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An Investigation of the Factors Contributing to the Shortage of Medicines at Umkhanyakude District Hospitals and PHC Facilities, KwaZulu-Natal, South Africa.

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An Investigation of the Factors Contributing to the Shortage of Medicines at Umkhanyakude District Hospitals and PHC Facilities, KwaZulu-Natal, South Africa.

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DECLARATION

I, Ntokozo Ben Fakude declare that the dissertation entitled: 'Investigation of the factors contributing to the shortage of medicines in Umkhanyakude district hospitals and PHC facilities, KwaZulu-Natal, South Africa, is my own original work and that the resources that I have used and quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.

Ntokozo Ben Fakude

11 December 2017

Date

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I also want to thank the Umkhanyakude District Health office for granting me permission to conduct the study in their hospitals. I also would like to thank all hospital management teams and pharmacy managers in all five hospitals at Umkhanyakude district for allowing me access to their premises to conduct this study. Last but one, I wish to thank all participants who completed the research questionnaire.

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EXECUTIVE SUMMARY

UMkhanyakude district pharmaceutical services started reporting shortages of medicines on weekly basis in 2013. However, there seems to be no improvement in the availability of medicines in the district, evidenced by the increasing number of patients leaving health facilities without their full quota of prescribed medicines. Shortages of medicines may manifest in various forms, e.g. disruptions in TB and ARV medicines supply may result in the development of MDR-TB and switching of ART patients to third line ARV regimens, respectively.

The study investigated factors contributing to the shortage of medicines at UMkhanyakude district hospitals and PHC facilities of KwaZulu-Natal, South Africa. A quantitative descriptive study was undertaken using a structured questionnaire administered to pharmacists and pharmacists assistants working in all five hospitals in Umkhanyakude district. The questionnaire explored demographic details, education and work experiences, factors causing medicine shortages, impact of medicines shortages on pharmacists and their assistants, and systematic issues in the management of medicines inventories. The study used a census survey approach, owing to the small size of the targeted population.

The findings of the study revealed that the following factors were significant in contributing to shortage of medicines in the district; shortage of pharmacists' assistants at PHC (90%); lack of computerised stock control system at PHC (88%); lack of dedicated transport for pharmaceutical services (79%); distance from suppliers (75%); global shortage of APIs (64%); and poor implementation of medicine supply management in PHC facilities (28%).

The shortage of pharmacists' assistants in PHC facilities and lack of computerised stock control system correspond with poor implementation of medicine supply management in clinics. The lack of dedicated vehicles for pharmaceutical services may have implications on PHC facilities incurring expenditure on medicines they may not have received. Therefore, health authorities need to take into considerations the strategic support nature of pharmaceutical services in realising the attainment of PHC re-engineering, Ideal Clinic Realisation and Maintenance, compliance with National Core standards and other strategic health programmes. Availability of medicines in rural

hospitals like Umkhanyakude cannot be achieved in an environment where there is poor alignment of strategic resources.

The knowledge gained from the study provided an insight regarding the need to understand how best to manage hospitals in modern days so as to ensure that all the strategic objectives of the department of health are realised. Moreover, difficulties inherent to rural hospitals regarding availability of medicines is not well documented scientifically, thus this study tried to provide that basic knowledge.

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List of Acronyms

ARV	ANTIRETROVIRAL
DHER	DISTRICT HEALTH EXPENDITURE REVIEW
EDL	ESSENTIAL DRUGS LIST
EML	ESSENTIAL MEDICINES LIST
FDC	FIXED DOSE COMBINATION
HIV/AIDS	HUMAN IMMUNO VIRUS/ACQUIRED IMMUNE DEFICIENCY SYNDROME
IDRM	IDEAL CLINIC REALISATION AND MAINTENCANCE
MDR-TB	MULTI DRUG RESISTANT TUBERCULOSIS
MSM	MEDICINE SUPPLY MANAGEMENT
NCS	NATIONAL CORE STANDARDS
NDP	NATIONAL DRUG POLICY
NHI	NATIONAL HEALTH INSURANCE
OHSC	OFFICE OF HEALTH STANDARDS COMPLIANCE
SAPC	SOUTH AFRICAN PHARMACY COUNCIL
STG	STANDARD TREATMENT GUIDELINES
TB	TUBERCULOSIS
TAC	TREATMENT ACTION CAMPAIGN
WHO	WORLD HEALTH ORGANISATION

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

The shortage of medicines in public health facilities is a major cause for concern, especially in developing countries like South Africa. Hayford, Privor-Dumm and Levine (2011:3) state that 30-50% of the population in Sub-Saharan Africa lack access to essential medicines. Evidence has been observed by the way medicine shortages attract media attention as well as the civil society organisations. This is because the majority of the populations in developing countries rely on public facilities for health care services. Thus, the majority of the population is severely affected when medicines are not available in public health facilities.

The recent shortages observed in the South African context affected all categories of medicines, for example, tuberculosis (TB) medicines, Antiretroviral (ARV) medicines, antihypertensive medicines, even vaccines, and so on. Unavailability of TB and ARV medicines results in the development of multi-drug resistant (MDR) TB and ARV treatment failures, respectively. Once patients have MDR-TB, it becomes a burden due to long durations of painful injections and many tablets to swallow at once. At the same time, the department of health also incurs more cost in procuring MDR treatment because it is very expensive. The same phenomenon is observed with shortages of ARV treatment. It is cheaper to put patients on a single fixed dose combination (FDC) tablet that to switch to the expensive second and third line ARV regimens as a result of treatment failures.

In some facilities patients were being sent home without treatment or else given a short supply requiring the patient to return more often to the health facility (Stop Stock Out, 2014:5). This is very costly for patients and may even worsen their health because they will end up defaulting on treatment and complicate their conditions. With such a big ARV programme, South Africa cannot afford the interruptions in the supply of essential medicines like ARVs and TB.

It is therefore important to investigate factors that could be contributing to the shortage of medicines in public health facilities, especially in rural settings.

1.2 Background to the problem

UMkhanyakude district is situated in the far Northern region of KwaZulu-Natal province in South Africa. The district is bordered by Mozambique on the north and Swaziland in the north-western part as well as Zululand district on the west and King Cetshwayo district on the south (Umkhanyakude District Health Plan, 2016/17: 15). The district is counted amongst the most deprived districts in KwaZulu-Natal (Day, Barron, Monticelli, and Sello, 2009: 17). Umkhanyakude provides health services to a population of 649 643 with five district hospitals, 57 fixed clinics and 18 Mobile clinics (Umkhanyakude District Health Plan, 2016/17: 15). According to Candy et al. (2009:17), the poverty rate of people living in these districts, including Umkhanyakude, is high and ranges from 63% to 82% of households living on less than R800 per month. This poverty rate is an indication that most of the people in Umkhanyakude district rely on the public sector for their health needs.

However, for health establishments in Umkhanyakude to respond to the health needs of its population, health facilities need to be well resourced with medical equipments, surgical supplies, medicines, staffing, and so on. Being faced with challenges of TB, human immune deficiency and acquired immune deficiency syndrome (HIV/AIDS), malaria and low immunisation coverage, the district requires a consistent uninterrupted supply of medicines (Umkhanyakude District Health Plan, 2016/17:24).

Medicines in the district are procured from the central medical depot called Provincial Medicine Procurement Unit (PMPU), which is about 400 kilometres from the district. It is not all the medicines ordered are supplied by PMPU but other medicines are on direct delivery, PMPU places orders on behalf of health facilities as per tender allocations. Depending on the efficiency of PMPU in processing the orders, medicines on direct delivery are delivered straight to facilities from companies. When placing an emergency order for an item that is kept by PMPU, it is easy for facilities to arrange transport and collect the stock timeously, should there be an emergency for that item. The problem is with medicines on direct delivery model, if PMPU does not have a buffer stock, and then facilities have to wait for longer periods for companies to deliver.

The year 2013 had been marked with many medicine deliveries being incomplete. PMPU returned many dues out lists of items which led to shortages of medicines. These

medicine shortages prompted district health service managers to implement supplier performance monitoring in trying to identify root cause of the problem. Shortages of medicines escalated to levels where patients would leave health facilities without a full quota of their prescribed medicines, which compromised their health outcomes. By the third quarter of 2016, tracer medicines stock out rate was averaging 23.1 per cent, way above the set target of 10 per cent per quarter (Umkhanyakude District Quarterly Performance Review, 2016:1).

1.3 Problem statement

Umkhanyakude District hospitals implemented the system of reporting shortage of medicines on a weekly basis, dating back to 2013. However, there seems to be no improvement in medicine availability in the district. The number of patients leaving the health facilities without a full quota of their prescribed medicines is increasing. The district has started seeing ARV patients being switched to third line regimens, however, there is no evidence if this could be associated with defaulting on their first line treatment due to disruption in the supply of ARV treatment. Many patients are also developing multi-drug resistant (MDR) TB, it is also unknown if this could be the results of both ARV and TB medicines supply shortages. The 2016/17 district annual performance report indicated poor immunisation coverage which could also be linked to shortages of vaccines during the beginning of the last financial year. And again, in one incidence, a patient has died due to a shortage of malaria treatment in both the hospital and the referring clinic.

Despite reporting shortage of medicines weekly, district hospitals are inundated by the number of emergency orders placed by primary health care (PHC) facilities. Hospitals also have to respond by placing emergency orders to the medical depot, which disrupts the normal functioning of this institution. Some hospitals' microbiological sensitivity results showed increased patterns of resistance to first line antibiotics, which may further compromise patient care. Umkhanyakude district hospitals and primary health care (PHC) facilities are faced with continuous shortage of medicines despite ongoing weekly stock out reports.

1.4 Aim of the study

The aim of the study was to investigate the factors that contribute to the shortage of medicines at Umkhanyakude district hospitals and PHC facilities.

1.5 Objectives of the study

The objectives of the study are:

- To determine the factors contributing to the shortage of medicines at Umkhanyakude district hospitals and PHC facilities.
- To determine the impact of shortage of medicines on pharmacists and pharmacists' assistants.
- To determine systematic issues affecting management of medicine inventories at Umkhanyakude district hospitals and PHC facilities.
- To recommend possible solutions to health managers to try and address the shortage of medicines at Umkhanyakude district hospitals and PHC facilities.

1.6 Research questions

In order to achieve the above objectives, the study sought to answer the following questions:

- What are the factors that contribute to the shortage of medicines at Umkhanyakude district hospitals and PHC facilities?
- What is the impact of the shortage of medicines on pharmacists and pharmacists' assistants at Umkhanyakude district?
- What systematic issues influence the management of medicine inventories at Umkhanyakude hospitals and PHC facilities?
- What possible solutions could be recommended to health managers to try and address the shortage of medicines at Umkhanyakude district hospitals and PHC facilities?

1.7 Significance of the study

The study will contribute to the body of knowledge regarding factors that contribute to shortage of medicines and how to tackle them for the benefit of all relevant stakeholders. Senior management in the department of health will use the recommendations of the study to formulate policies and strategies that will enhance medicine availability in public health facilities, especially in rural areas. Furthermore, the department of health will be able to focus on improving other social determinants of health instead of tackling issues of medicine shortages. Pharmacists will benefit if strategies adopted by management improve medicine availability as they will focus on their competencies and not sorting out stock outs. Eventually, patients will have all their medicines on time and on the date of their presentation to the health facility and decrease the cost burden of returning to clinics and hospitals more often.

1.8 Format of the study

The following chapters will include a literature review; research design and methodology; results, discussions and interpretation of findings and; conclusions and recommendations.

1.9 Conclusion

This chapter provided an introduction to the study. This chapter also provided the background orientation to the study, research objectives, research questions and the significance of the study. The next chapter discusses the literature review.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

In order to gain an in-depth insight about the research study, the researcher undertook a review of literature about the subject at hand. A literature review, as Creswell (2014:60), describes it, serves a variety of purposes which include sharing the results of other studies related to the one being studied, relates the current study to a larger pool of knowledge and arguments available in literature, as well as filling the gaps and extending previous studies. In this study, the literature review will involve evaluating the current health care system in South Africa; pharmaceutical services in South Africa and shortage of medicines.

2.2 A Review of the South African Health System

The South African health care system is composed of two sectors: the public sector and the private sector. Of major concern is that the public health sector provides services to 80% of the population and only consumes 20% of the health expenditure while the private sector caters for only 20% of the country's population and consumes 80% of the health expenditure (Sello, Serfontein, Lubbe and Dambisya, 2012:2). According to Sello et al. (2012:2), the current health care system was inherited from apartheid, which ensured that rural areas with mainly black and poor people did not have access to high quality health care services. That is why, according to Mayosi and Benatar (2014:1345 – 1346), in South Africa the public health sector has an estimated 30% of doctors providing health care to more than 40 million people who have no health insurance. On the other hand, there are about 70% of doctors working full time in private sector and providing health services to only about 16% of the insured population.

Moreover, the health system is plagued by a number of challenges which include recurrent shortages of medicines and medical supplies, high staff turnover, socioeconomic determinants of health that are outside the scope of the health system, unlimited medico-legal litigations, poor implementation of strategic plans and quality improvement initiatives and so on. It is therefore the injustices of the past laws that resulted in unequal allocation of health resources for the majority of the South African population (Mayosi and Benatar, 2014:1344).

2.2.1 Unequal Allocation of Health Resources

The current health system manifests in many ways which include poor allocation of health care resources. Poor people are underserviced under the current system, while the rich are over serviced. The consequences are dire for such a health system if the majority of the population is left exposed to an incommensurate burden of diseases; the society's well-being is compromised and subsequently affects health progress even for the rich proportion of the country (World Health Organisation, 2013:10). A study by Mayosi and Benatar (2014:1344) also revealed that deep into twenty years of democracy, the majority of South Africans remain captivated by disproportionate burden of infectious and non-communicable diseases, social disparities and shortage of human resources to care for the ever growing population and increased demand for health care. The same disparities had been observed regarding pharmaceutical services, as stated by Sello et al. (2012:2), pharmaceutical services remain disproportionately scattered between rural and urban areas, as a result, rural areas are severely affected by shortages of medicines. Therefore, to improve health outcomes, it is important to address the socioeconomic imbalances that influence the society's health status.

2.2.2 Social Determinants of health

The challenges facing the South African health care system are not unique to South Africa. The same challenges act as hiccups to progress in global population health. Part of the solution to the problem would be for South Africa to address the social determinants of health (lying outside the scope of the health system), which entails prioritising redress of social inequalities, fast tracking of universal coverage for health (Mayosi and Benatar, 2014:1349). Nations need to formulate policies to reverse the current socioeconomic determinants of health. Interventions include reducing inequalities in the distribution socioeconomic factors, like income and education, and entails reducing level of poverty. Intermediary determinants which catalyse the effect of socioeconomic position, such as smoking and working conditions need to be addressed by way of improving conditions of people in lower status jobs. And again governments need to address the reverse effect of health status on socioeconomic position. Considering that a compromised health status may lead to a worsening of individuals' socioeconomic position, inequalities in health could be reduced by ensuring that

chronically sick people are retained within the workforce (World Health Organisation, 2010:51).

However, faced with these social challenges, the government of South Africa is not sitting on its laurels with regard to the status quo of the health system. There are a variety of quality initiatives that have been launched to turn around the health system. The South African National Department of Health has undertaken quite a number of policy reforms to try and reinforce the much needed changes in the health care system (South African Health Review, 2016:4).

2.2.3 Health-related Acts and Regulations Intended to Improve Health Care

The South African National Health Act 61 of 2003 emanates from the provisions of the Constitution of the Republic of South Africa. The act provides a framework for a structured uniform health system within the Republic, taking into account the obligations imposed by the Constitution and other laws on the national, provincial and local governments with regard to health services; and to provide for matters connected therewith (National Health Act 61, 2003:1). The act was established so as to recognise the socio-economic injustices, imbalances, and inequities of health services of the past; the need to heal the divisions of the past and to establish a society based on democratic values, social justice and fundamental human rights; and the need to improve the quality of life of all citizens and to free the potential for each person (National Health Act 61, 2003:1).

Concerned with a deteriorating health care, improvement of quality health care has been the South African Department of Health's main objective. As stated by Moleko, Msibi and Marshal (2013:2), Section 27 and 28 of the Constitution guarantees the right of all South African citizens' access to health care. In an effort to improve the quality of life of all South African citizens and freeing the potential for each person, the National Department of Health undertook to amend quite a number of legislative instruments. The proposed amendments were included in the department's Strategic Plan 2014/15 to 2018/19, and they include effecting the National Health Insurance (NHI) Bill into law by 2018/19; regulation of health care in the private sector by implementing a functional National Pricing Commission by 2017; control of prices for original and generic medicines (South African Review, 2016:4).

However, not every effort is without challenges. As much as there are quite a number legislative reforms, these legislative instruments require some form of monitoring and evaluation. Monitoring and evaluation intend to determine if the legislative targets are being met or not (Dos Santos, Svensson and Padin, 2014:528). Eventually, if policy objectives are not met, policy makers need to conduct research to specific areas where policy objectives have challenges. Policy reforms alone cannot achieve success in changing the health care system, but require certain strategic plans that seek to extend policy objectives. Mayosi and Benatar (2014:1351) argue that too much emphasis on legislation and disregarding the social determinants of health will not yield much needed results in reversing disparities in health, wealth and education in South Africa.

2.3 Developments in the South African Health Care System

Although the health care system is faced with many challenges, but there areas of encouragement that one cannot afford not to recognise. As outlined by Harrison (2009:13), they are categorised in to streams which are legislation and gazetted policies and better health systems management.

2.3.1 Legislation and gazetted policies

Under legislation and gazette policies, South Africa has seen progress with the introduction of free primary health care for all; essential drugs programme; choice on termination of pregnancy; anti-tobacco legislation and community service for graduating health professionals (Harrison, 2009:13). The health related legislations discussed below are not exhaustive, other health legislations are not within the scope of this research.

2.3.2 Free Primary Health Care Service

Immediately after the first democratic elections in South Africa in 1994, the then President, Nelson Mandela announced the provision of free health care services for all pregnant women and children less than six years. The free care policy was eventually extended to cover all users of primary health care. Harrison (2009:14) further explains that this policy emanated from a survey conducted in June 1994 which saw people presenting late in health facilities and quite often citing cost of health care as a disabling

factor. However, the policy received welcome from health care users but was a strain on health care workers, especially nurses (National Health Act 61, 2003:6).

