

**INVESTIGATING ADHERENCE OF AUTHORISED PRESCRIBERS
TO STANDARD TREATMENT GUIDELINES/ESSENTIAL MEDICINE
LIST WHEN TREATING CHILDREN PRESENTING WITH
RESPIRATORY CONDITIONS AT PRIMARY HEALTH CARE LEVEL
IN THE UMKHANYAKUDE HEALTH DISTRICT, KWAZULU NATAL**

Masters in Science (Medical) in Pharmacy

With Dissertation

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DECLARATION

"I, Mrs Simangele Isabel Hlongwana, hereby declare that the work on which this thesis is based, is original (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or shall be submitted for another degree at this or any other university, institution for tertiary education or examining body".

S. Hlongwana

Signature

22 April 2013

Date

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ANC	African National Congress
ANC	Anti-Natal Care
ART	Antiretroviral Therapy
ARTI	Acute Respiratory Tract Infection
CHC	Community Health Centre
COPD	Chronic Obstructive Pulmonary Disease
DHP	District Health Plan
DHS	District Health System
DoH	Department of Health
ENT	Ear, Nose and Throat
GDP	Gross Domestic Product
HIV	Human Immunodeficiency Virus
HIV/TB	Human Immunodeficiency Virus/ Tuberculosis
HRKMC	Health Research and Knowledge Management Committee
IMCI	Integrated Management of Childhood Illness
KZN	KwaZulu Natal
LRTI	Lower Respiratory Tract Infections
MCREC	Medunsa Campus Research and Ethics Committee
MMCL	Military Medicine Code List
NDP	National Drug Policy
NHS	National Health System
NTG	National Treatment Guidelines

OPM	Operational Manager
OSD	Occupation Specific Dispensation
PHC	Primary Health Care
PA	Pharmacist Assistant
PBPA	Post Basic Pharmacists Assistants
PTC	Pharmacy and Therapeutic Committee
PULSA PLUS	Practical Approach to Lung Health
RTI	Respiratory Tract Infections
SAPC	South African Pharmacy Council
SAS	Statistical Analysis System
SPS	Strengthening Pharmaceutical Systems
MSH	Management Sciences for Health
STGs	Standards Treatment Guidelines
STGs/EML	Standard Treatment Guidelines/Essential Medicine List
STIs	Sexually Transmitted Infections
TB	Tuberculosis
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
URTI	Upper Respiratory Tract Infections
WHO	World Health Organization

ABSTRACT

Introduction: Primary Health Care (PHC) is regarded as the first level of contact with the National Health System with health care services provided mainly by nurses with varying competences. PHC is about interaction with people thus the quality of PHC depends extensively on the competence of the people who provide it. Therefore, the way health care personnel are trained and how capacity continues to be developed is of fundamental importance to PHC. Following the Alma-Ata Declaration, policies, such as the National Drug Policy (NDP) were developed in South Africa to guide health care services. The NDP resulted in the formulation of Standard Treatment Guidelines/Essential Medicine List (STGs/EML). Emphasis has been placed on all prescribers to strictly adhere to these guidelines when providing clinical patient care. Despite these developments reports still indicate that antibiotics are irrationally used when treating respiratory infections. It is therefore imperative that localised reasons for deviations from the STGs/EML when treating respiratory conditions are thoroughly investigated to facilitate relevant interventions.

Objectives: The objectives of the study were to: (1) document the treatment prescribed to children up to 12 years of age for respiratory conditions, (2) assess adherence of the authorised prescribers to the 2008 PHC STGs/ EML and (3) determine factors impacting on deviations from the 2008 STGs/EML.

Method: Twenty randomly selected PHC facilities in the district participated in the study. In each of the 20 selected PHC facilities, three prescribers were randomly selected for the structured interview and auditing of their prescription registers. Five prescriptions from each of the sampled prescription registers of the selected authorised prescribers, containing any of the children's respiratory conditions to be studied, were audited. A total of 15 prescriptions from each of the selected PHC facilities were audited. Descriptive statistics was used to

analyse data and responses to categorical variables were summarised as frequency counts and percentages. Results were presented as tables, figures and graphs.

