Pharmacy Council will not permit the distribution of personal information such as cellular phone numbers.

Kindly note that:

(a) The registers kept by the Registrar in terms of section 14 of the Pharmacy Act, 53 of 1974 may change consistently. For this reason, the Registrar can only guarantee the accuracy of the information as at the time the register was drawn off our data system; and

(b) The accuracy of the information provided is not guaranteed by the Registrar as it relies on the accuracy of information provide by registered persons.

Kindly note further the following strict conditions in processing and using the data provided shall be adhered to at all times:

(a) The data may be used exclusively for the research project as identified in the Human Research Ethics Committee (Medical) approval;

(b) The data may only be used by the researcher and may not be given or sold to any other person for use or distribution thereof, and must be protected from such distribution at all times;

ALL CORRESPONDENCE TO BE ADDRESSED TO THE REGISTRAR

South African Pharmacy Council

Registered Office
SAPC Building
591 Belvedere Street
Arcadia, Pretoria,0083

Postal Address
Private Bag X40040
Arcadia, 0007

Customer Care Line
0861 7272 00

Fax
(27)12-321 1492 /1479

E-mail
customercare@sapc.za.org

Website
www.sapc.za.org

(c) Emails to the pharmacists must explain that the information is for approved research purposes only;

(d) Communication to the pharmacists must allow for an opt out of receiving email communication/further communication; and

(e) The outcome of the research must be shared with the South African Pharmacy Council.

Failure to adhere to the conditions herein, will result in disciplinary action been taken against you in terms of Section 39 of the Pharmacy Act, 53 of 1974.

Yours faithfully

for REGISTRAR

Appendix D: Survey participation invitation email

Gmail

Ruvimbo Tina Tariro Kateera <rttkateera@gmail.com>

Survey on South African Pharmacists' Knowledge and Attitudes Towards Continuing Professional Development in Gauteng

<noreply@witsredcap.co.za> Mon, 25 Mar at 18:06
Reply to: <541222@students.wits.ac.za>
To: <rttkateera@gmail.com>

Good day

You are invited to voluntarily participate in a study titled "*South African Pharmacists' Knowledge and Attitudes Towards Continuing Professional Development in Gauteng*." The study has been reviewed and received ethical clearance from the University of Witwatersrand Human Research Ethics Committee (Medical) under Clearance Certificate Number M230516 M231213-A-0001. This is a research project being conducted using REDCap at the department of Pharmacy and Pharmacology, towards a Masters degree program. Participation involves the completion of a self-administered online survey focusing on demographics, knowledge and attitude questions related to your experiences with the mandatory continuing professional development activities, in your capacity as a Pharmacist in the Gauteng province.

Clicking on the link will automatically lead you to the survey which will take 5 to 10 minutes to complete. All responses are confidential and no identifying information will be collected. The data collected will be used exclusively for the approved research project as identified in the Human Research Ethics Committee (Medical) approval. Participation in this research is voluntary and you may withdraw at any time. You will not be penalized if you decide not to participate. **Please note that this is an anonymous link.**

South African pharmacists' knowledge and attitudes, towards Continuing Professional Development (CPD) in Gauteng

Your participation is highly valued as it will directly impact the results of this study. Should you have queries about your rights as a study participant or queries about any aspect of the research, you may contact the HREC (Medical): the HREC (Medical) Nicoleen Potgieter of the Register's office at Nicoleen.Potgieter@wits.ac.za; the Committee secretariat on 0117172700 / 1234 or email Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za.

Should you have queries regarding the content of the study, contact: the Principal Investigator (PI) Tina Kateera (541222@students.wits.ac.za); the supervisors Dr Gillian Mahumane (gillian.mahumane@wits.ac.za), Mrs Zelna Booth (zelna.booth@wits.ac.za) and Mrs Rubina Shaikh (rubina.shaikh@wits.ac.za).

Click the Link Below to start Survey:

South African pharmacists' knowledge and attitudes, towards Continuing Professional Development (CPD) in Gauteng

or

Copy and paste url below in your browser to start survey:

https://redcap.core.wits.ac.za/redcap/surveys/?s=P35bI793eQTiT7Sj.