2.3.3 Essential Drugs Programme

In 1996, Standard Treatment Guidelines (STGs) and Essential Drugs List (EDL) were published for mandatory use in public health facilities. The STG/EDL was developed in terms of the National Drug Policy (NDP) which was intended to improve access essential medicines by all South Africans (National Drug Policy for South Africa, 1996:11). The STG/EDL was meant to ensure use of generic medicines in public health facilities as well as promoting rational use of medicines. Further to that, the government introduced the single exit price for every pharmaceutical product in 2005, which according to Harrison (2009:14), meant that the manufacturer is required to specify a price. The policy helped reduce prices by about 20%, hence making medicines more affordable (Harrison, 2009:14). Use of generic medicines did not make medicines more affordable only for public health care users but also in the private sector. This translated to enormous savings for customers as co-payment are either low or totally eliminated (Board of Health Care Funders of Southern Africa, 2013:3).

2.3.4 Choice on Termination of Pregnancy

Plagued with challenges of many unsafe abortions being carried out country-wide, South Africa introduced the Choice on Termination of Pregnancy Act 92 of 1996. At the time, it was estimated that 425 women were dying each year as a result of unsafe and illegal abortions (Harrison, 2009:14). According to the act, women have up to 12 weeks of pregnancy to request termination of pregnancy, and provides medical practitioners until 20 weeks of pregnancy (depending on individual circumstances) to terminate pregnancy (Choice on Termination of Pregnancy Act 92, 1996:3).

However, a recent research conducted by the global human rights organisation, found that less than 7% of national health facilities provide abortions. The research found that certain districts in KwaZulu-Natal, for example, Umzinyathi, Zululand and Umkhanyakude have either one or no public facilities providing these services (Mail and Guardian, 13 February 2017:27). This is concurring with Harrison (2009:15), when asserting that although the legislation had improved morbidity associated with illegal

abortions, but the observed clinical differences are not that substantial. Nevertheless, there is substantial decrease (90%) in the number of deaths associated with illegal abortions since the introduction of the legislation (Harrison, 2009:15).

2.3.5 Anti-tobacco legislation

Further to the efforts to improve health outcomes, the Tobacco Products Control Act 83 of 1993 was amended to prohibit advertising and promotion of tobacco products. The act also ensured increased taxation on cigarette to try and curb smoking as a habit. This act is party to an effort by the government to discourage behaviours that seemed to affect health outcomes since tobacco is injurious to the health of the smoking person (Tobacco Products Control Act 83, 1993:1). However, although the idea of discouraging tobacco smoking is good, but there is no information available to measure progress made by the decrease in tobacco demand to diseases caused by smoking. Smoking remains one of the socio-economic challenges facing the health system as mentioned in the National Department of Health's annual report for 2013-2014 financial year (National Department of Health Annual Report, 2013/14:16).

2.3.6 Community Service for Graduating Health Professionals

Inequities in the South African health system prompted the department of health to introduce a community service programme for health professionals. It was to ensure rational distribution of health professionals across the country, mainly in the underserved rural areas. Harrison (2009:15) asserts that the first intake doctors, dentists and pharmacists took place in 2001, increasing the number of general practitioners by 20% in 2006 and 2007. However, in the study conducted by Hatcher, Onah, Kornik, Peacocke and Reid (2014:11), findings are that although the programme is an excellent recruitment strategy of health professionals but the program needs to be accompanied by more transparent processes that ensure effective execution of the placement strategy. However, as stated by Mthethwa (2009:2), medical officers do not always honour their contractual obligation to serve the department and this offsets the department of health's strategy to strengthen the recruitment and retention of scarce health care professionals.

2.3.7 Better Health Systems Management

Although the health care system in South Africa is plagued by many challenges including management issues, there are some improvements in certain areas of management that have been observed. Improvements in health systems management have been seen with regard to greater parity in district expenditure; clinic expansion and improvement; hospital revitalisation programme; improved immunisation programme and improved malaria control (Harrison, 2009: 13). Health care organisations are complex systems and require that the system be made better and not only individuals in the system (McDaniel, Driebe and Lanham, 2014:5). That is why, as Berman and Bitran (2011:1) assert, to effectively strengthen health systems, there is a need for health systems analysis to be an integral part of good practice to guide planning, policy development, monitoring and evaluation. According, to McDaniel et al. (2014:9), health systems required new management designs to effectively implement a quality improvement strategy which is a challenge in the public sector.

2.3.8 Greater Parity in District Health Expenditure

Addressing health inequities created by the apartheid system required attention of the new democratic administration post 1994. Amaghionyeodiwe (2009:220) emphasises that when public spending is aimed at improving the education and health of people, it will definitely lead to a better quality of life and subsequently improves economic development of a country. According to Harrison (2009:16), in 1993, per capita public spending on health by provinces was ranging between R164 and R491. However, when a comparison was made with the richest districts, the richest districts' expenditure was 3.6 times more than poorer districts. A considerable improvement started happening from 2001 to 2008, where the disparities between rich and poor districts dropped from 9.3 to 3.3 per cent (Harrison, 2009:16). Interestingly, one would associate improvements in health systems management to the district health expenditure review (DHER) which serves as a rationale for resources used within the district in terms of service delivery performance and informs budget allocation. DHER scrutinises the resources allocated to the district including personnel, the district performance, in relation to health outcomes (KZN Department of Health, 2012:4). However, other strategic development efforts of the department of health include such programmes as

the national core standards, hospital revitalisation programs, clinic expansion and improvements, improved immunisation programme, and ideal clinic realisation model.

As mentioned above, the National Department of health is not sitting idle on the issue of improving health care. There are strategic quality improvement initiatives that have been introduced to extend policy reforms objectives. Health is determined by factors such as poverty, lack of clean portable water, stress, lack of safety at homes and on the roads, air pollution, drugs and alcohol abuse leading to domestic violence, sexual indiscretion, child neglect and moral degeneration, violence against women and children as well as interpersonal violence. These factors then called for the department of health to collaborate and cooperate with other government departments to attain improvement in health status for all South Africans (Negotiated Service Delivery Agreement, 2010:5).

The development of the negotiated service delivery agreement (NSDA) sought to ensure strengthening health systems effectiveness which will serve as significant output for the health sector (Moleko et al. 2014:2). Moleko et al. (2014:2), further stipulate that strengthening health systems effectiveness can be achieved by means of primary health care (PHC) re-engineering, the strengthening of human resources, and improvement and standardisation of quality of care through certification of health facilities.

Interestingly, PHC re-engineering does not intend to deviate from the need to strengthen the district health system – which serves as an institutional means for the delivery of PHC and district health services. But it will mean that district and sub-district management will have to develop operational plans taking into account the key priorities of the PHC re-engineering and focus on (Department of Health, 2011:3). However, PHC re-engineering does not seem to be properly aligned with other health services that are capable of completing the whole strategy. The nature of PHC facilities in South Africa does not seem to promote availability of medicines in clinics. The state of infrastructure in PHC facilities does not take cognisance of the increasing demand for healthcare which translates into more space being required to store adequate quantities of medicines. As a result, PHC facilities are constantly running out of medicines which offset the health objectives for ensuring that people get their prescribed medicines on the same day (Crowley and Stellenberg, 2015:88).

As part of quality improvement initiatives, the department of health came with the establishment of the Office of Health Standards Compliance (OHSC) in 2008. Six key priorities were identified for all health establishments in South Africa to focus on and they include values and attitudes of staff; reducing waiting times and queues for administration, assessment, diagnosis, pharmacy, surgery and referral time; cleanliness of hospitals and clinics; patient safety; infection prevention and control; and availability of medicines, supplies and equipment (Moleko et al, 2014:2). The impacts of the National Core Standards on pharmaceutical services will be further discussed in the following sections below.

The fact that pharmaceutical services are an integral part of the health care system, policy development could not spare the way the profession is practiced in South Africa.

2.4 Pharmaceutical Services in South Africa

Pharmaceutical services is defined as the acquisition, storage and responsible provision of medication, as well as any medication-related care that will achieve optimal patient outcomes and improve a patient's quality of life, Crowley and Stellenberg (2015:84). The South African Pharmacy Council (SAPC) is an independent statutory body created as a result of the recognition of the pharmacy profession by the legislature in South Africa, as a specific occupational group. The SAPC is established in terms of the Pharmacy Act 53 of 1974 as amended. The council is vested with statutory powers of peer review and is responsible for funding itself. The mission of the SAPC is to ensure the provision of quality pharmaceutical services in South Africa by developing, enhancing and upholding universally acceptable standards, professional ethics and conduct, ongoing competence and pharmaceutical care (Pharmacy Act 53 of 1974:3).

The SAPC is an autonomous body, which receives no funding from Government or any other source. However, the council is funded entirely by the profession who registers with the SAPC and include pharmacy students; pharmacist interns; pharmacists performing community service; pharmacists; specialist pharmacists; pharmacist's assistants; pharmacy owners; responsible pharmacists and providers and assessors (Pharmacy Act 53 of 1974:3).

Pharmaceutical services in South Africa, as a component of the health care system, also present a two-tier system where health expenditure on pharmaceuticals does not follow the majority of the population. This is emphasised by Sello, Serfontein, Lubbe and Dambisya (2012:2), that the distribution of pharmaceutical services follows a similar pattern as all other health care services. This is evidenced by the fact that quite often the shortage of medicines affects the majority of the population.

2.4.1 Policies, Legislations and Guidelines Impacting on Pharmaceutical Services.

As mentioned above, the health care system in South Africa is plagued with inequities. A similar trend is observed in the pharmaceutical sector, evidenced by lack of equity in access to essential drugs which adversely impact on the quality of care (Sello et al. 2012:2). Disparities between the private and public sectors were observed in 1990 where the private sector was responsible for 80% of the country's total expenditure on drugs, despite the fact that 60-70% of the total volume of drugs was consumed in the public sector. Faced with these disproportionate realities in health care, the South African government developed the National Drug Policy (NDP) in 1996.

The NDP stands to serve the health needs of South Africa in the following ways, to mention a few:

- It offers a clear description of the approach by which pharmaceutical services in the country will be managed.
- Provides for the development of an adequate pharmaceutical infrastructure.
- Facilitates the design, production and implementation of appropriate programmes for human resource development.

The goal of the NDP is to ensure an adequate and reliable supply of safe, cost-effective drugs of acceptable quality to all citizens of South Africa and the rational use of drugs by prescribers, dispensers and consumers. The NDP has three specific objectives which include the health, economic and national development objectives.

One of the health objectives of the NDP is to ensure the availability and accessibility of essential drugs to all citizens. Economic objectives include lowering the cost of drugs in both the private and public sectors. Included in the national development objectives is

support for the development of the local pharmaceutical industry and local production of essential drugs and improving the knowledge, efficiency and management skills of pharmaceutical personnel (National Drug Policy for South Africa, 1996:3-4). In order to achieve all the above objectives, the Minister of Health appointed a Drug Policy Committee (DPC) with the following terms of reference:

- Develop a pricing plan for drugs used in South Africa in the public and private sector.

- Develop an Essential Drugs List (EDL) recently called the Essential Medicines List (EML) to be used in the public sector and prepare treatment guidelines for the health personnel.

- Develop specific strategies to increase the use of generic drugs in South Africa.

- Prepare a plan for effective procurement and distribution of drugs in South Africa, particularly in rural areas.

However, looking at the terms of reference of the DPC as well as all the objectives of the NDP, it becomes apparent that the country has an appealing pool of strategic plans to improve access to medicine, both in the form of policy and legislation, but the challenge remains one that of executing these plans. As a country experiencing widespread shortages of medicines and pressures from the media and civil society organisations, like the Treatment Action Campaign (TAC), actions should have been taken to ensure appropriate official training of pharmaceutical personnel in drug supply management. This may entail engaging relevant stakeholders, like providers of pharmacy education to try and match pharmacy education and training with current needs of the pharmaceutical sector. Considering that the pharmaceutical sector is a major driver for the healthcare sector, it is, however, disappointing that in Africa, there are very few research studies on managerial issues in the sector, making it difficult to gain insight on the current needs of the industry (Narayana and Pati, 2012:368).

Distributions of drugs in rural areas remain a cause for concern, considering that it does not support the current increasing demand for health care. Stock outs in hospitals and PHC facilities are associated with poor supply chains and practices. These sentiments were echoed by Pharasi and Miot (2012:178), in that although there are some

achievements in the availability of medicines, but there is more room for improvement with regard to infrastructure and training of health care workers for effective procurement and distribution practices. Looking at how these drugs are distributed between hospitals and clinics, the objectives of the NDP of ensuring safety and quality of drugs to the citizens is compromised. Although there are challenges in achieving certain goals of the NDP but one is inspired by efforts put on the development of the essential drugs list and standard treatment guidelines.

2.4.2 Relevance of the STG and EDL in Pharmaceutical Services

The essential drugs list used in the public sector promotes the use of generic drugs in South Africa. These guidelines stand to promote equitable access to affordable medicines that are safe, effective and improve the quality of care for all South African citizens (Primary Health Care Standard Treatment Guidelines and Essential Medicines List, 2014). Promoting the use of generic drugs relieves the socio-economically challenged citizens from the financial burdens of expensive branded drugs, hence the STG and EDL ensures that cost-effective treatment options are made available to citizens of the country (Standard Treatment Guidelines and Essential Medicines List, 2008:iv). The guidelines stipulate that prescribers must use generic names when prescribing medicines and this is done to ensure that patient care is not compromised by use of trade names, thus allowing pharmacists to dispense interchangeable multisource medicines. To further advance efforts to improve quality of health care, the department of established the Office of Health Standards Compliance which was to be implemented through meeting the requirements of the National Core Standards (National Health Amendment Act 12, 2013:4).

2.4.3 Application of the National Core Standards in Pharmaceutical Services

According to Bradley, Putter, Johnson and von Zeil (2011:42), the National Core Standards (NCS) are in line with the National Department of health's strategic plan of 2009/2012, and the 10-Point Plan of 2009-2014, which emphasise improving the quality of health services and the establishment of a quality management and accreditation body, respectively. Ensuring compliance of health establishments with NCS is the mandate of the Office of Health Standards Compliance, failure which, this office will issue a compliance notice to a person in charge of any health establishment if such

establishment does not comply with any norm and standard (National Health Act 12, 2013:20).

Bradley et al. (2011:42), assert that the Department of Health combined various policies and guidelines into the National Core Standards to set measurable standards for quality health service delivery that can be applied across the health system. The purpose of the National Core Standards is to develop a common definition of quality of care, which should be found in all health establishments in South Africa, to serve as a guide to the public, and to managers and staff at all levels; establish a benchmark against which health establishments can be assessed, gaps identified, and strengths appraised; provide a national framework to certify that health establishments are compliant with standards (National Health Amendment Act 12, 2013:6).

The seven domains of the National Core Standards cover both the core business of the health system and the necessary support systems to achieve the core business, and as Bradley et al. (2011:42), further stipulate, they include patient rights; safety, clinical risk; clinical support services; public health; leadership and corporate governance; operational management; and facilities and infrastructure. Pharmaceutical services fall under clinical support services. The following table 8.1 illustrates the meaning of the National Core Standards for pharmacy education and practice; key issues in pharmacy that affect the quality of care; and the application of the National Core Standards to improve the quality of pharmaceutical services, adopted from Bradley et al. (2011:43)

Table 2.1 the Meaning of the National Core Standards for Pharmacy Education and Practice

Provides guidelines and tools to assess practice in a standardised manner
Improve accountability and efficiency
Assists in identifying gaps
Can empower pharmacists
Facilitate legislative compliance
Need to be compared to other standards, e.g. gross domestic product (GDP) and

Basel statement
Provides awareness of requirements in the undergraduate pharmacy curriculum
Guide research and project selection

Source: Bradley et al. (2011:43)

2.5 Shortage of Medicines

Medicines are chemical compounds used for treating, preventing and maintaining health (Bishnu, Palaian, Shankar and Ansari, 2017:1). As Bishnu et al. (2017:1) maintain that medicines have become an integral part of every life, hence their shortage attracting so much media attention. As such, availability, accessibility and affordability are crucially important in saving people's lives while at the same time curtailing morbidity.

The shortage of medicine is a global problem, not only affecting developing countries as it may be assumed. However, the degrees of shortages between developed and developing countries may not necessarily be the same, with developing countries affected the most. Developed countries, like the United States of America (USA) also reported medicines shortages a decade ago (Gray and Manasse, 2012:1). This is not a new matter, hence raises questions as to why the problem was not anticipated way before the situation got to where it is now and why there were no contingency plans to respond timeously to the current crisis.

2.5.1 Potential Factors Contributing to Shortage of Medicines

A literature review of factors contributing to shortage of medicines indicated that it is a combination of both local and global factors. The cost factor of drugs is one area of great concerns. In one way or another, cost of drugs may be caused by inadequate investment on health by many African countries, including South Africa. The cost of drugs in developing countries was 650% in the private and 250% in the public sectors, more than the international reference price, respectively (World Health Organisation, 2009:95).

In 2001, South Africa was counted among countries that committed to spend 15% of total government expenditure on health, the minimum recommended by the World

Health Organisation (WHO), but to date the country is spending 14% (Banik and Stevens, 2015:1). Inadequate expenditure on health has high costs implications for South Africa which is seen in public health facilities struggling to keep basic medicines such as antibiotics, considering the rand-dollar exchange rates when South Africa has to procure these drugs abroad. If South Africa could benchmark on India's successes in developing a drug manufacturing industry, availability and affordability of medicines will be a thing of the past. However, for South Africa, the country has started with the building of a state-owned pharmaceutical company, which is a step towards resolving medicine shortages. Perhaps this initiative will also address issues of substandard and counterfeit medicines which are major concern for developing countries (Patel, Norris, Gauld and Rades, 2009:547).

Moreover, policy issues are cited quite often in literature as contributing to high costs of medicines leaving poor people in low-income countries unable to access even basic treatments. Three policy areas have been identified in the South African context and include government's research and development expenditures on health; the extent of price controls on drug development; and intellectual property protections for life-science innovation (Kahn, 2016:1). By failing to invest in biopharmaceutical research, South Africa is paying less than its fair share for drugs, and at the same time promotes uncompetitive drug market by putting in place weak intellectual property protections. In this manner, the country is slowing down global drug innovations that could cure or ameliorate management of diseases (Kahn, 2016:1).

Medicine stock outs have been observed to be varying amongst provinces, districts and facilities. Types of medicines out of stock tended to vary amongst provinces, districts and facilities as well. In cases where the type of medicines out of stock among provinces, districts and facilities happened to be the same, indicated that the problem of stock out was common nationally, thus has nothing to do with a particular province. However, instances had been observed where, for example, one facility in a particular district reported high stock out rate of a certain medicine while other facilities reported no stock outs. In such circumstances, that stock out would be attributed to that particular facility and not as a provincial or national crisis; therefore, it would call for scrutiny of the internal processes in that facility (South African Health Review, 2012/13:182).