Results: Pneumonia (39.7%) was found to be the most common respiratory condition seen at Umkhanyakude Health District followed by the common cold and influenza. Amoxicillin (52%) was the most often prescribed antibiotic for these respiratory conditions. Only 4% of prescribers showed full adherence to the 2008 PHC STGs/EML. While prescribers had a positive attitude towards the 2008 PHC STGs/EML, their sense of adherence, content understanding of these guidelines, as well as knowledge of medicine used for respiratory conditions, were exaggerated. Failure to accurately diagnose respiratory conditions and lack of implementation and monitoring strategies were also amongst the factors impacting on adherence.

Conclusion: Adherence to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children up to 12 years of age was found to be a challenge in Umkhanyakude PHC facilities with only four percent of prescribers adhering to these guidelines. The Umkhanyakude Health District Management team must consider employing multifaceted interventions from the recommendations of this study in order to improve adherence to the PHC STGs/EML.

Recommendations: Strategies such as intensified monitoring and evaluation, improved supervision, targeted training and education together with compulsory in-service training are recommended to improve adherence to the STGs/EML in the Umkhanyakude Health District. Guideline implementation strategies with integrated approaches to guideline dissemination must also be strengthened.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This chapter will give a broad overview of the national policies, strategies and plans post 1994 for the provision of health care services in South Africa with more focus to Primary Health Care (PHC). In addition it will provide an overview of the following:

- Information on the introduction of PHC in South Africa following the Declaration of Alma-Ata and the development and implementation of the National Drug Policy (NDP).
- Information on the formulation of the District Health System (DHS), the country's demarcation system to increase access to health services.
- Burden of respiratory conditions at PHC level which emphasises the importance of investigating adherence to guidelines when treating these conditions.
- Baseline requirements for the utilisation of other professional categories of staff other than nurses at PHC level.
- Purpose of the study with aim and objectives.

1.2 BACKGROUND AND RATIONALE FOR THE STUDY

1.2.1 Primary Health Care services in South Africa

PHC is defined as “essential health care based on practical, scientifically sound and social acceptable methods and technology” (Declaration of Alma-Ata, 1978). PHC includes a comprehensive package of basic health care services and it is regarded as the first level of contact of individuals, family and the community with the National Health System (NHS) (Wentzel, 2008). The PHC concept was officially adopted in the Alma-Ata Declaration as a

means of providing a full package of health care services in an equitable and affordable manner (Oluwole, 2008).

PHC is about interaction with people thus the quality of PHC depends extensively on the competence of the people who provide it. Therefore, the way health care personnel are trained and how capacity continues to be developed is of fundamental importance to PHC. The training of health care professionals needs to focus on reorientation and broadening of skills to enable them to respond to the challenges of implementing a comprehensive PHC package (Lehmann, 2008; Abdulraheem, Olapipo & Amodu, 2012).

Before 1994, South Africa's public health services were racially segregated, highly unequally distributed between rural and urban areas; rich and poor communities, overwhelmingly hospital-based and curative in their emphasis (Sibiya, 2009). Since 1994 the establishment of the government of national unity led to policy developments that addressed disparities of the past, by creating an integrated NHS, based upon PHC, and decentralised in terms of management to geographically defined districts (Wentzel, 2008).

The government adopted the African National Congress (ANC) PHC blueprint in the White Paper on Health Services Transformation (1997), which envisaged a decentralised health service delivery model that is nurse-driven and based on the DHS which allows people to access health services near to where they live (Cullinan, 2006). The National Health Bill which was passed in October 2003 facilitated the implementation of the DHS with emphasis on providing health care services based on the PHC approach (Schaay, Sanders & Kruger, 2011). This has increased access to health care services by the majority of citizens and has led into the construction of approximately 4500 PHC clinics which are largely staffed by nurses, with limited support from doctors, and servicing approximately 35 million of the population (Bateman, Feldman, Mash, Fairall, English & Jithoo, 2009).

With the DHS concept, the entire country is sub-divided into adjacent geographical districts. In each district, health services are provided through district hospitals, Community Health

Centres (CHCs) and PHC clinics (Sibiya, 2009). Fixed and mobile clinics are the primary point of contact for the majority of the population to access health care services which are mainly provided by nurses (Jaffray & Miti, 2010).