Your participation is highly appreciated, as it will directly contribute to the outcomes of this study.

Yours faithfully,

Regards

Tina Kateera

Principal Investigator

Appendix E: Survey participation reminder email

Gmail

Ruvimbo Tina Tariro Kateera <rttkateera@gmail.com>

[Reminder] Survey on South African Pharmacists' Knowledge and Attitudes Towards Continuing Professional Development in Gauteng

<noreply@witsredcap.co.za> Sun, 07 Apr at 18:05
Reply to: <541222@students.wits.ac.za>
To: <rttkateera@gmail.com>

Good day

You are invited to voluntarily participate in a study titled "*South African Pharmacists' Knowledge and Attitudes Towards Continuing Professional Development in Gauteng*." The study has been reviewed and received ethical clearance from the University of Witwatersrand Human Research Ethics Committee (Medical) under Clearance Certificate Number M230516 M231213-A-0001. This is a research project being conducted using REDCap at the department of Pharmacy and Pharmacology, towards a Masters degree program. Participation involves the completion of a self-administered online survey focusing on demographics, knowledge and attitude questions related to your experiences with the mandatory continuing professional development activities, in your capacity as a Pharmacist in the Gauteng province.

Clicking on the link will automatically lead you to the survey which will take 5 to 10 minutes to complete. All responses are confidential and no identifying information will be collected. The data collected will be used exclusively for the approved research project as identified in the Human Research Ethics Committee (Medical) approval. Participation in this research is voluntary and you may withdraw at any time. You will not be penalized if you decide not to participate. **Please note that this is an anonymous link.**

South African pharmacists' knowledge and attitudes, towards Continuing Professional Development (CPD) in Gauteng

Your participation is highly valued as it will directly impact the results of this study. Should you have queries about your rights as a study participant or queries about any aspect of the research, you may contact the HREC (Medical): the HREC (Medical) Nicoleen Potgieter of the Register's office at Nicoleen.Potgieter@wits.ac.za; the Committee secretariat on 0117172700 / 1234 or email Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za.

Should you have queries regarding the content of the study, contact: the Principal Investigator (PI) Tina Kateera (541222@students.wits.ac.za); the supervisors Dr Gillian Mahumane (gillian.mahumane@wits.ac.za), Mrs Zelna Booth (zelna.booth@wits.ac.za) and Mrs Rubina Shaikh (rubina.shaikh@wits.ac.za).

Click the Link Below to start Survey:

South African pharmacists' knowledge and attitudes, towards Continuing Professional Development (CPD) in Gauteng

or

Copy and paste url below in your browser to start survey:

https://redcap.core.wits.ac.za/redcap/surveys/?s=P35bl793eQTiT7Sj.

Your participation is highly appreciated, as it will directly contribute to the outcomes of this study.

Yours faithfully,

Regards

Tina Kateera

Principal Investigator

Appendix F: Ethics training certificates

TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Clinical Trials Centre
The University of Hong Kong

Certificat de formation - Training Certificate

Ce document atteste que - this document certifies that

Ruvimbo Tina Tariro Kateera

a complété avec succès - has successfully completed

Research Ethics Evaluation

du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation

Release Date: 2021/10/23

CID : QqAlr2NuY4

Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

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Programme de Formation Continue (5 Crédits)

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[REV : 20170310]


TRREE
Zertifikat
Certificat
Certificado
Certificate
Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants
Certificat de formation - Training Certificate
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Clinical Trials Centre
The University of Hong Kong
gillian mahumane
a complété avec succès - has successfully completed
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du programme de formation TRREE en évaluation éthique de la recherche
of the TRREE training programme in research ethics evaluation
Release Date: 2023/03/27
CID : IFeWYfYaaz
Professeur Dominique Sprumont
Coordinateur TRREE Coordinator
APPROVED BY
SIWF FMH
ISFM
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TRREE

Zertifikat
Certificat
Certificado
Certificate

Promouvoir les plus hauts standards éthiques dans la protection des participants à la recherche biomédicale
Promoting the highest ethical standards in the protection of biomedical research participants

Certificat de formation - Training Certificate

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Clinical Trials Centre
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Rubina Shaikh