The severity of medicine stock outs differs between rural and urban health facilities, with rural facilities being the more severely affected. This was observed when comparing the length of stock out between rural and urban facilities. Rural facilities tended to have a prolonged length of stock outs while urban facilities had shorter ones (Stop Stockouts, 2014:40). As mentioned in literature, it is difficult to ensure an uninterrupted supply of medicines in rural health facilities. A medicine that had been out of stock in both rural and urban facilities, tend to be delivered first in urban facilities compared to rural areas, hence the shorter length of stock out in urban health facilities. This cannot be argued because it is common knowledge that pharmaceutical industries are in urban areas as well as suppliers thus will respond quicker to facilities around them and it is cheaper compared to rural facilities (Sello et al. 2012:4).

Facilities in rural areas are adversely affected because it is difficult for suppliers to send a small parcel over a long distance; instead they accumulate stock to various facilities as a cost saving major, thus leading to prolonged stock outs in rural areas. This is evidenced when comparing KwaZulu-Natal, Gauteng and Western Cape. Stock out in KwaZulu-Natal can last to more than a month whereas in Gauteng and the Western Cape provinces stock outs lasted only less than a month (Stop Stockout, 2014:34). Arguably, although KwaZulu-Natal is mainly a rural province but the health facilities situated in urban areas are not adversely affected like the facilities in rural areas.

There is failure on the part provincial governments to assist health districts to achieve the goals of PHC re-engineering. When PHC re-engineering strategy was introduced, there seemed to be a lack of how best to implement the strategy from a pharmaceutical perspective. That is why hardly any district hospital has a vehicle dedicated for the provision of pharmaceutical services. As a result, there is poor transportation of medicines between district hospitals and PHC facilities (Bishnu et al. 2017:82). This lack of dedicated transport for pharmaceutical services has serious implications for stock losses between hospitals and PHC facilities as well as maintenance of cold chain for vaccines when there are power failures in PHC facilities. It is difficult to ascertain if medicines dispatched for a particular clinic has indeed reached the intended clinic. Moreover, for PHC re-engineering to be comprehensively implemented, there need to be dedicated transport and adequate infrastructure for proper distribution storage of medicines (Crowley and Stellenberg, 2015:89).

Again, as asserted by Bishnu et al. (2017:82), medicine shortages can also be caused by factors such as unavailability of active pharmaceutical ingredients (API); natural disasters; voluntary recall of medicines due to post marketing safety issues; regulatory issues; imbalances between supply and demand; and limited or single manufacturer of medicines. Gray and Manasse (2012:2) alluded to the small number of manufacturers as another cause for the shortage of medicines, citing that under such circumstances shut-down for various reasons could result in shortages with limited options to source the affected medicines from somewhere else. Studies had shown that certain pharmaceutical manufacturers tend to be reluctant to manufacture medicines with low profit margins such as digoxin and atropine which results in the shortage of these medicines. Regulatory and policy factors also cause medicine shortages (South African Health Review, 2012/13:183).

Regulatory standards may require that manufacturing plants be upgraded failing which may result in stock outs. Gray and Manasse (2012:2), also state that when there are changes in procurement practices other suppliers of medicines may be invalidated, causing shortage of medicines.

The logistics associated with procurements of medicines are not appropriately handled. For example, a delay in the payments for medicines causes suppliers to withhold stock. District hospitals in rural areas do not have the necessary means to execute proof of deliveries and submit these within the stipulated thirty days' period because there are no appropriate provisions for these. Competition also plays a part in the shortage of medicines (van der Merwe Smit and Bredenkamp, 2013:106).

When there is high competition on particular generic, pharmaceutical companies will tend to produce limited quantities to avoid wasteful and fruitless expenditures should these medicines not be sold. Bishnu et al. (2017:82), further states that medicine shortages in developing countries are also caused by few pharmaceutical manufacturers. Manufacturing quality problems have been implicated in shortages of medicines when there are few companies producing that particular product (Gray and Manasse, 2012:1). With few manufacturers in developing countries, governments will tend to import medicines from abroad. In this case, shortages will occur when the developing country's currency is weaker than the exporting country. As a result, the

importing country will not procure enough quantities of medicines to satisfy local demand this is further complicated by lack of patent protection in developing countries (La Croix and Liu, 2007:423).

When medicines are procured abroad, there are regulatory implications for this which may entail keeping the said medicines on hold so as to undergo quality assurance processes. Therefore, regulatory requirements of imported medicines coupled with currency fluctuations further contribute to medicine shortages (Kahn, 2016:1)

In a study conducted by Xaba, Peu and Phiri (2012:10), the authors revealed that abuse of the health care system also contribute to shortage of medicines. This happened when, for example, foreigners presented to health facilities and collected medicines more than once in one month. They beat the system by presenting in more than one facility with the sole purpose of collecting treatment and sell it in their home country. Such a challenge is caused by a slow pace in installing information technology infrastructure in public health facilities. An electronic recording system will enable health facilities to identify patients who are trying to collect treatment more than once in a month, provided all public health facilities are linked to one system.

Without technology it will always be difficult to curb medicine theft from pharmacies. With antiretroviral (ARV) medicines being used to make nyaope or whoonga, these medicines are a high risk. Nyaope or whoonga is a drug cocktail that contains illicit drugs and HIV antiretroviral medication (The Daily News, 2017:5). Many pharmacy store rooms do not have CCTV cameras to minimise theft, leaving medicines vulnerable to theft which eventually leads to stock outs of medicines.

Poor medicine supply management is one other critical factor contributing to shortage of medicines, especially observed in PHC clinics. In a study conducted by Crowley and Stellenberg (2015:87), the authors found that some PHC facilities do not have standard operating procedures for drug receiving, storage and dispensing; coupled with poor documentation of transactions on stock cards. It therefore becomes difficult to determine monthly consumptions and re-order levels. Without these quantities, it is not easy to execute an adequate order quantity which will lead to either understocking with resultant stock outs or overstocking with resultant medicine expiries.

As mentioned above, PHC re-engineering is not properly aligned to pharmaceutical services in that there are no pharmacy assistants in most PHC clinics who are properly trained to run medicine store rooms in clinics. Instead there is task shifting, with pharmaceutical services being provided by nursing personnel in PHC clinics. The nurses are therefore overwhelmed with work load which compromises the quality of pharmaceutical services in PHC clinics as well as nurses' core functions. Crowley and Stellenberg (2015:18) also alluded to this saying that the imposition of additional tasks such as medicine supply management and dispensing increases the work load on nurses, whereas nurses should be supported to provide health care services for which they are responsible. The department of health has many good strategic plans but the challenge is in how best to implement these. Evidence in literature, as Hough, Thompson Jr, Strickland and Gamble (2011:246) assert, indicates that it is a whole lot easier to craft a strategic plan than it is to execute the plans and achieve the desired outcomes.

The health care system is also plagued with poor data reporting. As the study by Crowley and Stellenberg (2015:88), found that clinic managers does not report stock outs of medicines, painting a false picture for that particular clinic or district? Observations of the district health information system (DHIS) usually indicate that there are no significant medicine stock outs, with PHC clinics reporting zero stock outs but this does not correspond with the number of emergency orders placed by the same clinics to the mother hospital pharmacy.

However, the National Department of health, in 2015, commissioned a task team to establish the causes of non-availability of medicines. The task team included supply chain management services with vast experience in supporting pharmaceutical supply chain in many countries (Department of Health, 2015:1). The task team concluded that the following are causes of shortage of medicines:

- Essential medicines that are no longer of any commercial value and no longer produced or their production is not prioritised.
- Difficulties in the manufacture of a medicine in line with orders received.
- Delays in intercontinental transport systems.

- Orders not received in time or insufficient order quantities.
- Supplier accounts not paid within 30 days.
- Quantities ordered in excess of estimated tender quantities.
- Depots not supplying medicines as per quantity ordered from facilities, and
- Not ordering adequate quantities of medicines for the need of patient seeking care at a facility.

2.5.2 Pharmaceutical Supply Chains

By adopting the National Drug Policy in 1996, the South African government's objectives was to ensure equitable access to essential medicines by addressing a full range of components, which include, legislation; selection; pricing; procurement and supply; human resources and traditional medicines; as well as cooperation with other regional and international organisations (Pharasi and Miot, 2012-13:177). Basically, the NDP sought to guide procurement processes in the pharmaceutical sector which include distribution, prescribing and dispensing of pharmaceutical products.

As mentioned earlier that the South African health system presents a two-tier system, the selection and procurement of medicines in private and public sector is also different. The funding of medicines in the private healthcare sector is dependent on complicated medical scheme rules and policies based on the type of health plan and benefits that a scheme member has selected. For high-volume, low-cost medicines, selection is based on price but for high-cost medicines, selection is subject to thorough evaluation, including clinical efficacy and effectiveness, cost-effectiveness and budget impact (Pharasi and Miot, 2012-13:179). Moreover, through the Prescribed Minimum Benefits (PMB), the regulations to the Medical Schemes Act (Act 131 of 1998) requires that medical aids must pay for diagnosis, medical management, and medications of a stipulated list of chronic conditions, covering approximately 75% of chronic conditions seen in primary practice. However, Pharasi and Miot (2012-13:180), further explain that in the public healthcare sector, selection of medicines is provided by the National Essential Medicines List Committee (NEMLC), provincial and institutional-based Pharmacy and Therapeutics Committee (PTC).

Selection of medicines to be available in public sector is based on three STG/EML, namely, the primary health care STG/EML, the hospital level STG/EML, and the hospital level (Paediatric) STG/EML.

The pharmaceutical supply chain is faced with major struggles, including that in South Africa. These struggles are attributed to the fact that the industry is not investing adequately to reconfigure its manufacturing and distribution operations. But it cannot be argued that supply chain is an important link between the laboratory and the marketplace (Pricewaterhouse Coopers, 2009:2). Literature reveals that there is a lack of flexibility and cost-effectiveness in the pharmaceutical supply chain compared to other industries like fashion retailers, information technology and communication industries, etc. It remains to be seen how the sector will cope with advances in new product type developments, for example, advances in nanotechnology, tissue re-engineering and stem cell research, when it cannot respond to current demands of manufacturing and distribution of conventional chemical entities. The new product types and devices to deliver them will require advanced manufacturing and distribution techniques (Pricewaterhouse Coopers, 2009:5).

Worsening the situation in South African pharmaceutical supplies is a weaker rand-dollar exchange rate. In 2015, the rand depreciated by 31 per cent against the dollar, which negatively affected local manufacturers who import active pharmaceutical ingredients (API) and importers of finished medicines. A weaker rand posed a risk to continued supply of medicines because pharmaceutical companies would be reluctant to supply unprofitable medicines (Kahn, 2016:1).

In South Africa, pharmaceutical supply chain struggles are further augmented by poor implementation of the objectives of the NDP. When the impact of the NDP on the availability of medicines was evaluated by the Human Sciences Research Council (HSRC) in 2005, it became apparent that although there were notable progress in certain areas of the policy implementation, but significant inputs were still required in the form of improved infrastructure and training of healthcare workers (Pharasi and Miot, 2012-13:178). The issue of infrastructural challenges cannot be overemphasised, especially in the public sector. With the bulk of antiretroviral (ARV) medicines being used in the public sector, there is inadequate storage space to accommodate large

volumes of antiretroviral medicines. The consequence of lack of adequate storage space was poor medicine supply management which led to unpredictable stock outs. Nevertheless, space issues could not be addressed due to the pressure incurred by the government from both local civic organisations and international community to make ARV available to the public.

Poor medicine supply management could result in ARV theft because it is very difficult to ensure proper stock control in space constrained facilities. The Gauteng department of health has revealed to the New Age (January 2017:5) that it has dealt with 28 cases of ARV theft to the value of R33 000. It is unknown how much has been stolen before that has not been brought to book. Therefore, medicine theft defeats the efforts by government to ensure uninterrupted supply of medicines.

2.5.3 Impact of Medicine Shortages

As mentioned above, medicines have become an integral part of every life. Non-availability of medicines has dire consequences for patients, health care providers and the health system as a whole. A reliable and sustainable supply of medicines plays a critical role in the quality of lives of populations. Shortage of medicine is like a lack of a backup system when there is power outage, because a patient may die when there is no medicine, similar to power outage during an operation and there is no backup, a patient may die.

Bishnu et al. (2017:82), state that when there is shortage of medicines, health care providers are prompted to switch patients to an alternative medicine. However, alternative medicines may be of low quality as some of them seldom having been subjected to advanced high quality controls and patients may fall victim of higher costs associated with an alternative therapy. The concern for quality is alluded to by Metzger, Billet and Link (2012:2461), in that these alternative medicines may be less efficacious and more toxic, thus patient safety may be compromised. And again, non-availability of medicines is risky for patients due to patients being not treated, undertreated and medication errors as a result of trying to substitute non-available medicine (World Health Organisation, 2016:180). Studies have indicated that when there is a shortage of medicine and an alternative is recommended, quite often the alternative drug is not bioequivalent to the drug being substituted (Metzger et al. 2012:2462).

Moreover, as Bishnu et al. (2017:82) further outline, people have to travel long distances, especially in remote rural areas where there are scarce road infrastructure and transport, health facilities and other resources. When medicines are inadequate, people have to travel to health facilities more often and, as such, they incur increased traveling costs. Considering that the majority of people in developing countries are unemployed, like in South Africa, people may default treatment because they cannot cope with double costs of traveling. The health system also incurs increased costs when people default treatment and subsequently complicate or become resistant to their first line treatment, an example is often seen with ARV patients.

The reputation of the health system is tarnished when adequate health care cannot be provided. And again, medicine shortage has a potential to compromise quality of care because health care professionals have to deviate from providing care and try to address shortages.

2.6 Conclusion

The literature review provided an in-depth knowledge about the subject matter. The researcher explored the South African health system with its old and new challenges and its relevant policy developments. The chapter discussed pharmaceutical services, specifically within the South African context, the pharmaceutical supply chains, documented factors associated with shortage of medicines in literature and the impact of medicine shortages. The next chapter will discuss the research design and methodology that was chosen for the study.

CHAPTER THREE: RESEARCH DESIGN AND METHOLOGY

3.1 Introduction

The section discusses the research and design methodology that was chosen for this study. According to Creswell (2014:41), research design is a type of inquiry that could take the form of qualitative and quantitative approaches that serve as a compass for procedures in a research design. The topics that will be discussed under this section include the research methodology, the sampling strategy, data collection instruments, data analysis techniques and the ethical considerations that will be taken into considerations in the study.

3.2 Research Design

Research design of a study entails spelling out the basic strategies that a researcher employs to answer research questions and test the hypothesis (Polit and Beck, 2010:222). There are a number of research designs from which a researcher can choose, namely, the causal-comparative, correlational, explanatory, descriptive, and exploratory research designs.

3.2.1 Causal-comparative research design

A causal-comparative study aims to determine the cause and effect of a phenomenon. This type of study is conducted because the fact that variables can occur co-incidentally.

3.2.2 Correlational research design

The aim of a correlational study is to determine the interrelationship between two variables, that is, the tendency for variation in one variable to be related to variation in another. However, this interrelationship does not prove causation. According to Polit and Beck (2010:235), correlation studies are conducted in the next phase in a study with the aim of developing an evidence base.

3.2.3 Explanatory research design

According to Polit and Beck (2010:23), the aim of an explanatory study is to determine the basis of specific natural phenomena and to explain their cause. Explanatory

research is said to be linked to theories in which ideas about phenomena and their interrelationship are organised and interpreted.

3.2.4 Exploratory research design

This is a type of research which is used by researchers where there is low degree certainty and understanding of the phenomena. The researcher undertakes an investigation about the full nature of the phenomenon, how it happens, and what other factors to which it is related (Polit and Beck, 2010:22). Moreover, this type of study design provides promising insights, is conducted to develop theory, and is flexible and lacks a formal structure (Polit and Beck, 2010:22).

3.2.5 Descriptive research design

A descriptive study design can either be experimental or non-experimental. Theory in a descriptive study is used deductively to generate a hypothesis is eventually being tested provisionally.

The research design that was chosen for the study was the non-experimental descriptive survey. A non-experimental descriptive study reflects a post-positivist philosophical approach (Creswell, 2014:200). Descriptive research study is aimed at establishing and describing the relationship between two or more variables in a population (Churchill, Iacobucci and Israel, 2010:70). The study sought to identify and describe factors contributing to the shortage of medicines in Umkhanyakude district hospitals and PHC facilities.

3.3 Research Philosophy

There are two distinct research philosophies that researchers can choose from and they include quantitative and qualitative methods. A quantitative research is based on the positivist research paradigm while a qualitative research is based on the phenomenological research paradigm.

3.3.1 Phenomenological research paradigm

Creswell (2014:42) defines a phenomenological research as a design of inquiry coming from philosophy and psychology in which the researcher describes the lived experiences of individuals about phenomena as described by participants. The author

continues to state that, typically, a phenomenological research entails conducting interviews. In phenomenology, as echoed by Groenewald (2004:21), the researcher bracket himself consciously in order to understand phenomena in terms of the perspectives of the participants. Phenomenology is an approach to qualitative research with the goal of the research being to rely as much as possible on the research participants' views; hence this type of research does not have a formal structure and makes use of open-ended questions so that participants can share their experiences without any limitations (Creswell, 2014:37-38). Quite often, as Creswell (2014:37) further asserts, unlike in quantitative (post-positivism) research where researchers start with a theory, the researcher in qualitative research strives to make sense of the meaning individuals ascribe to the world they live in and inductively develop a theory.

3.3.2 Positivism paradigm

The positivism research is sometimes called post-positivism research or the scientific methods. Creswell (2014:37) states that positivism research represents a traditional form of research. The author further states that this type of research holds true for a quantitative research than a qualitative research. The assertion by Creswell (2014:37) that positivism holds a deterministic philosophy in which cause determines effects concur with the assertion by Polit and Beck (2010:14-15) that phenomena are not existing randomly, but they have antecedent causes.

The reductionist nature of positivism research emanates from the intent to reduce ideas into small, discrete set to test, such as variables from which hypothesis and research questions are derived (Creswell, 2014:37). Unlike phenomenology, positivism research begins with theory, data collection which will eventually support or disprove the theory. In positivism, the researcher is independent from the study participants and this serves as the basis for objectivity in quantitative research studies (Polit and Beck, 2010:15).

The research methodology that was chosen for this study was the quantitative methodology. According to Polit and Beck (2010:64), quantitative research uses a deductive reasoning approach to make predictions about how phenomena would behave in the real world if the theory were true. Creswell (2014:32) describes qualitative research as an approach for exploration with the aim of understanding the meaning individuals or groups ascribe to a social or human problem, while quantitative research

is an approach for testing objective theories by examining the relationship among variables. These variables can be measured using instruments so that numbered data can be analysed using statistical procedures. A quantitative methodology was used as the intention was to provide a quantitative or numeric description of the trends, attitudes and opinions of the sample, and eventually, generalise from this sample to a population, which will not be feasible with a qualitative method (Creswell, 2014:420).