In South Africa the proportion of Gross Domestic Product (GDP) allocated to the majority of the South African citizens remains unacceptably low and as a result of this government has found innovative means of funding health care including the diverting of funds from tertiary and academic centres to expanding PHC services in both rural and urban areas (Bateman *et al*, 2009).

In the Alma-Ata Declaration, (1978) all governments were expected to formulate national policies, strategies and plans of action to launch and sustain PHC as part of the comprehensive NHS. In South Africa the formulation of the NHS led to the development of the NDP in 1996 (Department of Health (DoH), 1996). Amongst others, one of the objectives of the NDP is to ensure appropriate prescribing through development and implementation of the Standard Treatment Guidelines/ Essential Medicine List (STGs/EML).

Development of the STGs/EML is regarded as the most important starting point for interventions in improving rational medicine use (United Nations High Commissioner for Refugees (UNHCR) Manual, 2006). The STGs/EML indicates the most cost-effective therapeutic approach as the treatment cost is found to be higher when guidelines are not followed (Makhado, 2009). In the NDP (DoH, 1996), all prescribers are expected to adhere to STGs/EML, in order to promote rational medicine use and minimise treatment cost. The STGs/EMLs are periodically reviewed every five years. However, a major limitation to the provision of good quality PHC in South Africa is the shortage of properly qualified nurses referred to as Clinical Nurse Practitioners as this category of nurses is considered to be playing an important role in the delivery of PHC services (Bateman *et al*, 2009).

Antibiotic misuse was found to be significantly frequent in children, especially when presenting with viral upper respiratory tract infections (URTIs) (Alumran, Hurst & Hou, 2011). In Asia, America and Europe 90% of children consulting for a common cold, URTI and acute bronchitis were prescribed antibiotics as a result of parents' demand (Huang, Morlock, Lee, Chen & Chou, 2005). Another study conducted by Danysz (2010) found that the majority of the antibiotics prescribed did not adhere to the STGs/EML, especially for lower respiratory tract infections (LRTI) at Themba hospital (Danysz, 2010). Despite the effectiveness of antibiotics in the treatment of numerous bacterial infections, it is often used inappropriately.

URTIs in children represent the most common clinical reason requiring a consultation, usually caused by viruses and do not require antibiotics although antibiotic prescribing accounted for 60% in general practice (World Health Organization (WHO), 2012). However, in a review of essential medicine priorities in Ear, Nose and Throat (ENT) conditions in children by Gray in 2008 it was indicated that there is insufficient evidence to support the prescribing of antibiotics in URTI.

LRTI were found to be the main causes of death in children less than five years as a result of poor case management, inadequate medication, policies and human resources (Graham, English, Hazir, Ernerson, & Duke, 2008). Fifty five per cent of deaths in children less than five years in African countries are caused by pneumonia, malaria and diarrhoea (Christopher, May, Lewin & Ross, 2011).

In the Umkhanyakude Health District respiratory conditions in children are amongst the top five conditions seen at PHC level (Umkhanyakude Health District 2008/09 Disease Profile Report). Adherence to STGs/EML help to reduce practice variations within the clinical setting, improves quality of care, promotes efficient and effective use of resources thus providing benefits to patients, health professionals and to the health care system as a whole (Mayers, 2010).

1.3 PROBLEM STATEMENT

Part of the researcher's duties as a District Pharmacist was to periodically conduct prescription audits for all PHC clinics within the district. Unpublished results from the previous audits have indicated that nurses were not consistently following the previous 2003 PHC STGs/ EML (DoH, 2003) when treating patients, mostly as a result of their inaccurate diagnosis of respiratory conditions in children. The use of antibiotics where not indicated can lead to antibiotic resistance, poor therapeutic outcomes and inappropriate use of financial resources (Danysz, 2010; Makhado, 2009; WHO, 2012). Anecdotal evidence showed that antibiotics misuse existed at Umkhanyakude Health District. Studies determining reasons for deviations in prescribing according to the latest STGs/EML have not been conducted and this warranted a study of this nature to be undertaken.

1.4 RESEARCH QUESTIONS

- 1.4.1 Are the authorised prescribers adhering to the 2008 PHC STGs/EML (DoH, 2008) when treating respiratory conditions in children up to 12 years in Umkhanyakude Health District?
- 1.4.2 What are the possible factors impacting on the adherence of the authorised prescribers to the 2008 PHC STGs/EML (DoH, 2008)?