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Introduction to Research Ethics

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Professeur Dominique Sprumont
Coordinateur TRREE Coordinator

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TRREE
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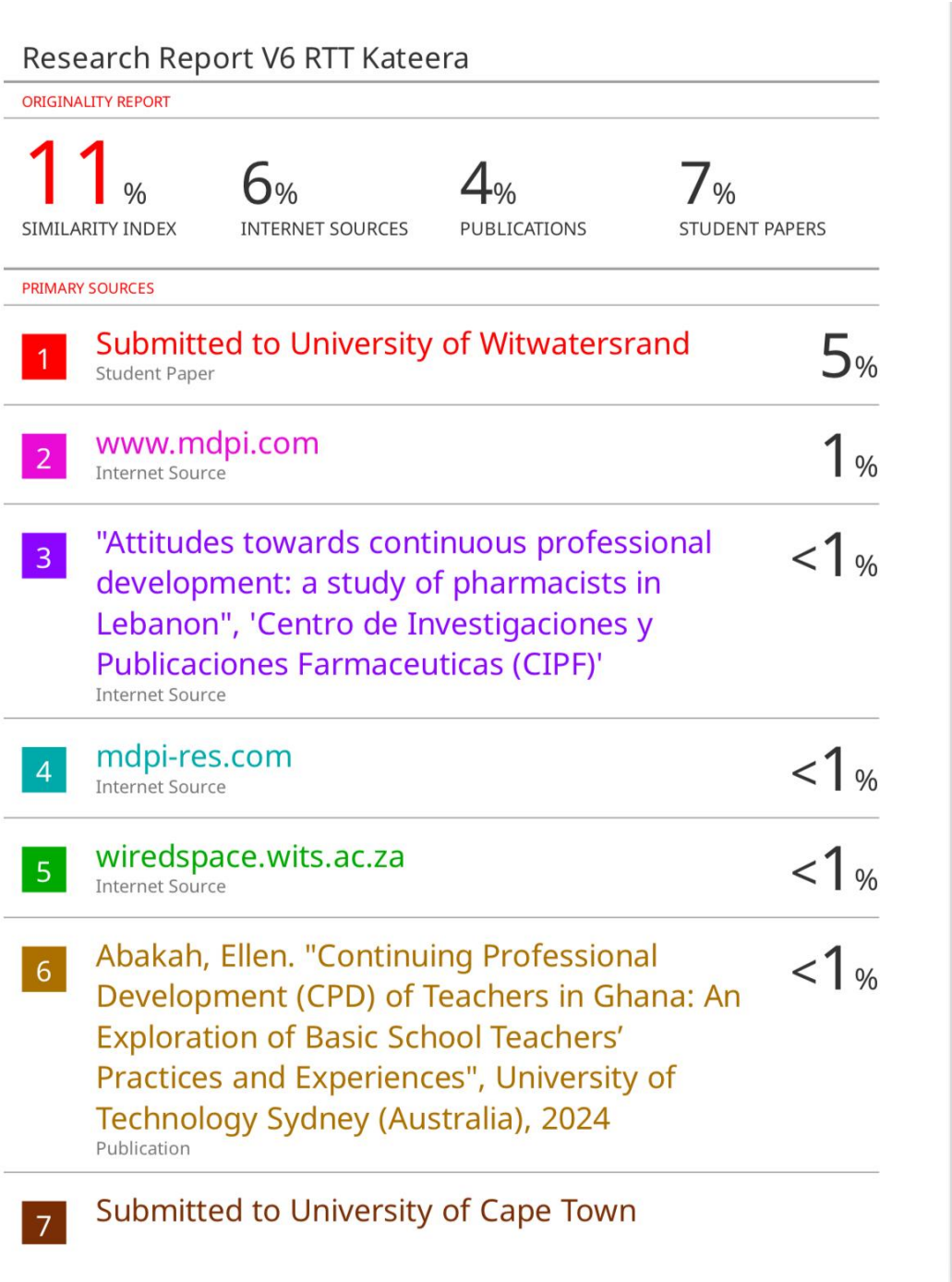

Research Report V6 RTT Kateera

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