Quantitative research is not without flaws. According to Creswell and Plano Clark (2011:12), the disadvantages of a quantitative research include weak understanding of the context or setting in which people talk, the voices of the participants are not directly heard in this type of study and often the researchers are in the background disallowing the opportunity for their own personal bias and interpretation to be discussed. However, quantitative research has an advantage of allowing for generalisation to a larger population because of large number of participants (Creswell and Plan Clark, 2011:12).

The research approach was chosen because the variables are inherently impossible to manipulate and since the aim of the study is purely descriptive (Polit and Beck, 2010:234).

3.4 Research Strategies

The research strategy chosen for this study was the positivist research strategy which was relevant for a quantitative study.

3.4.1 Positivist Research Strategy

The positivist research strategy that was employed took the form of a non-experimental descriptive survey. Survey research, according to Creswell (2014:18), is meant to provide a quantitative or numeric description of trends, attitudes, or opinions using structured questionnaire. Eventually, a generalisation from a sample was done. This strategy was chosen because it was more convenient and feasible for the researcher to undertake. It was feasible because no time was required to conduct interviews and given the geographical location of the health facilities in the chosen district, it was not going to be easy to complete the study timeously. Moreover, the researcher intended to assign a numeric description of the factors contributing to the shortage of medicines in the district.

3.4.2 Target Population

According to Houser (2015:178), a population in the study are all the individuals of interest to the researcher as well as to whom the research results are applicable and have significance. According to Mung'omba (2011:58), the emphasis on the researcher is to clearly define the target population from which information will be collected. It is for this reason that the target population for the study were pharmacists and pharmacist's assistants working in the district hospitals of Umkhanyakude. Pharmacists and pharmacist's assistants are in a suitable for the study because they specialise in the provision of pharmaceutical services. They know the pros and cons of how pharmaceutical services are run in the district and the challenges associated with the profession. The study population consisted of thirty (28) pharmacists and forty (19) pharmacists assistants working in five hospitals in the district of Umkhanyakude. Pharmacists and pharmacists assistants were suitable for the study owing to their valuable expertise and experience in pharmaceutical services, thus are able to provide the nitty-gritty of the challenges surrounding the profession. And again, pharmacists and their assistants have first-hand information regarding medicine availability and any changes in treatment guidelines.

3.4.3 Sampling

There are two main types of sampling strategies, and they include probability and non-probability sampling strategies. In a probability sample strategy, the researcher decides in advance that the population will be represented in the probability sample, which is seldom the case in a non-probability sample (Mung'omba, 2011:36). However, in this study, a census sampling approach was chosen owing to the small size of the target population which is less than a hundred, hence difficult to sample. A census survey method allows for all the members of the target population to participate in the study. According to Crano, Brewer and Lac (2015:220), a census entails a study involving all the possible members of the target population with the potential to be included from the population of interest. However, a census does not actually mean that all members of the population, such as all pharmacists and pharmacists' assistants in all UMkhanyakude district hospitals will eventually participate in the study, but the intended

population to which the researcher intends to generalise the survey results (Crano et al., 2015:220).

The inclusion criterion was all pharmacists and pharmacists' assistants working in the district hospitals. Other pharmacy personnel like general orderlies, pharmacy clerks and pharmacist intern were not included in the study. A sample of 47 participants who met the criterion participated in the study of which 28 were pharmacists and 19 were pharmacist's assistants.

3.4.4 The Research Instruments

The research instrument is used to measure the variables relevant for the study. As a research instrument, the study made use of a structured questionnaire (Appendix B).

3.4.4.1 Questionnaire Construction

The questionnaire construction was aligned to the objectives of the study. Construction of the questionnaire was in the form of closed-ended questions. Respondents were required to reply to structured questions and provide structured answers. Compared to interviews, the advantage of using a questionnaire is that it allows for respondents who are not capable of expressing themselves verbally or in writing as may be the case with some exploratory studies, to participate comfortably in the study.

Therefore, the questionnaire was constructed in such a way that the respondents were able to describe the factors contributing to the shortage of medicines in the district and consisted of the following:

Section A – Demographics.

Section B to D – Factors contributing to the shortage of medicines, impact of the shortage of medicines on pharmacists and pharmacist's assistants, systematic issues affecting management of medicines inventories at Umkhanyakude district hospitals and PHC facilities.

Section E – recommendations to the management based on the study findings.

3.5 Pilot Study

The aim of doing a pilot study was to identify if there were any errors in the research instrument and correct them before the actual study. The pilot study, as defined by Zikmund (2012:78) is a preliminary study conducted with a small number of the target population to serve as a guide to the actual larger study. The pilot study was conducted with ten participants, which included six pharmacists and four pharmacist's assistants.

The pilot study was conducted in one hospital pharmacy in the district a week before the actual study. Participants were given a week to complete the questionnaire. The researcher was the one administering the questionnaire and collected it after completion. However, data collected during the pilot study was not included in the results of the main study.

3.6 Administration of the Questionnaire

Prior to presenting to respective hospital pharmacy managers, the researcher communicated with emails all study approvals and consent forms to all hospital managers. The researcher visited hospital pharmacy managers to give an introduction to explain the purpose of the study and the data collection procedures including dates during which such data were to be collected. After finishing the introduction, the researcher then emailed questionnaires to all pharmacy managers for printing and completion thereof. Completion of the questionnaires took place in the absence of the researcher. Respondents were given a week to complete the questionnaire after which it would be collected. Due to time constraints, the researcher made arrangements to collect completed questionnaires from all hospitals as there was no time to send field workers.

3.6.1 Collection of Questionnaires

Due to time constraints, participants were given a full week to complete the questionnaires. Prior to the scheduled collection dates, pharmacy managers were telephoned so as for them to ensure all participants had completed the questionnaires. Hospital pharmacies were also used as collection points from which all questionnaires were to be collected. After collection, the researcher ensured that all questionnaires were kept securely in a controlled access lockable cabin during and after analyses.

3.7 Data Analysis

Data analyses entails systematically applying statistical or illustrate, condense and recap, evaluate data collected. Data analysis in this study provided a description of trends and patterns in the population (Polit and Beck, 2010:392). The data collected in this study was analysed using a quantitative data analysis method by capturing the data on a Microsoft Excel spreadsheet (Crowley and Stellenberg, 2015:85). Basically, descriptive statistics was used to summarise and describe quantitative data collected during the study (Polit and Beck, 2010:436).

3.7.1 Validity and Reliability

According to Polit and Beck (2010:377), validity is used to evaluate a quantitative research instrument. The authors further state that validity and reliability are dependent on each other to some degree, in that if an instrument is unreliable it cannot possibly be valid. Validity can be achieved when one can draw meaningful and useful inferences from scores on the research instruments (Creswell, 2014:155). There are four specific types of validity and they include face validity, content validity, criterion validity, and concurrent validity.

3.7.1.1Face validity

Face validity ensures that the instrument looks to be measuring the intended concept (Polit and Beck, 2010:377). The researcher achieved this quality by developing a questionnaire that was readable and clear for the participants. Moreover, the researcher conducted a random selection of perspective participants and interviewed them shortly after completing the questionnaire. This was done to ascertain whether the answers provided were a true reflection of their perceptions.

3.7.1.2 Content validity

Content validity provides the extent to which an instrument indicates ample sampling of the relevant construct being measured. However, as Polit and Beck (2010:377-78) assert, there is no totally objective system of ensuring content coverage of the instrument. To ensure content validity, the researcher conducted adequate literature review and used own experiences in developing the questionnaire.

3.7.1.3 Criterion validity

Researchers use criterion validity to establish relationships on scores of an instrument with other scores in external criterion. If there is a strong correspondence in the scores of the instrument with the scores on the external criterion, the instrument is said to be valid (Polit and Beck, 2010:378). However, due to this approach being mostly used in applied and or practically orientated research studies, the researcher could not use this approach to validate the instrument and given that the study was under severe time constraints.

3.7.1.4 Concurrent validity

Concurrent validity refers to the ability of an instrument to differentiate between individuals who differ on their current status on some criterion (Polit and Beck, 2010:378). Since this approach requires some frame of reference or benchmark, the researcher could not apply this approach in the current study.

3.7.2 Reliability

In quantitative research, reliability evaluates the quality of a quantitative measure by ensuring consistency in measuring the attribute (Polit and Beck, 2010:373). This concurs with Creswell (2014:201) in that reliability refers to whether scores to items on an instrument are internally consistent, stable over time, and whether there was consistency in the administration and scoring during the study. This therefore means that reliability is concerned with accuracy of the instrument in measuring the construct.

There are three types of reliability and they are parallel forms of reliability, test-retest reliability, and inter-rater reliability. In testing reliability, the researcher developed the questionnaire using simple English that was also relevant to pharmacy personnel irrespective of their educational background. In applying the test-retest approach, the researcher pre-tested the instrument time and again to ascertain whether there was consistency in the interpretation of the variables being tested. The inter-rater approach is concerned with the extent to which two or more researchers would agree about the scoring on an instrument. Because the procedure requires having two observers making simultaneous, independent observations, it was impractical to apply in the study (Polit and Beck, 2010:375).

3.7.3 Limitations of the Study

The study was conducted in a rural district of Umkhanyakude and the findings from the study may not be totally applicable in other rural districts as well as in metros. Data collection was mainly done in hospital pharmacies although the study covered PHC facilities under these hospitals. Therefore the population did not cover pharmacist assistants working in PHC facilities as well as nurses doing the work of pharmacist assistants in PHC facilities. The study can therefore be expanded or reproduced to include PHC personnel so as to gain an in-depth insight into the factors causing medicines shortages in rural districts. However, hospital pharmacy personnel had an overall experience of pharmaceutical services both in hospitals and clinics.

Due to the limited scope of the study, factors contributing to the shortage of medicines that may be due to logistics between the medical depots and the courier companies were not covered. Lastly, the intended sample size could not be attained because some of pharmacy personnel were on leave.

3.7.4 Elimination of Bias

Emanating bias in a study ensures that the research remains objective throughout the study. Firstly, the researcher was not present during the completion of the questionnaire, hence could not influence the results. The researcher did not make inferences in race or ethnicity because these were not relevant for the study. The words used in the study were gender neutral and no assumptions about any age groups were indicated.

3.8 Ethical Considerations

Because research involves collecting data from people about people, as well as about organisations and their processes, it is therefore incumbent on researchers to anticipate ethical issues that may arise during research studies (Creswell, 2014:132). In order to address ethical issues in the study, Creswell (2014:132) recommends that attention should be directed to issues before conducting the study; beginning the study; during data collection and data analysis; and in reporting, sharing ,and storing the data.

3.8.1 Ensuring that permission is obtained

Considering that institutions may raise power issues with researchers, before commencing the study the researcher submitted research proposal for institutional approval; local facilities and district health office approval. Moreover, before the study commenced, a letter of permission (Appendix A) was sought from the relevant authorities as an assurance that authority has been granted to conduct the study.

3.8.2 Ensuring Participants Have Given Informed Consent

The researcher ensured that participants were given an informed consent form (Appendix B) to sign before participating in the study. The informed consent form detailed issues of confidentiality of participants, ensured no harm to participants, voluntary nature of participation as well as withdrawal from the study at any particular point in time. This was done to assure participants that information collected from them will not be used against them in one way or another (Polit and Beck, 2010:122). According to Polit and Beck (2010:127), informed consent means that participants have adequate information about the study, comprehend the information, and have power of free choice, enabling them to consent to or decline participation in the study voluntarily.

3.8.3 Ensuring No Harm Comes to Participants

The researcher employed the fundamental ethical principle of beneficence, which ensures that researchers minimise harm while at the same time maximise benefits (Polit and Beck, 2010:121). The researcher was very sensitive towards participants' exposure to undue risks of harm or discomfort. This was achieved by avoiding questions that could compromise participants' emotions, social support and financial well-being (Polit and Beck, 2010:121).

3.8.4 Ensuring Confidentiality and Anonymity

Data analysis was ensured to minimise bias or siding with participants. All results of the study, positive and contrary, will be disclosed while at the same time respecting the privacy and anonymity of participants (Creswell, 2014:133). The rights of participants' privacy was ensured by means of keeping all the information they provided in the strictest confidence (Polit and Beck, 2010:125).The findings of the study were reported honestly. Participants in the study were protected by using composite stories so that they cannot be identified. Credit will also be given to advisers, supervisors, and

participants. The raw data collected will be stored for five (5) years (Creswell, 2014:133).

3.9 Conclusion

The chapter gave an outline of the study design and methodology. The study philosophy, population and sampling strategy were also explained. The manner in which the data will be collected, how the pilot study was conducted have been described, data analysis and issues of ethical considerations were detailed. Chapter four will discuss data analysis and interpretation.

CHAPTER FOUR: RESULTS, DISCUSSION AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter presents the analysis of data collected from the respondents of district hospitals and Primary Health Care facilities in, UMkhanyakude District, KwaZulu-Natal, South Africa. According to Fink (2010: 180), data analysis involves the process of selecting data, in addition to the discarding of irrelevant data. It also involves statistics of organising and interpreting numerical information. In this study, the questionnaire was analysed using Microsoft Excel. The findings are depicted by making use of graphical and descriptive statistics.

4.2 Response rate

Table 4.1 Response rates

Position	Number of questionnaires distributed	Number of questionnaires returned	Percentage of questionnaires returned	Percentage of questionnaires not returned
Pharmacist	30	28	93%	7%
Pharmacist's Assistant	40	19	48 %	52%

The target population for this study was 30 pharmacists and 40 pharmacy assistants. Table 4.1 indicates the number of questionnaires distributed and returned and the response rates for both groups of respondents. With regard to the pharmacists, 30 questionnaires were distributed, and 28 were duly completed and returned. The response rate was 93%. A total of 40 questionnaires were distributed to the pharmacy assistants and 19 were returned. The response rate was 48 %. The reasons for the non - return of questionnaires was not established as participation was totally voluntary. It was noted that the majority of pharmacy assistants did not return the questionnaires.

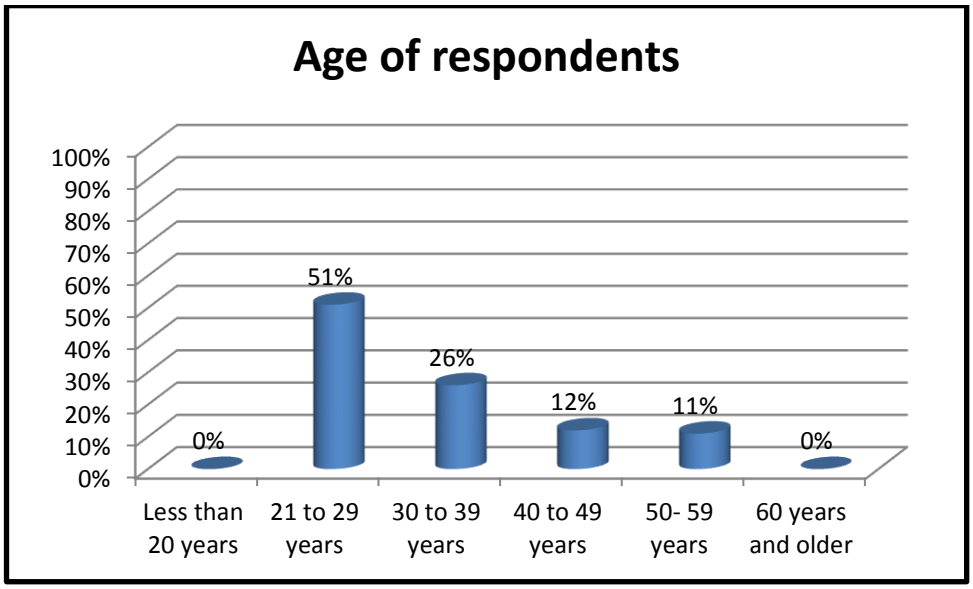
4.3 Findings

4.3.1 Demographic variables

Section A of the questionnaire gathered the demographic data of the respondents and it consisted of four questions **(Appendix A).** The purpose of this section was to document respondent's age, work experience, qualifications and positions in the pharmacies. These variables were used in the study as they could have a direct relationship to responses on the other questions asked.

4.3.1.1 Age of respondents

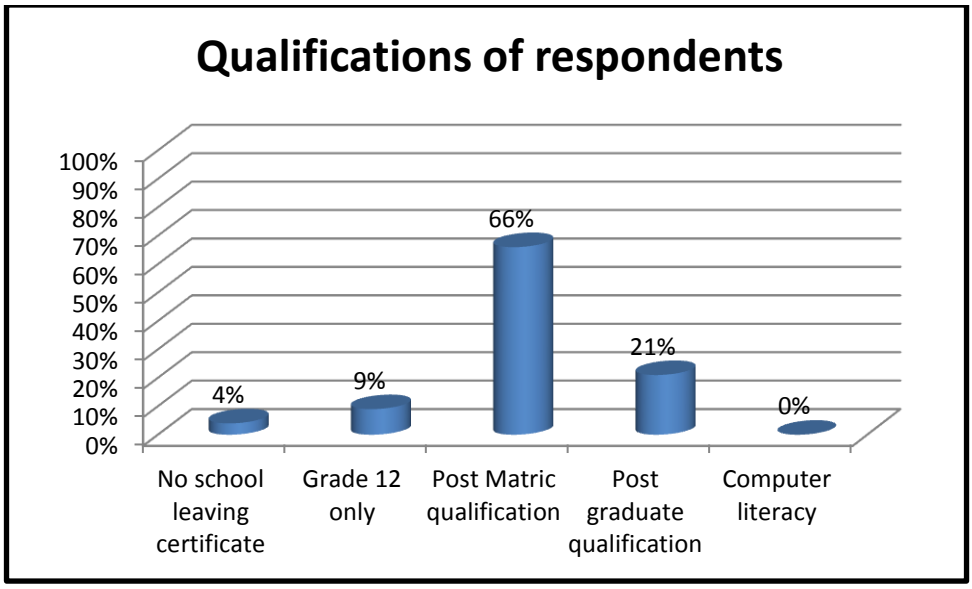
Figure 4.1: Age of respondents



In response to the question on age of respondents, the majority (51%) were between the ages of 21 to 29 years, 26 % were between 30-39 years, 12 % were between 40 to 49 years and 11 % were between 50 to 59 years. There were no (0%) respondents younger than 20 years and 60 years and older. The results reflect that most of the pharmacy staff falls in the age category of 21- 39 years old.