1.5 PURPOSE OF THE STUDY

1.5.1 Aim

The aim of this study was to investigate whether authorised prescribers at PHC facilities in the Umkhanyakude Health District in KwaZulu Natal (KZN) adhere to the 2008 PHC STGs/EML (DoH, 2008) when treating respiratory conditions in children up to 12 years of age.

1.5.2 Objectives

The objectives of the study were as follows:

- To document the treatment prescribed to children up to 12 years of age for pneumonia, bronchospasm, chronic asthma, acute bronchiolitis, croup, common cold and influenza.
- To assess adherence of the authorised prescribers to the 2008 PHC STGs/ EML (DoH, 2008) in the treatment of the above mentioned conditions.
- To determine the factors which impact on deviations from the 2008 STGs/EML (DoH, 2008) by authorised prescribers in the treatment of the above mentioned conditions.

1.6 IMPORTANCE OR SIGNIFICANCE OF THE STUDY

The NDP (DoH, 1996) supports operational research which focuses on identification of problems related to prescribing and dispensing at different levels of the health system. This policy further emphasises the role of the pharmacist in promoting rational medicine use. The results of the conducted research will assist in facilitating interventions on the role of the pharmacist in promoting rational medicine use.

Pharmaceutical service delivery plays an important role in the provision of a comprehensive PHC package; therefore the allocation of Post Basic Pharmacists' Assistants (PBPAs) at PHC to improve medicine availability is highly recommended (Strengthening Pharmaceutical Systems/Management Sciences for Health (SPS/MSH), 2008). Utilisation of Pharmacists' Assistants (PAs) in monitoring stock management and adherence to STGs/EML has shown positive changes in clinical practice of prescribers at PHC level (Trap, Todd, Moore & Laing, 2001).

The scope of practice of the PBPA allows this cadre to prepare and dispense a prescription under indirect supervision of a pharmacist at PHC level provided there are written and updated protocols (DoH, Pharmacy Act 53 of 1974). In order to comply with the Pharmacy Act when considering employment of PBPAs at PHC level, the adherence to STGs/EML by authorised prescribers at PHC level becomes very crucial as the PBPA can only dispense prescriptions complying with the STGs/EML.

Therefore this study will facilitate subsequent interventions to improve adherence to STGs/EML thus ensuring optimal utilisation of PBPA's at PHC level and as well as the proposed pharmacy technicians. The scope of practice of pharmacy technicians will also allow this cadre to work at PHC under indirect supervision of the pharmacists and be able to assess and dispense prescriptions for medicines which appear on the PHC STGs/EML and which are prescribed in accordance with STGs/EML (DoH Government gazette, 2011a).

There is no doubt that the STGs/EML is useful in providing proper patient care in a cost – effective manner (Danysz, 2010; Makhado, 2009; WHO, 2012). Non-adherence to any latest STGs/EML is not desirable. The assessment of localised factors affecting adherence will be more useful as differences exist between health service areas. Identification of local reasons for non-adherence will help in ensuring establishment and implementation of strategies for improving adherence to any latest STGs/EML that are applicable locally thus improving patient outcomes (Gray, 2011).

In the Umkhanyakude Health District, PHC services are delivered mainly by PHC nurses with varying prescribing and dispensing competences. This study aimed at understanding the prescribing patterns and factors impacting on the adherence of the PHC nurses to the 2008 STGs/EML when treating children up to 12 years of age presenting with respiratory conditions at the PHC facilities of the Umkhanyakude Health District.

1.7 SUMMARY

Professional nurses at PHC play an important role in the delivery of health care services. Government policies including development of STGs/EML are in place to support their function. URTI in children represent the most common clinical reason requiring a consultation. URTIs are usually caused by viruses and do not require antibiotics, although antibiotic prescribing accounted for 60% in general practice. Studies found that the majority of the antibiotics prescribed for respiratory conditions did not adhere to the STGs/EML. The

Chapter 1: Introduction

next chapter will focus more on some of the research findings on the implementation of the National STGs/EML in South Africa and in other parts of the world.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter contains the literature survey that was conducted. It provides a background to the health care situation in South Africa and the geographical demarcation of districts for provision of health services. The Regulations around nurses being authorised prescribers at PHC are also discussed. This discussion is followed by the development of STGs/EML and the epidemiology of respiratory conditions. The chapter concludes by citing various studies on irrational use of medicine and factors impacting on adherence of prescribers to STGs/EML.