4.3.1.2 Qualifications of respondents

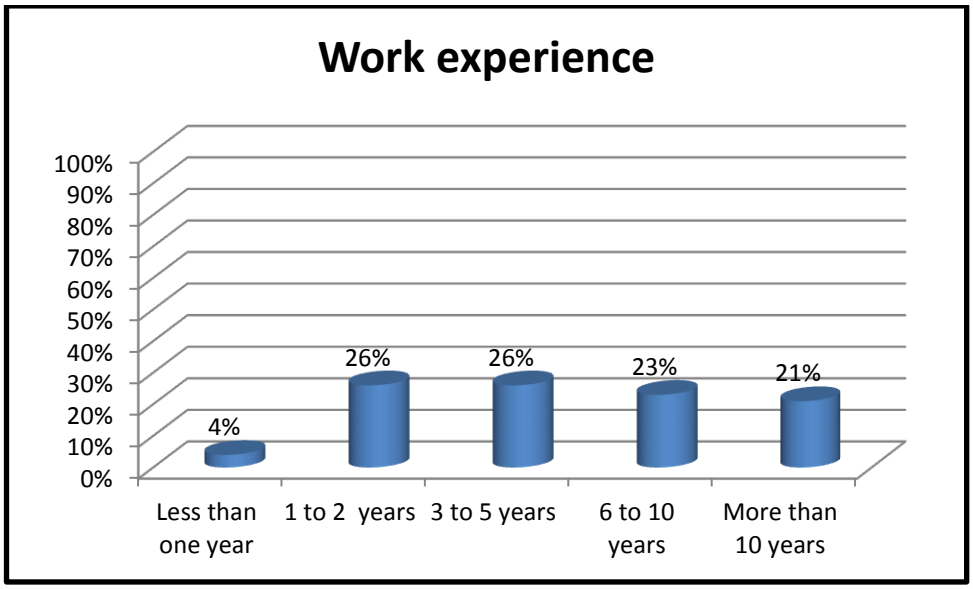
Figure 4.2 Qualifications of respondents



The qualifications of the respondents included 66 % having a post matriculation (Grade 12) qualification , 21 % had post graduate qualifications , 9 % had Grade 12 certificates and no further qualifications while 4% indicated they had no school leaving certificates .None of the respondents (0%) had a qualification in computer literacy . Most of the staff is in possession of a post Grade 12 qualification. This is in accordance with the requirements of the positions of respondents as most would require some pharmaceutical qualification in order to work in the pharmacies. The 4 % that indicated that they had no school leaving certificate were basic pharmacy assistants as the requirements for registering the National Certificate: Pharmacist assistant basic is a minimum grade 10 (standard 8) pass in Maths and English with 50% and above (South Africans Qualifications Authority, 2015: 1). There are very few pharmacists in the rural areas of KwaZulu. In these rural hospitals, the people working in the pharmacies are pharmacist assistants for whom the minimum educational requirement is a standard eight certificate. These workers are given in-service training for which there is not a widely recognised certification (University of KwaZulu Natal, 2017:4).

4.3.1.3 Work experience of respondents

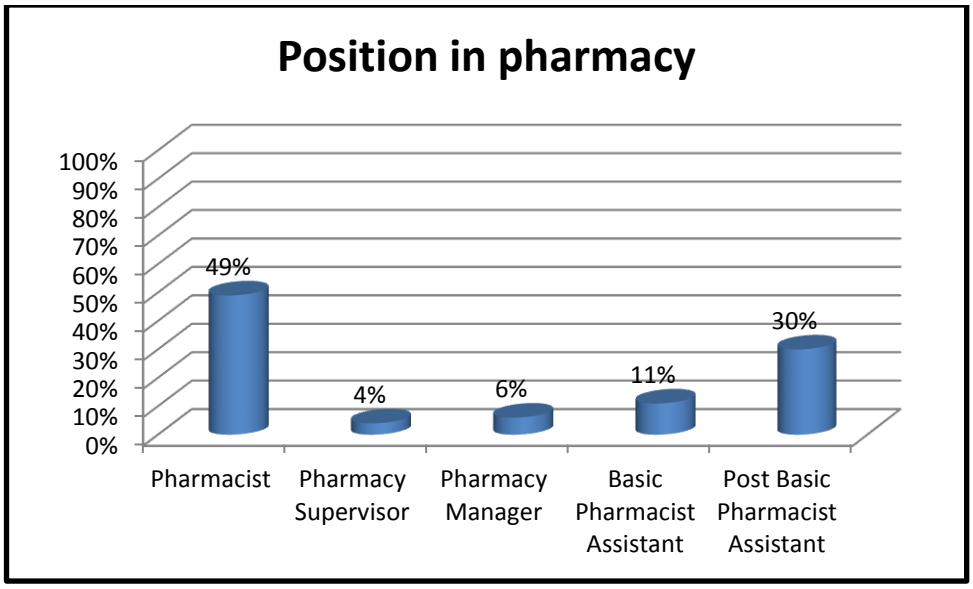
Figure 4.3 Work experiences of respondents



In response to the question on work experience of respondents, a total of 26 % indicated that they had 1 to 2 years of experience and 26 % had 3 to 5 years. A total of 23 % had between 6 to 10 years and 21 % had more than 10 years' experience. Only 4 % had less than one year's experience. The above graph indicates that the majority of participants have been employed in the pharmacy for more than one year. This will assist in obtaining the correct information because most of the participants have experience with the medicine shortages in the pharmacies. The years of experience also indicates most respondents are knowledgeable about the activities of the pharmaceutical services.

4.3.1.4 Position in pharmacy

Figure 4.4 Respondents' position in pharmacy



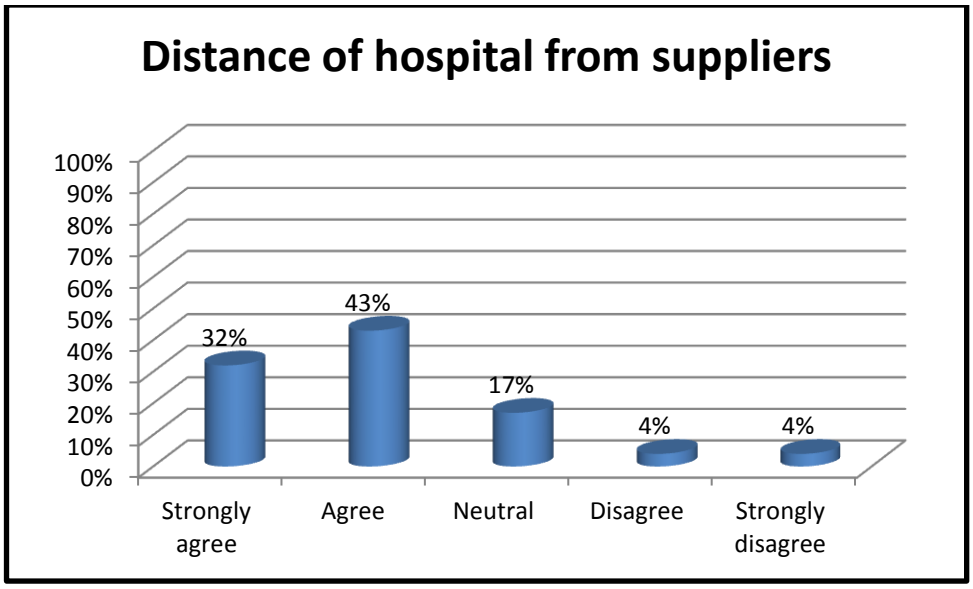
Of the 47 respondents working in the pharmacies, pharmacists made up the majority at 49 %, and 30 % were post basic pharmacist assistants. Pharmacy supervisors made up 4% of the sample, while 6% were pharmacy managers and 11 % were basic pharmacist assistants. The respondents' current position in the pharmacies was in accordance with what the study envisaged; as it intended to obtain information from all pharmacy staff that deal with the shortage of medicines. This meant that they had a broader knowledge of the medicine shortages.

4.3.2 Factors contributing to the shortage of medicines

There are many factors contributing to shortage of medicines as it is a combination of both local and global factors. Section B of the questionnaire dealt with the first objective of the study, which was to determine the factors contributing to the shortage of medicines at Umkhanyakude district hospitals and PHC.

4.3.2.1 The distance of the hospital from suppliers is associated with shortage of medicines

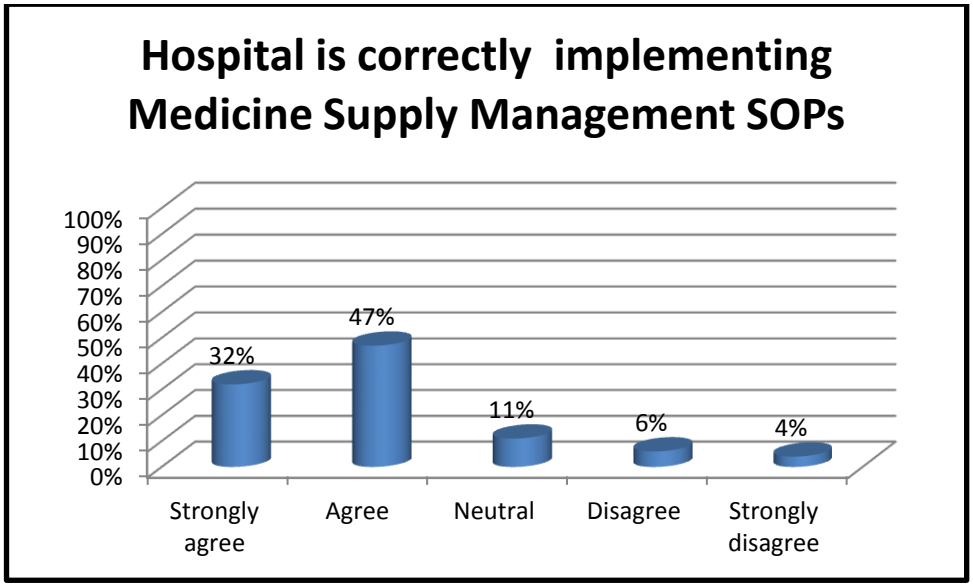
Figure 4.5 Distance of hospital from suppliers



In order to establish reasons for the shortage of medicines, the question asked if the distance of the hospital from the suppliers was a possible cause. The majority (75%) were in agreement. A total of 32 % strongly agreed while 43% agreed. An equal number 4 % disagreed and 4 % strongly disagreed, while 17 % chose to remain neutral. Corke (2015:1) finds that the main reason for drug shortages in South Africa is due to management and logistical challenges between the pharmaceutical companies and the clinics. Most drugs are available in South Africa's medicine depots but patients are unable to get their prescriptions filled in local health centres because of local logistical and management problems, ranging from inaccurate forecasting to storage or transport issues. Only a minority of shortages are due to pharmaceutical companies being unable to provide enough drugs worldwide (Corke, 2015:1).

4.3 2.2 correct implementation of Medicine Supply Management SOP by hospitals

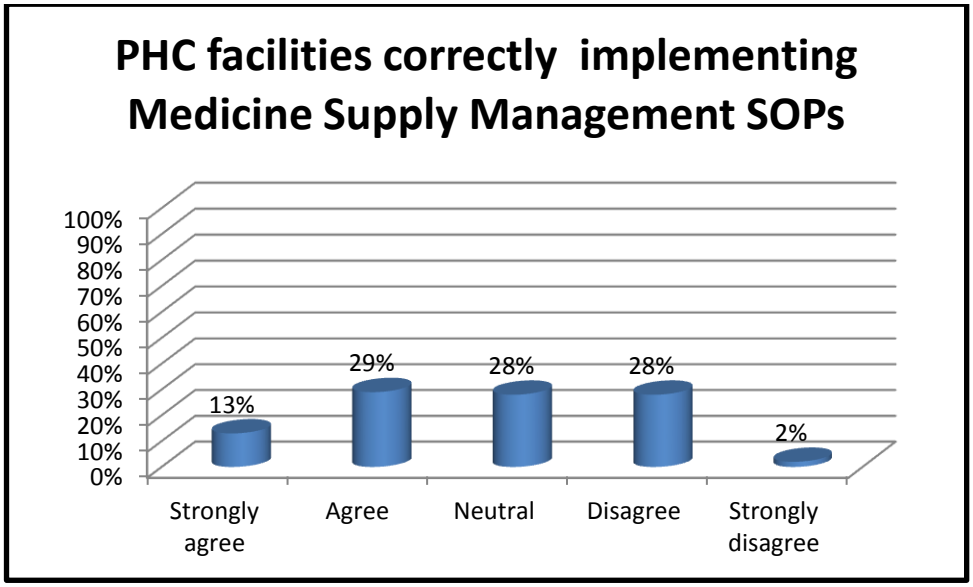
Figure 4.6 Correct implementation of Medicine Supply Management SOP by hospitals



The majority (79%) were in agreement that hospitals were correctly implementing the Medicine Supply Management SOPs, where 32 % strongly agreed and 47% agreed. Only 11 % chose to remain neutral, while 6% disagreed and 4 % strongly disagreed. Christopher (2016: 1) reports that steps have been taken by the Stop Stock Outs Project (SSP) and the National Department of Health (NDoH) to deal with stock outs. NDoH created a national supply chain task force, and also began several supply chain reforms in 2015. The SSP was granted R300m for the development of a national electronic medicine stock management system which goes hand in hand with addressing logistical and administrative challenges within the current medicine supply system to optimise its effectiveness (Christopher 2016: 1) .

4.3.2.3 Correct implementation of Medicine Supply Management SOP by PHC facilities

Figure 4.7 Correct implementation of Medicine Supply Management SOP by PHC facilities

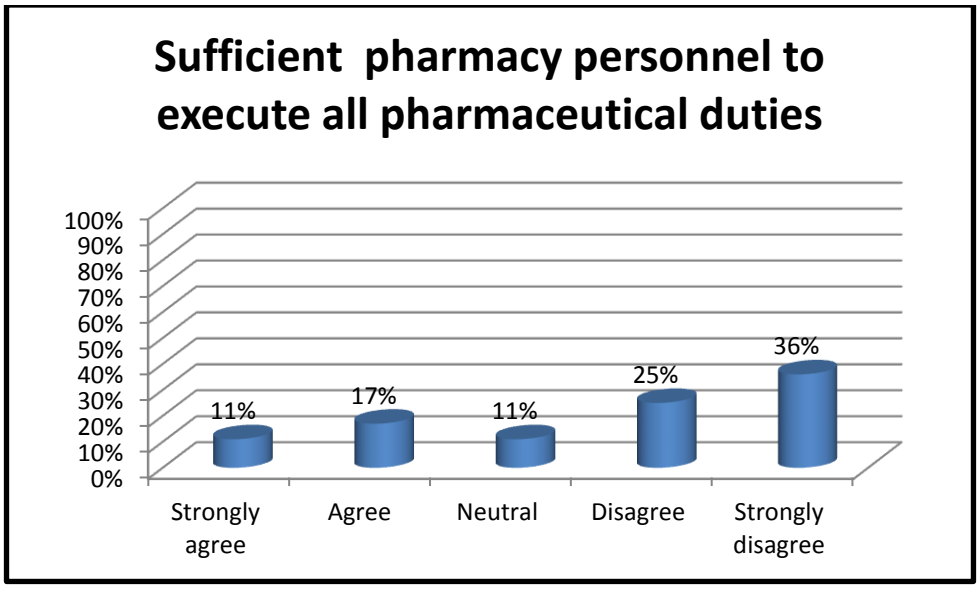


The majority (41%) were in agreement that PHC facilities were correctly implementing the Medicine Supply Management SOPs, where 13 % strongly agreed and 29 % agreed. A significant 28 % chose to remain neutral, while 28 % disagreed and 2 % strongly disagreed.

Poor medicine supply management is one other critical factor contributing to shortage of medicines, especially observed in PHC clinics. In a study conducted by Crowley and Stellenberg (2015:87), the authors found that some PHC facilities do not have standard operating procedures for drug receiving, storage and dispensing; coupled with poor documentation of transactions on stock cards. It therefore becomes difficult to determine monthly consumptions and re-order levels. Without these quantities, it is not easy to execute an adequate order quantity which will lead to either under stocking with resultant stock outs or overstocking with resultant medicine expiries.

4.3.2.4 Sufficient pharmacy personnel to execute all pharmaceutical duties

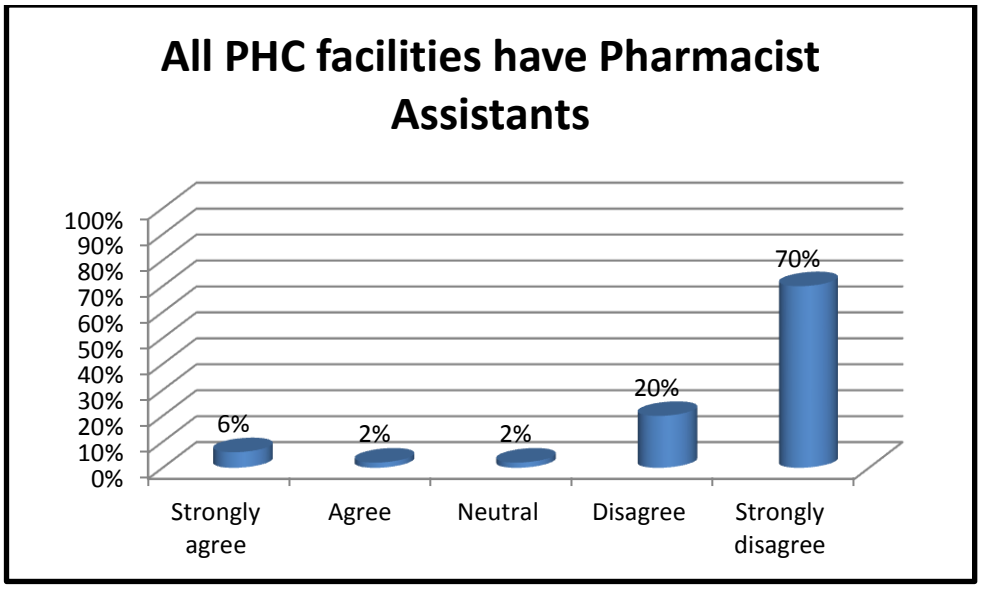
Figure 4.8 Sufficient pharmacy personnel to execute all pharmaceutical duties



The question on whether there are sufficient personnel to execute all pharmaceutical duties in the pharmacy yielded a very high percentage who disagreed (25%) and 36 % strongly disagreed. An equal percentage11% strongly agreed and 11 % was neutral. Only 17% of respondents agreed. In a report by Ndenze (2017:1), it is stated that the country's pharmaceutical industry has a huge skills shortage, lacking at least 12,000 pharmacists in order to meet international standards of 50 pharmacists per 100 000 people. The skills shortage and the cost of specialised skills also affect the entire pharmaceutical industry supply chain as companies are required to have a supervising pharmacist. It is estimated South Africa requires 12,000 pharmacists to meet the international benchmark. Jobson (2015: 6) reports that the 2012 National Health Facilities Baseline Audit reported on a survey of 3,356 clinics and community health centres that found that most clinics had facility managers, but nearly half of the clinics had no visiting doctors; 84% had no assistance from a pharmacist or pharmacy assistant (Jobson 2015: 6).

4.3.2.5 Availability of Pharmacists assistants at PHC facilities

Figure 4.9 Availability of Pharmacists assistants at PHC facilities



There is a strong level of disagreement (90%) with the statement that there are Pharmacy Assistants in all PHC facilities, where 20 % disagreed and 70 % strongly disagreed. Only 6 % strongly agreed and 2% disagreed, while 2 % remained neutral. Cooke (2011: 20) found that the PHC plan required training of post-basic pharmacy assistants. Due to the slow process of staffing facilities with these appropriately trained staff, it was recommended to use basic trained pharmacy assistants to do outreach to CHC and clinics.

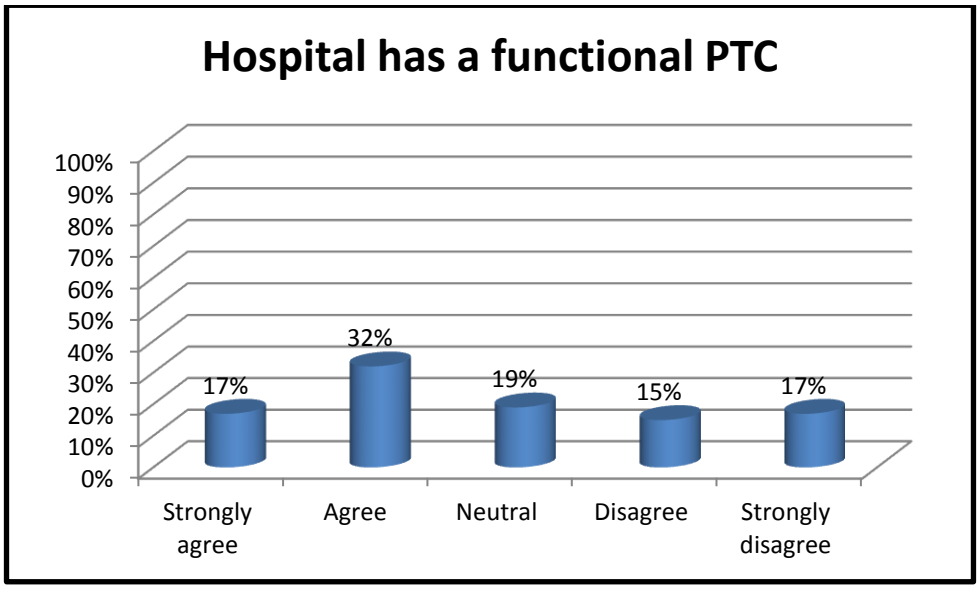
Crowley and Stellenberg (2015:18) found that PHC re-engineering is not properly aligned to pharmaceutical services in that there are no pharmacy assistants in most PHC clinics who are properly trained to run medicine store rooms in clinics. Instead there is task shifting, with pharmaceutical services being provided by nursing personnel in PHC clinics. The nurses are therefore overwhelmed with work load which compromises the quality of pharmaceutical services in PHC clinics as well as nurses' core functions. Crowley and Stellenberg (2015:18) also alluded to this saying that the imposition of additional tasks such as medicine supply management and dispensing increases the work load on nurses, whereas nurses should be supported to provide health care services for which they are responsible.

The shortage of pharmacy personnel requires the need for the multidisciplinary team to shoulder the responsibilities collectively, under the guidance of the available

pharmacist. Wentzel (2008: 29) reports in a study that professional nurses have to examine patients, prescribe and dispense medicine, order medicine from the medical depot, and do drug management. Neither pharmacists nor pharmacy assistants are available in most of the clinics. In some clinics, the clinic manager takes responsibility for drug management, involving ordering and checking stock (including expiry dates), receiving orders from the medical depot, and unpacking boxes in the storeroom while in other clinics these routine tasks are delegated to professional nurses.

4.3.2.6 Hospital has a functional Pharmaceutical and Therapeutics Committee (PTC) to ensure rational use of medicines

Figure 4.10 Hospital has a functional PTC

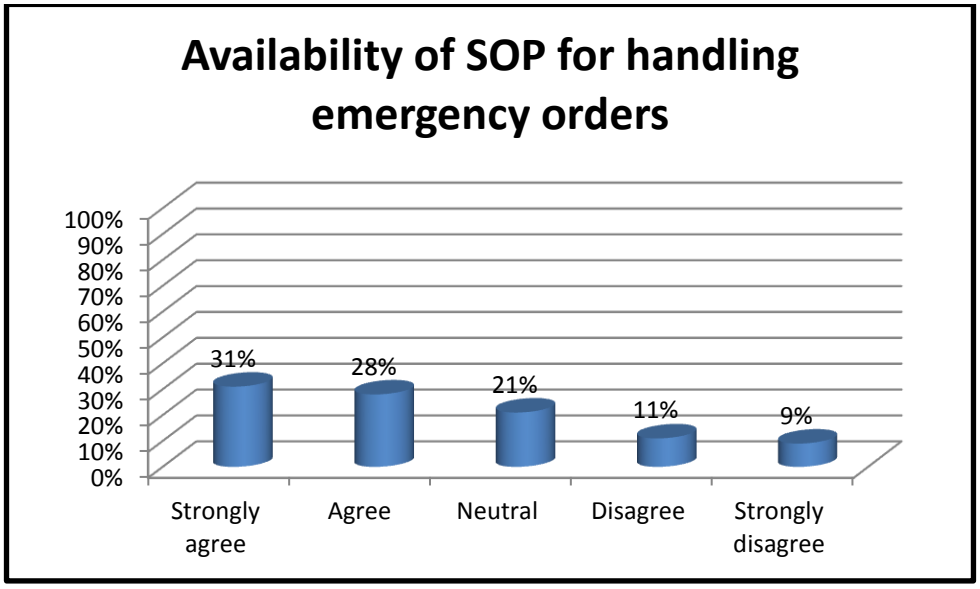


The responses to the hospital having a functional PTC committee indicated that overall there was agreement (49%), as 32 % agreed and 17 % strongly agreed, while a similar (17%) strongly disagreed and 15% disagreed. A total of 19 % chose to remain neutral. The National Department of Health (NDoH) (2015:8) has adopted the WHO's approach and has established the Pharmaceutical and Therapeutics Committees (PTCs) as the core intervention to target the various threats to the efficient use of resources. A Pharmaceutical and Therapeutics Committee (PTC) provides a forum for all relevant role players, from prescribers to dispensers, to contribute to an efficient medicine management system. This shall ensure that appropriate, safe, effective and cost-

effective medicines are available to improve the quality of therapeutic care in the South African health sector (The National Department of Health (NDoH), 2015:8).

4.3.2.7 Availability of a standard operating procedure for handling of emergency orders between the hospital and the supplier

Figure 4.11 Availability of a standard operating procedure for handling of emergency orders between the hospital and the supplier

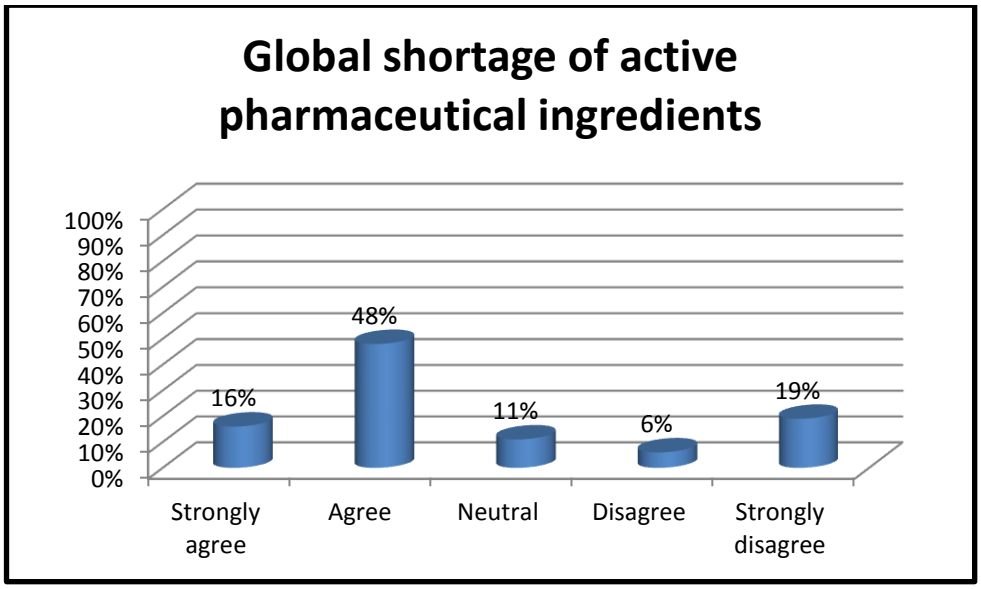


SOPs for handling of emergency orders between the hospital and the supplier was perceived to be available as indicated by 31 % strongly agreeing and 28% agreeing. Only 9% strongly disagreed and 11 % disagreed while a significant 21 % remained neutral. The emergency order point is the level where the risk of stocking out is likely, and an emergency order should be placed immediately. A maximum/minimum inventory control system is designed so that facilities always have enough stock to serve their clients and to prevent emergency orders. However, every system must have a procedure for placing emergency orders if they are ever needed. An emergency order would be needed to avoid reaching a stock out before the end of the review period. At the Health Centres and Hospitals an emergency order is needed if the stock level falls below 2 weeks of stock (0.5 months of stock) before the end of the review period. At the Health Posts an emergency order is needed if the stock level falls below 1 week of stock (0.25 months of stock) before the end of the review period (Standard Operating

Procedures (SOP) Manual for the Integrated Pharmaceuticals Logistics System in Health Facilities, 2015:55).

4.3.2.8 The global shortage of active pharmaceutical ingredients.

Figure 4.12 the global shortage of active pharmaceutical ingredients is cause for shortage of medicines in the hospital



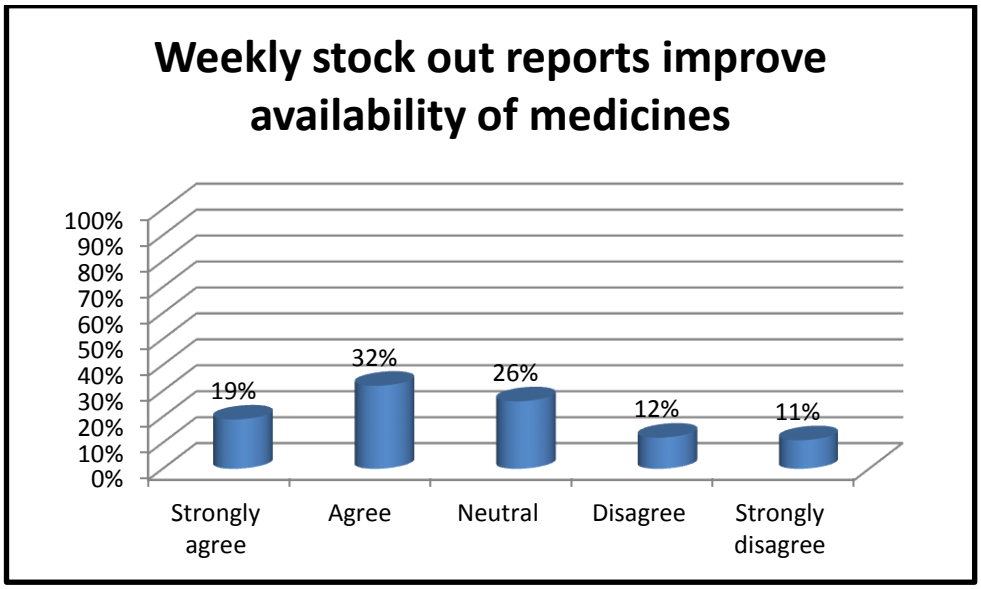
Almost a third (64 %) of respondents agreed that global shortage of active pharmaceutical ingredients with 48% agreeing and 16 % strongly agreeing. Only 11% were neutral and 6 % disagreed and 19 % strongly disagreed. Mbanjwa (2015: 1) reports that shortage of drugs were attributed to some pharmaceutical suppliers lacking the necessary active compounds needed to make some of the drugs. The Minister, Dr Motsoaledi noted that drug stock outs across South Africa are often caused by manufacturing challenges. However, of the daily reports from patients and health workers of drug shortages received by the SSP, only 20% of reported cases are found to be caused by manufacturing issues. Instead, the SSP has found that the remaining 80% of cases are caused by management and logistical challenges between the medicine depot and clinics at provincial and district levels. These include incorrect quantities of drugs being ordered by clinics, inaccurate forecasting of drugs per population, and poor stock management at facility level Mbanjwa (2015: 1). Gonzalez (2015:1) supports these findings by stating that the DOH attributed the bulk of shortages

to supplier constrained and shortages of the pharmaceutical ingredients used to make the drugs.

Bishnu et al. (2017:82) assert that medicine shortages can also be caused by factors such as unavailability of active pharmaceutical ingredients, natural disasters; voluntary recall of medicines due to post marketing safety issues; regulatory issues; imbalances between supply and demand; and limited or single manufacturer of medicines.

4.3.2.9 The weekly stock out reports improve availability of medicines in the hospital

Figure 4.13 the weekly stock out reports improve availability of medicines in the hospital



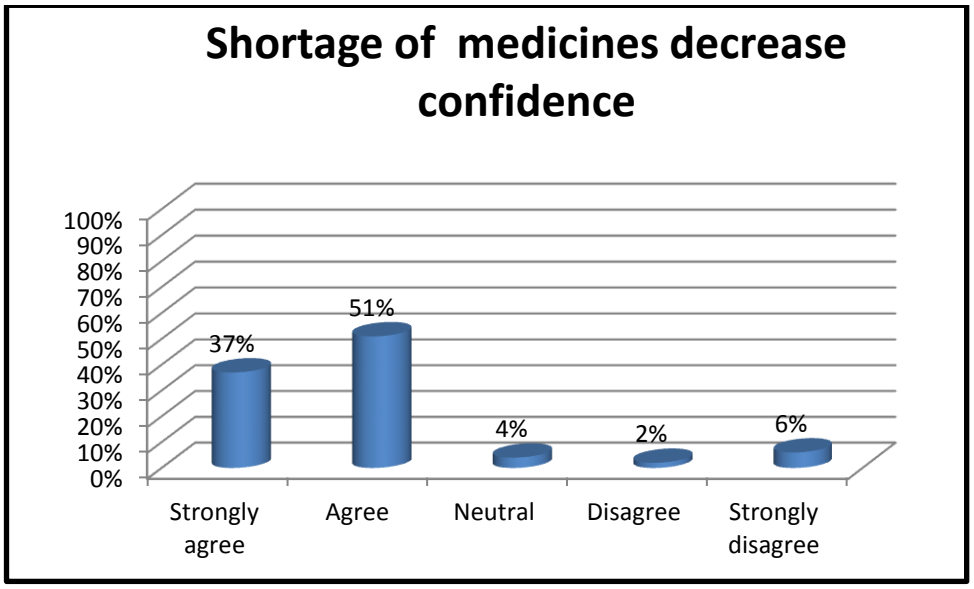
Weekly stock out reports was perceived as helpful in improving the availability of medicines indicated by 32 % agreeing and 19 % strongly agreeing. Only 23 % (12 %) disagreed and 11% strongly disagreed that this did not help improve, while 26 % remained neutral. The Stop Stock Outs Project (SSP) monitors and communicates about shortages and stock outs of medication, and ensures that transparency and accountability exists along the supply chain. With its free hotline, the SSP ensures that patients and health care workers can ring the alarm when stock outs occur anywhere in the country. Rapid communication to public health authorities aims to speed up resolution of stock outs so that every patient and every health care worker has the medicine they need (Low, 2015:3).

4.3.3 Impact of medicine shortages on pharmacists and pharmacist's assistants

Section C of the questionnaire investigated the impact of medicine shortages on pharmacists and pharmacist's assistants

4.3.3.1 Shortage of medicines decreases pharmacists and pharmacist's assistants' confidence

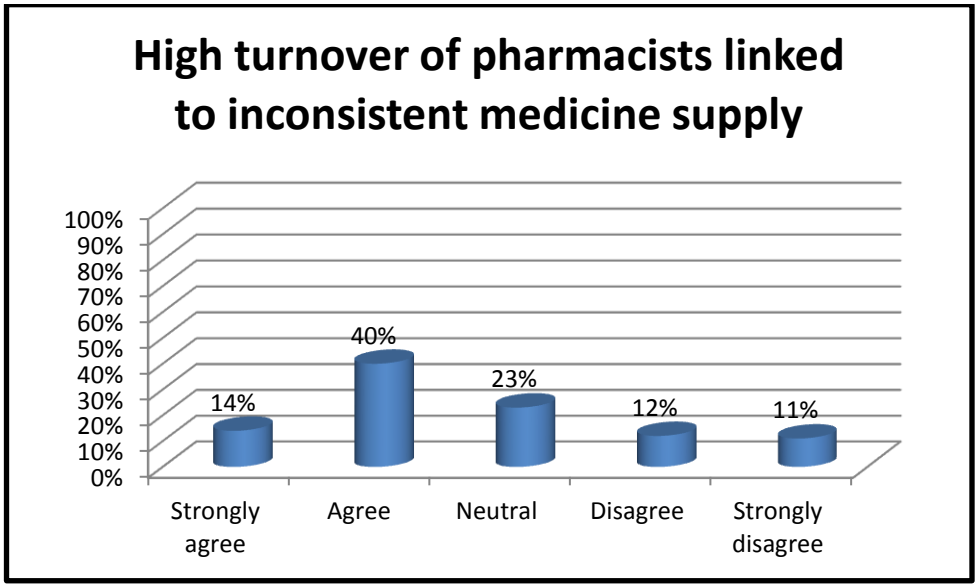
Figure 4.14 Shortage of medicines decreases pharmacists and pharmacist's assistants' confidence



There was a very high level of agreement among respondents (88%) that shortage of medicine decreases confidence with 37 % strongly agreeing and 51 % agreeing. There was a very low percentage, 6 % strongly disagreed, 2 % agreed and 4% remained neutral. The responses indicate there is a low level of confidence among respondents. Patel (2013:2) says South African law makes the Minister of Health Aaron Motsoaledi, MECs, Heads of Departments, Depot Responsible Pharmacists, and facility Responsible Pharmacists liable for these shortages. These obligations are legally enforceable, meaning that the office holders can be sued in their official capacities if they fail to comply with their obligations. This is in turn impacts on pharmacists as they can be held legally liable for any problems arising out of the shortage of medicines.