2.1.1 District Health System

The ANC democratic government adopted the strategy for transforming national health care services in South African through the implementation of the DHS principle, which is a vehicle for providing PHC services in a geographically demarcated area within a specified population (Dookie & Singh, 2012). The country is geographically demarcated into nine provinces with the delivery and management of health services decentralised to these provinces. The provinces are further sub-divided into smaller administrative and service units namely districts (Sibiya, 2009). Health services within the districts are provided through hospitals, CHCs, fixed and mobile PHC clinics.

2.1.2 Umkhanyakude Health District

The KZN province is geographically demarcated into 11 districts. The study was conducted at Umkhanyakude Health District PHC facilities in KZN province which is situated in the North-Eastern part of the province. It is bordered by Mozambique to the North, the Umfolozi River to the South and Swaziland. Being a frontier district it serves many clients from the

neighboring countries of Swaziland and Mozambique. Indicated below is a map indicating the location of the PHC facilities that were included as part of the study.

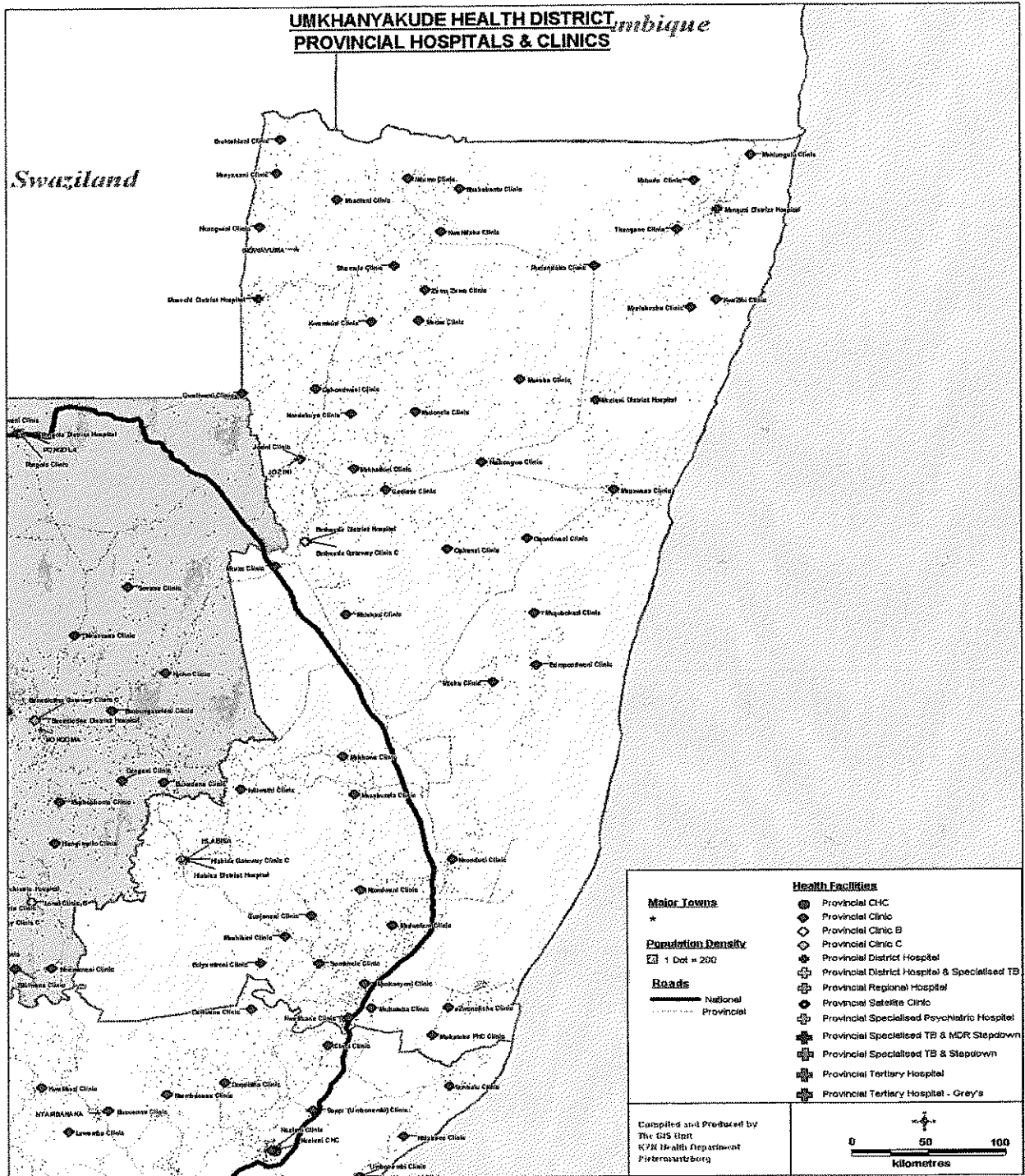


Figure 2.1: Umkhanyakude Health District Provincial hospitals and clinics (Umkhanyakude District Health Plan (DHP), 2012/2013)

Recruitment and retention of scarce skills including properly qualified and experienced PHC nurses are still a challenge in this district due to its deep rural nature. This is despite of the government's intervention of introducing scarce skills and rural allowances and later Occupation Specific Dispensation (OSD).

The socio economic challenges at Umkhanyakude Health District include high Human Immunodeficiency Virus/ Tuberculosis (HIV/TB) prevalence, unemployment, poverty, poor water and sanitation and distances to resources. Children under five years mortality rate is reported to be at 9.3% and HIV prevalence at 39.9% in 2010/2011 (DHP 2012/2013). Respiratory conditions in children are amongst the top five conditions seen at Umkhanyakude PHC level (Umkhanyakude Health District 2008/09 Disease Profile Report).

2.2 RESPIRATORY CONDITIONS IN CHILDREN