4.3.3.2 The linkage between high turnover of pharmacists and inconsistent supply of medicines in the district.

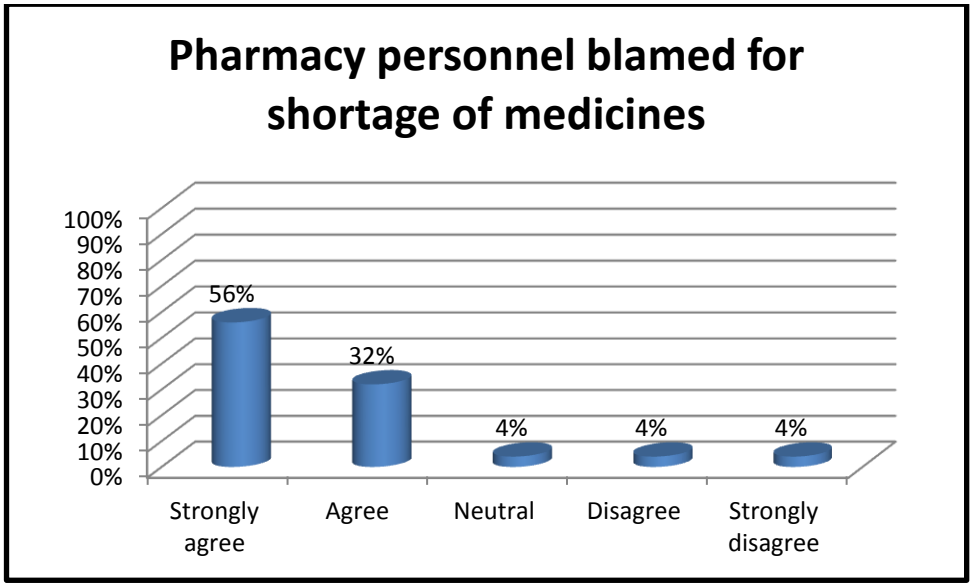
Figure 4.15 the high turnover of pharmacists can be linked to inconsistent supply of medicines in the district



The majority (54 %) were in agreement that the high turnover of pharmacists can be linked to inconsistent supply of medicines in the district. A total of 14 % strongly agreed and 40 % agreed, while a significant 23 % remained neutral. Only a small percentage (23%) was in disagreement, where 12 % disagreed and 11 % strongly disagreed. Yao (2017:1) finds that to many pharmacists, drug shortages can be a tough challenge to handle effectively. While the problem has a direct and dire impact on patient care, there is, unfortunately, no effective solution that can completely eradicate the problem. This leads to a high turnover of pharmacy personnel.

4.3.3.3. Blame on pharmacists and their assistants for shortages of medicines.

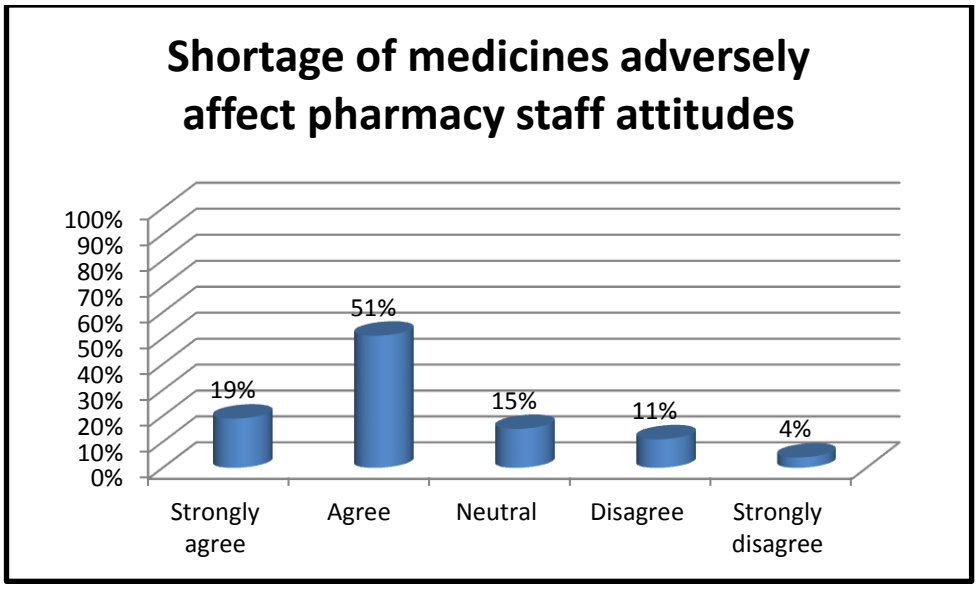
Figure 4.16 Other health care workers blame pharmacists and their assistants for shortages of medicines



The majority of pharmacy staff (88 %) was in agreement that they are blamed for shortage of medicines, where 56% strongly agreed and 32 % agreed. An equal percentage 4 % each chose to remain neutral, 4% disagreed and 4 % strongly disagreed. Writing in the South African Medical Journal, Bateman (2013:601) says the shortages are caused by a number of factors, including a shortage of pharmacists, protracted labour disputes, dismal management, corruption, and woeful communication between suppliers, depots and facilities. Bateman (2013:602) also reports that the Democratic Nursing Organisation of South Africa, (DENOSA) reported that angry patients are labelling its members as 'uncaring professionals that deprive patients of medication', and called for the Public Protector to urgently probe the drug stock-outs.

4.3.3.4 Shortages of medicines adversely affect pharmacy staff attitude.

Figure 4.17 Shortages of medicines adversely affect pharmacy staff attitudes



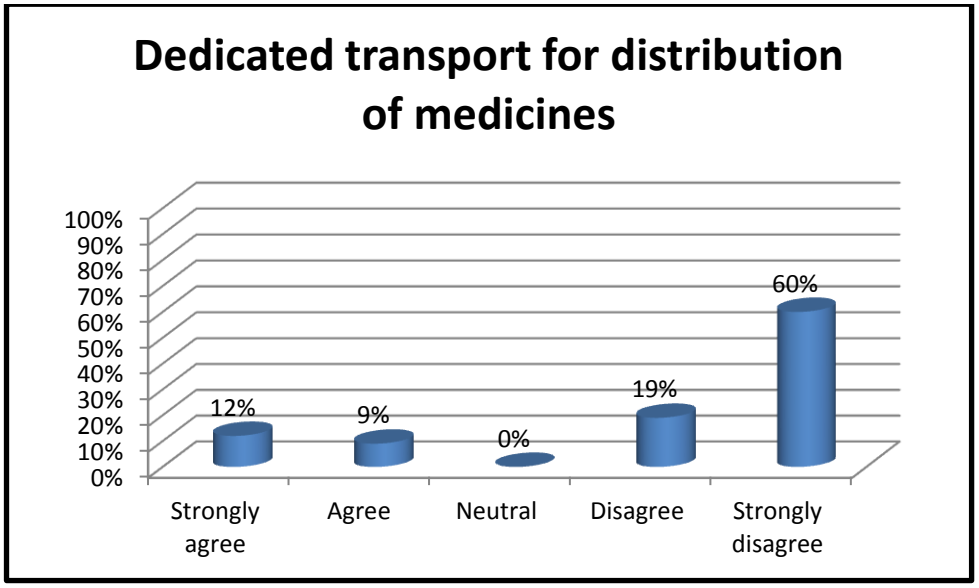
Pharmacy staff attitudes were adversely affected by the shortage of medicines as indicated by the significant number of respondents (70%).The majority (51%) agreed and 19 % strongly agreed. A total of 15 % remained neutral while a collective 11 % disagreed and 4 % strongly disagreed. In the pharmaceutical sector, lack of access to essential drugs has an adverse impact on the quality of care (Sello et al. 2012:2).

4.3.4 Systematic issues in the management of medicines inventories

Section D investigated the systematic issues in the management of medicines inventories

4.3.4.1 Dedicated transport for the distribution of medicines between the hospital and clinics.

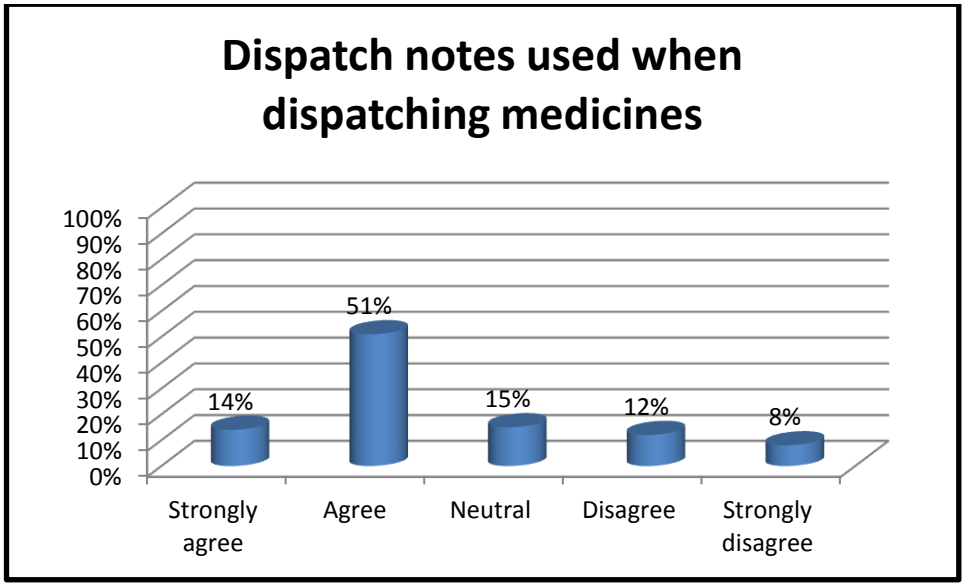
Figure 4.18 There is a dedicated transport for the distribution of medicines between the hospital and clinics



In response to the availability of dedicated transport being available for the distribution of medicines between the hospital and clinics, the majority (79%) were in disagreement where 60 % strongly disagreed and 19 % disagreed. Only 12 % strongly agreed and 9 % agreed, and none (0%) remained neutral. There is failure on the part of provincial governments to assist health districts to achieve the goals of PHC re-engineering. When PHC re-engineering strategy was introduced, there seemed to be a lack of how best to implement the strategy from a pharmaceutical perspective. That is why hardly any district hospital has a vehicle dedicated for the provision of pharmaceutical services. As a result, there is poor transportation of medicines between district hospitals and PHC facilities (Bishnu et al. 2017:82). This lack of dedicated transport for pharmaceutical services has serious implications for stock losses between hospitals and PHC facilities as well as maintenance of cold chain for vaccines when there are power failures in PHC facilities. It is difficult to ascertain if medicines dispatched for a particular clinic has indeed reached the intended clinic. Moreover, for PHC re-engineering to be comprehensively implemented, there need to be dedicated transport and adequate infrastructure for proper distribution storage of medicines (Crowley and Stellenberg, 2015:89).

4.3.4.2 The use of dispatch notes by hospitals during distribution of medicines

Figure 4.19 the hospital is making use of dispatch notes to ensure medicines dispatched reach the intended clinics

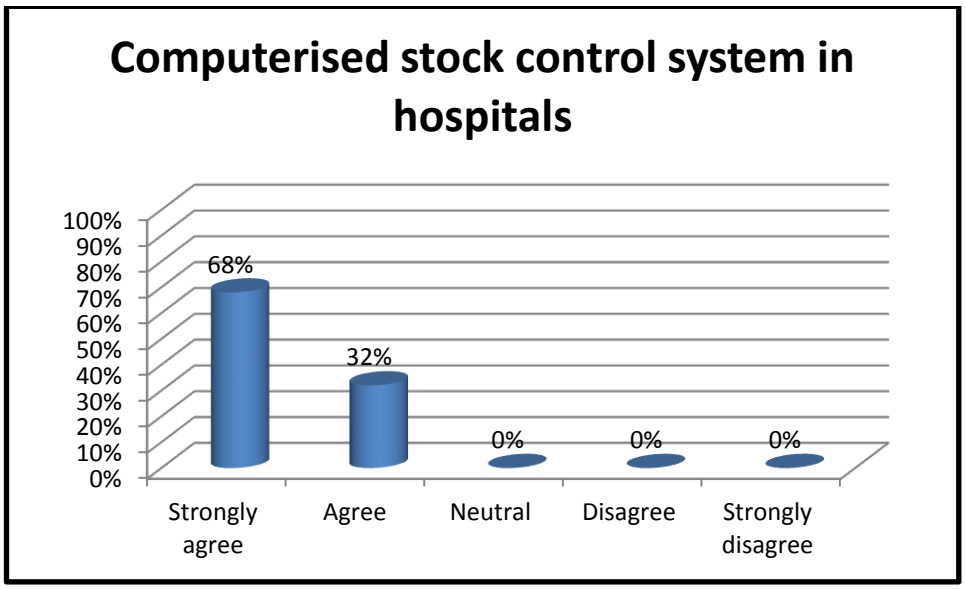


A collective 65 % of respondents were in agreement (51 % agreed and 14 % strongly agreed) that dispatch notes are used when dispatching medicines. A total of 15 % chose to remain neutral, while 12 % disagreed and 8 % strongly agreed.

Light speed (2013:1) finds the distribution chain has many links. At each point in the chain, good management is required to ensure that the medicines flow as they should. Many of the recent stock-outs in South Africa are likely to have been caused by poor management at various points along this complex chain. The monitoring of what happens along the distribution chain in South Africa is insufficient. While the Department of Health is able to track stock levels at depots, it is unable to track stock levels at the facility level. This makes it difficult to track where and why the system is failing. It also increases the risk of medicine thefts at the clinic level.

4.3.4.3 Computerised stock control system in the hospital

Figure 4.20 There is a computerised stock control system in the hospital



There is a computerised control system in the hospital which received unanimous agreement from respondents. All 100 % of respondents were in agreement where 68 % strongly agreed and 32 % agreed. None (0%) neither disagreed nor remained neutral.

Bateman (2013: 601) adds that the National Health Department is urgently trying to source and install a countrywide computer software system that will link healthcare facilities with drug depots and suppliers in order to relieve ongoing essential drugs stock-outs which threaten the lives of thousands of patients. The issue has become a national crisis, affecting districts in 8 of the 9 provinces. The department is trying to install a system that will link facilities' computer software with that of depots and suppliers to enable better management.

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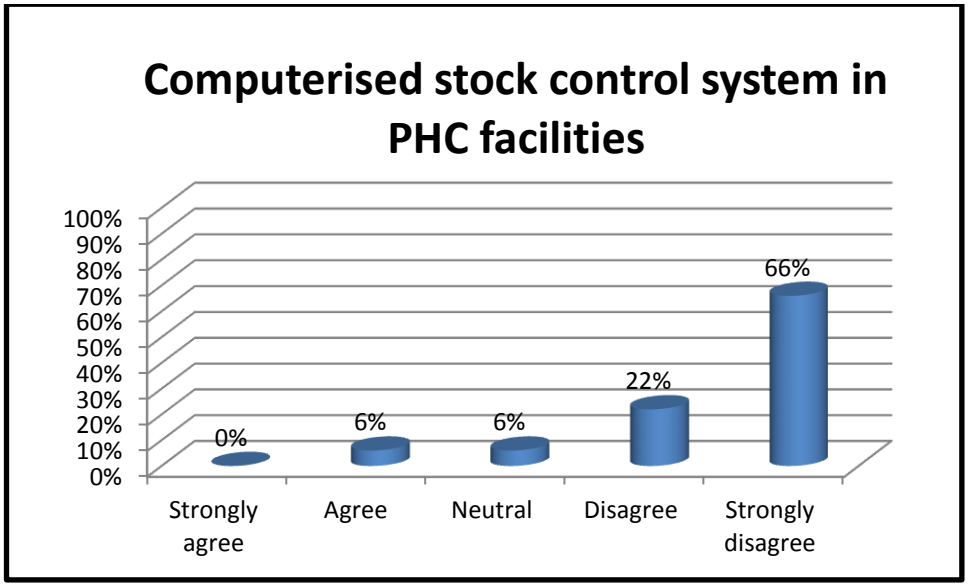
4.3.4.4 Computerised stock control system in all PHC facilities under hospitals

Figure 4.21 There is a computerised stock control system in all PHC facilities under the hospital



In contrast to the hospital, PHC facilities do not have computerised stock control systems. This was indicated by the responses where 66 % strongly disagreed and 22% disagreed. Only 6 % remained neutral and 6 % agreed, while none (0%) strongly agreed.

Motsaledi (2016:1) indicated that there was a plan to have 100% of all primary health care clinics reporting medicine availability into a national medicine surveillance centre within the next three months. The process of installing dedicated computer hardware for the rollout of the Patient Health Information System in clinics has commenced. Out of the 700 primary health care facilities in the NHI pilot districts, 657 have already been covered. A total of 1,400 additional facilities are expected to be completed in this financial year, with the remaining facilities to be completed in 2017/18 financial year.

4.4 Conclusion

This chapter discussed the findings of the study. There are, however, still significant challenges experienced in the South African public health system when it comes to addressing the problem of medicine shortages. There are various factors that contribute to the shortage of medicines that was highlighted in this chapter. The results indicate that there is a lack of pharmacy personnel to carry out the functions. There are also

other factors such as the lack of reliable transport to distribute the medications, incorrect dispatching procedures and the lack of computerised systems. The next chapter will discuss the conclusions and recommendations.

CHAPTER FIVE: CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The shortage of essential medicines is a global problem. However, the impact of this problem is more significant in developing countries and more specifically in the public health sector, owing to its massive demand for pharmaceuticals. The demand for pharmaceuticals in the public health sector is facilitated by the mere fact that a large proportion of the population depends solely on the public hospitals for their health care needs. This chapter, however, will conclude on the findings of the study and compare these to other studies in literature.

5.2 Findings from the Study

The findings from the study were divided into two categories, namely, those from literature and those from the primary study.

5.2.1 Findings from Literature Review

A literature review indicated that shortages of medicines are caused by a combination of local and global factors. However, literature on medicine shortages at local levels was very scarce; instead, most literature was about national and global factors contributing to the shortage of medicines. The cost of drugs was shown to be playing a role in medicine stock outs, mainly affecting developing countries. Weaker currency, as seen in South Africa, made procurement of medicines abroad very costly. Issues of policy were seen to be going hand-in-hand with cost of medicines. Stringent patent laws made it difficult to control price of medicines, as a result, countries without manufacturing capacity could not cope with the high cost of patented medicines.

Poor pharmaceutical supply chains were also implicated in medicine stock outs. Studies show that there is lack of coordination in the pharmaceutical supply chains. Health authorities tended to miss the role of middle men in drug supply – only focused on manufacturers and end users. It therefore emerged that logistics companies in the pharmaceutical sector were not adequately held to account for medicine stock outs.

Lastly, the global shortage of active pharmaceutical ingredients API) was cited as the mostly cause of shortages of medicines. This was compounded by either quality problem in manufacturing or natural disasters in countries producing APIs.

5.3 Findings from the Primary Study

The study looked mainly on local factors in medicine shortages. However, there were some correlations with findings in literature. The main factors contributing to the shortage of medicines from this study were poor implementation of medicines supply management SOPs, shortage of pharmacist assistants in PHC facilities, lack of computerised stock control systems in clinics and lack of dedicated transport for the distribution of medicines between hospitals and clinics in the districts.

5.3.1 Age of Respondents

Section A of the study questionnaire looked at the demographic profiles of the respondents. It became apparent that pharmacy departments in the Umkhanyakude district is dominated by young personnel, namely 51% of the respondents were between the age of 21 to 29 and the majority being pharmacists. However, this raises concerns whether the shortage of medicines somehow can be linked to the experience of the pharmacy personnel. The young age group provides the opportunity as this group is still teachable so as to attain new skills that are relevant to enhance provision of quality pharmaceutical services.

5.3.2 Factors contributing to the shortage of medicines

There were notable differences the implementation of medicines supply management SOPs between hospitals and PHC facilities. The respondents indicated that medicines supply management SOPs are properly implemented in hospitals (79%) but this was not the case in PHC facilities as 90% of the respondents disagreed. This corresponds with the findings that 61% of respondents indicated that there were no enough pharmacists' assistants in PHC facilities to provide pharmaceutical services. Further to the shortage of pharmacists' assistants in the district's PHC facilities, was a lack of computerised stock control systems. And again, the fact that hospitals in the district do not have dedicated transports for pharmacies is cause for concern. These findings combined will make it a hurdle to realise the objectives of the National Core Standards, PHC re-

engineering, Ideal Clinic Realisation and Maintenance (ICRM) and National Health Insurance (NHI) (Knoesen, 2017:1).

One needs to commend the department of health for introducing Stock Visibility Solution (SVS) as well as migration of pharmaceutical services from PlankMed stock control system to Rx Solution. These initiatives have allowed weekly stock out reporting, providing transparency in the pharmaceutical supply chain. Transparency in the supply chains enables the department to establish where the problem of medicine stock outs lie and address it accordingly. However, there is still some room for improvement in this area; it will be more effective for the department to move towards a technology that will enable pharmacies to track medicine orders with suppliers.

Although the study confirms that the global shortage of active pharmaceutical ingredients is cause for shortage of medicines but local supply chains between districts and medical depots need to be revisited. The finding that hospitals in the district are affected by distance from suppliers raises concerns. This is a pure indication that although there is an SOP for handling emergency orders between hospitals and the medicine depot but there is a question of how this is being complied with; considering that hospitals are properly implementing medicine supply management standard operating procedures.

Challenges regarding pharmaceutical supply chains at a global level have been raised in literature. It is concerning that there is reluctance in investing on improving pharmaceutical supply chains compared to other industries and this is mainly observed in the public sector. Ultimately, it is apparent that medicines shortages in Umkhanyakude district are mainly due to poor coordination of pharmaceutical supply chains between the medical depots and hospitals which is worsened by the distance of these hospitals from the medical depot, insufficient pharmacists' assistants in PHC facilities, lack of dedicated transport for pharmaceutical services and global shortage of active pharmaceutical ingredients.

5.4 Conclusions

The first objective of the study was to determine the factors contributing to the shortage of medicines at Umkhanyakude district hospitals and PHC facilities. The findings of the

study indicated that the main factors contributing to the shortage of medicines in the district were poor implementation of medicine supply management SOPs at PHC facilities, shortage of pharmacists assistants in clinics, and the global shortage of APIs. The distance of the district hospitals and clinics from the suppliers did contribute to shortages of medicines but to a lesser extent. However, the study indicated that the weekly stocks out reports were improving medicine availability in the district.

The second objective was to determine the impact of medicine shortage on pharmacists and pharmacists' assistants. The findings indicated that medicine shortages result in the blame being put on pharmacy personnel. Pharmacy staff attitudes and confidence were adversely affected by shortages of medicines. The concern for this is that organisations are striving to have productive staff to deliver on their mandate; however, this could not be possible if the department has staff with low morale.

Thirdly, the study also sought to determine systematic issues affecting the management of medicine inventories. Two main findings seemed to be of concerns, namely lack of dedicated transport for pharmaceutical services and lack of computerised stock control systems in clinics. The lack of dedicated transport for pharmaceutical services renders the profession unresponsive to shortages of medicines in both clinics and hospitals. The manual handling of medicine inventories in clinics in these high times of technology is cause for concern. Medicine stock cards have the potential for being lost making it difficult to retrieve valuable stock usage information needed for ordering adequate quantities of stock.

5.5 Recommendations

Despite the narrow scope of this study, however, it was an important research that sought to look at the issue of medicines shortages at a district level than at national and global levels. This study will also provide a baseline for other studies in the context of medicines shortages at district levels because there were limited studies in literature that focused on districts. It is hoped that findings from this study will help health managers and authorities to understand the factors that contribute to the shortage of medicines in remote rural districts like Umkhanyakude. The following are recommendations from the study:

5.5.1Transport for Pharmaceutical Services

When considering the challenges encountered when PHC facilities have stock outs of critical medicines, one has to recommend that it is high times that pharmaceutical services have dedicated transport. Pharmaceutical services in hospitals need to move towards a just-in-time response to medicine shortages in clinics. Audits conducted in clinics do indicate that some medicines were out of stock from clinics but available in hospitals. At times clinics will report a stock out of medicines but with transport challenges in hospitals it becomes impossible to respond effectively and patients are compromised. Hospitals do have dedicated vehicles for other programmes other than pharmaceutical services but quite often these vehicles cannot help pharmacies respond to medicine challenges in clinics.

The lack of dedicated vehicles for the provision of pharmaceutical services in rural districts makes it impossible to minimise stock losses and possible pilferages between clinics and hospitals. It therefore becomes impossible to ascertain whether stock leaving hospital pharmacies have indeed reached the intended clinics. Moreover, with challenges in the handling of emergency orders between medical depots and hospitals, such vehicles for pharmacies could play a critical role in collecting medicines timeously.

5.5.2 Coordination of Pharmaceutical Supply Chains between Medical Depots and Hospitals

The service level agreement (SLA) between the medical depot and hospitals stipulates that emergency orders from hospitals will be processed within 48 hours of receipt of an authorised emergency requisitions. However, the SLA does not stipulate the delivery turnaround time for emergency orders – leaving a gap in that courier companies have a leeway in the handling of emergency orders. Emergency orders have a potential to alleviate medicine stock outs. It is therefore recommended that the SLA between hospitals and the medical depot stipulates clearly the delivery turnaround time for emergency orders as well as how courier companies come into play. Supply chains in any industry play a strategic role in the service or production value chain therefore require strong performance monitoring.

5.5.3 Pharmacists' Assistants for PHC Facilities

Beside the findings of this study, the audit findings from the sector audit of the Department of Health for the year ended 31 March 2017 alluded to the need for pharmacists' assistants in PHC facilities. The audit findings mentioned that pharmaceutical care in clinics was being done by nurses who were not even trained on pharmaceutical care. The result of this was poor adherence to SOPs with a resultant poor stock management in the form of cold chain being not maintained, poor record keeping and lack of temperature control measures, to mention a few. Umkhanyakude Pharmaceutical Services had advocated for proper implementation of medicine supply management SOPs in the district but these efforts bore no fruits owing to the shortage of relevant personnel to carry on the tasks of pharmaceutical services.

5.5.4 Computerised Stock Control System for PHC Facilities

The availability of computers for stock control in clinics cannot be over emphasised. As mentioned above, lack of pharmacy vehicles make it difficult to render effective pharmaceutical services. Placing orders to the medical depot for clinics is complicated by clinics having to send manual orders via an unreliable transport system to mother hospitals for capturing. These orders sometimes reach the hospitals very late and sometimes by the time they arrive there are no network which result in orders being captured late and the need for pharmacies to request placing late orders to the depot. It is therefore important to have computers with network for stock control and placing of orders purposes.

Undertaking of PHC stock takes will be much easier, given the recent developments that hospitals are to ensure that PHC facilities conduct quarterly stock takes. Currently, stock take returns from PHC are captured manually which is time consuming. Eventually, this will allow for a continuous stock visibility throughout the pharmaceutical supply chain and hospitals will be able to extract current data from clinics under their catchment.

5.5.5 Pharmacy Education

It is recommended that the concept of pharmaceutical supply chain management be looked at from an academic perspective. Skills in pharmaceutical supply chain

management might play a significant role in the provision of pharmaceutical care. One wonders if this should be part of pharmacy training considering the strategic nature of proper coordination of supply chains.

5.6 Conclusion

As mentioned in the study, the department of health like many other government departments has well-crafted strategic plans but lack a definitive approach on how best to implement them. The study highlighted challenges with systematic issues affecting the provision of pharmaceutical services, like transport, computers for stock control and pharmacists' assistants for PHC facilities. Failure to address these challenges has a potential to render the realisation of PHC re-engineering, Ideal Clinic Realisation and other strategic health programmes of the department impossible.

It is recommended that further studies be conducted so as to validate the findings of this study. The researcher did not cross tabulate the findings in the study thus the results from this study may be used in other studies so as to reach either a similar or a different conclusion. Extension of this study may take various forms including focusing deeply on internal processes of pharmaceutical stock management in hospitals and PHC facilities to establish other root causes that may have effect on medicine stock outs. The study was conducted within the context of Umkhanyakude district, so it is recommended that similar studies be conducted in other rural districts and again in urban districts so as to be able to validate the findings of this study by comparing rural districts alone and against urban districts.

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APPENDICES

Appendix A: Research Questionnaire

TITLE: **An investigation of the factors contributing to the shortage of medicines at district hospitals and Primary Health Care facilities in UMkhanyakude District, KwaZulu-Natal, South Africa**

The personal information will not be used in any way to identify the respondent. Please place a tick or cross in the appropriate block to complete the statements below.

SECTION A – DEMOGRAPHIC INFORMATION

1. What is your age? (please tick)

1. Less than 20 years	
2. 20 to 29 years	
3. 30 to 39 years	
4. 40 to 49 years	
5. 50 to 59 years	

2. State your qualifications (please tick)

1. No school leaving certificate	
2. School leaving (Matric) certificate but no post qualification	
3. Post Matric qualification in any University, FET, Accredited Provider	
4. Postgraduate qualification in any institution	
5. Computer literacy	

3. State your work experience. (please tick)

1. Less than a year	
2. 1 to 3 years	
3. 3 to 5 years	
4. 5 to 10 years	
5. More than 10 years	

4. Which of the following best describes your position in the pharmacy department? (please tick)

1. Pharmacist	
2. Pharmacy Supervisor	
3. Pharmacy Manager	
4. Basic Pharmacist's Assistant	
5. Post Basic Pharmacist's Assistant	

SECTION B – FACTORS CONTRIBUTING TO THE SHORTAGE OF MEDICINES

INSTRUCTIONS: A list of possible factors contributing to the shortage of medicines in hospitals is presented below. Please indicate if these are the factors applicable in your hospital. Please use the following key to indicate your answer y by placing a tick in the appropriate block:

(1) Strongly agree (**2**) Agree (**3**) Neutral (**4**) Disagree (**5**) Strongly disagree

RATING	1	2	3	4	5
1. The distance of the hospital from suppliers is associated with shortage of medicines					
2. The hospital is properly implementing medicine supply management SOPs					
3. PHC facilities are properly implementing medicine supply management SOPs					
4. There are enough pharmacy personnel to execute all pharmaceutical duties					
5. All PHC facilities under the hospital have pharmacist's assistants					
6. The hospital has a functional PTC committee to ensure rational use of medicines.					
7. There is a standard operating procedure for handling of emergency orders between the hospital and the supplier, e.g. PPSD					
8. The global shortage of active pharmaceutical ingredients is cause for shortage of medicines in the hospital					
9. The weekly stock out reports improve availability of medicines in the hospital					

SECTION C – IMPACT OF MEDICINE SHORTAGES ON PHARMACISTS AND PHARMACIST'S ASSISTANTS

Please rate the following statements below using the following key and placing a tick in the appropriate block:

(1) Strongly agree (**2**) Agree (**3**) Neutral (**4**) Disagree (**5**) Strongly disagree

RATING	1	2	3	4	5
1. Shortage of medicines decreases pharmacists and pharmacist's assistants' confidence					
2. The high turnover of pharmacists can be linked to inconsistent supply of medicines in the district					
3. Other health care workers blame pharmacists and their assistants regarding shortages of medicines.					
4. Shortages of medicines adversely affect pharmacy staff attitudes					

SECTION D - SYSTEMATIC ISSUES IN THE MANAGEMENT OF MEDICINES INVENTORIES

Please rate the following statements below using the following key and placing a tick in the appropriate block:

(1) Strongly agree (**2**) Agree (**3**) Neutral (**4**) Disagree (**5**) Strongly disagree

RATING	1	2	3	4	5
1. There is a dedicated transport for the distribution of medicines between the hospital and clinics					
2. The hospital is making use of dispatch notes to ensure medicines dispatched reach the intended clinics					
3. There is a computerised stock control system in the hospital					
4. There is a computerised stock control system in all PHC facilities under the hospital					

Appendix B: Introductory Letter and Consent Form for Participants

20 April 2017

Dear Participant

My name is Ntokozo Fakude; I am a student pursuing an MBA degree at Management College of Southern Africa (MANCOSA) based in Durban. As part of the requirements for obtaining my degree, I am required to conduct research and submit a research report. The research topic I have selected is***:*** **An Investigation of the factors contributing to the shortage of medicines at Umkhanyakude District hospitals and Primary Health Care facilities, KwaZulu-Natal, South Africa.**

.

I would appreciate your assistance by agreeing to participate in the study. Participation in this study will be completely voluntary and the participants may at any time withdraw from the study without prejudgment or providing reasons for the decision. The information produced during completion of the questionnaire will remain strictly confidential. Data collected will be coded so that there's no link to any names. The identities of participants and institution will not be revealed while the study is being conducted and on completion when the findings are published.

Thank you in advance for the cooperation.

Yours sincerely

_____

Ntokozo Fakude
Student No. 125895
Email: fakudenb14@gmail.com
Work Tel: 035 591 0122 Cell No.: 072 067 8993

Consent form

Title of the study: An **Investigation of the factors contributing to the shortage of medicines at Umkhanyakude District hospitals and Primary Health Care facilities, KwaZulu-Natal, South Africa.**

Statement of Agreement to Participate in the Research

- I hereby confirm that I have been informed by the researcher, Ntokozo Fakude, about the nature, conduct, benefits and risks of this study.
- I have also received, read and understood the above written information regarding the study.
- I am aware that the results of the study, including personal details regarding my age, years of experience, qualification and additional certificates will be anonymously processed in to a study report.
- I may, at any stage without prejudgment, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and declared myself prepared to participate in the study.
- I understand that new findings developed during the course of this research which may relate to my participation will be made available to me.

_____ _____ _____ _____

Full Name of Participant Date Time Signature

I, _____ herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

NB Fakude _____ _____

Full Name of Researcher Date Signature

Appendix C: Permission Letter

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

304 Ntshinde Road, Jozini, 3969
PB X026, Jozini 3969
Tel: 035 572 1327 Fax: 035 572 1245 Email: he.wey.williams@kznhealth.gov.za
www.kznhealth.gov.za

DIRECTORATE:
District Clinical Specialist Team
Umkhanyakude Health District Office

Enquiries : Dr CH Vaughan Williams
Telephone : 035-5721327 Ext 114

6 July 2017

Dear Mr NB Fakude

I have pleasure in informing you that permission has been granted to you by the District Office to conduct research on in this district, entitled:

'Investigating the factors contributing to shortage of medicines at Umkhanyakude District hospitals and PHC facilities'

Please note the following:

1. Please ensure that you adhere to all the policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
2. This research will only commence once this office has received confirmation from the Provincial Health Research Committee in the KZN Department of Health.
3. Please ensure this office is informed before you commence your research
4. The District Office will not provide any resources for this research.
5. You will be expected to provide feedback on your findings to the District Office.

Sincerely,

C H Vaughan Williams
Family Physician, Umkhanyakude Health District Office

Fighting Disease, Fighting Poverty, Giving Hope

Appendix D: Approval of Submitted Study - UHERB

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

330 Langalibalele street,
Private Bag X9051 PMB, 3200
Tel: 033 395 2102 Fax: 033 394 3782
Email: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

DIRECTORATE:
Umgungundlovu Health Ethics
Research Board (UHERB)

Reference: UHERB
Enquiries: Ms N. Makhathini
Date: 033 395 2102

Dear Mr NB Fakude

RE: APPROVAL OF SUBMITTED STUDY:

An investigation of the factors contributing to the shortage of medicines at district hospitals and Primary Health Care facilities in uMkhanyakude District, KwaZulu Natal, South Africa.

Your application to UHERB was reviewed at its last meeting.

UHERB has the pleasure in informing you that your research study has been approved.

In order to proceed with conducting the study, the following is required:

i. Institutional support from the participating study sites
ii. Provincial Health Research and Ethics Committee (PHREC) approval. Application is done online on the National Health Research Database (NHRD) website: www.nhrd.hst.org.za . You will need to register and obtain a username and password before registering your application online. Please go to: "Request use of Provincial facilities".
iii. Upload all the necessary documents.
iv. Submit a report upon completion of the study.

We wish you well on your study.

Regards

Dr Damian Clarke
FCS (SA) MBA, M Med Sci, MBA, M Phil, Phd
Chairperson, UHERB

Appendix E: Approval of a Research Proposal – HRKM332/17

KZ_201708_17

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

330 Langalibalele Street
Private Bag X9051 PMB, 3200
Tel: 033 395 2805 (3189) 3123 Fax: 033 3943582
Email: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

DIRECTORATE:
Health Research & Knowledge Management (HRKM)

Reference: **HRKM332/17**
KZ_201708_17

10 October 2017

Dear Mr N B Fakude
(MANCOSA)

Subject: Approval of a Research Proposal

1. The research proposal titled '**An investigation of the factors contributing to the shortage of medicines at district hospitals and Primary Health Care facilities in, UMkhanyakude District, KwaZulu-Natal, South Africa**' was reviewed by the KwaZulu-Natal Department of Health (**KZN-DoH**).

   The proposal is hereby **approved** for research to be undertaken at the selected facilities in Umkhanyakude District.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facilities before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Ms G Khumalo on 033-395 3189.

Yours Sincerely

Dr E Lutge
Chairperson, Health Research Committee
Date: 17/10/17

Fighting Disease, Fighting Poverty, Giving Hope