Acute respiratory tract infections (ARTI) in children represent the most common clinical reason requiring a consultation at PHC level (Pagaiya & Garner, 2005). Cough is the most common complaint in PHC. Pneumonia has been found to be a leading cause of death in South Africa, especially with the high prevalence of HIV infections in the country (Bateman *et al*, 2009). Acute respiratory conditions and diarrhoea are leading causes of childhood morbidity and mortality in developing countries, however, inappropriate management and prescribing of medication as well as misclassification of illnesses by health care workers is common (Graham *et al*, 2008). Adherence to STGs/EML for the treatment of common respiratory conditions such as pneumonia and URTIs appears to be a challenge in many health facilities around the world (Danysz, 2010; Holloway & van Dijk; WHO, 2012).

The respiratory conditions in children are classified as follows in the 2008 PHC STGs/EML (DoH, 2008):

Conditions with predominant wheeze: bronchospasm acute associated with asthma and chronic obstructive bronchitis, asthma chronic, bronchiolitis acute in children.

Upper airway disease: croup in children (laryngotracheobronchitis).

Respiratory infections: common cold and influenza, pneumonia in children.

The above are the respiratory conditions that children normally present with at PHC facilities and the study focused on these conditions. The details of the approved treatment regimens for the above conditions are attached in appendix A.

Early diagnosis and treatment of respiratory conditions in children at PHC may reduce child deaths therefore measuring adherence of PHC nurses to STGs/EML and the factors impacting on their adherence may be of interest for health planners (Boonstra, Lindbaek, Khulumani, Ngome & Fugelli, 2002).

2.3 NURSES AS AUTHORISED PRESCRIBERS

Nurse practitioners are the front line providers for the PHC services with minimal support from other professionals; this had also resulted to nurses forced to practice beyond their scope of practice especially in an underserved area (Wentzel, 2008). Non-Medical prescribing has been defined as an extension of prescribing authority to other health care professionals other than doctors, such as nurses and allied health professionals. This is done to improve access to basic health care and essential medicines especially in the remote and rural areas where there is a shortage of doctors (Bhanbhro, Drennan, Grant & Harris, 2011).

Legalising nurse prescribing has started to be common in different parts of the world during the past decades and it takes place in three different models i.e. independent, supplementary and community practitioner nurse prescribing (Kroezen, Francke, Groenewegen & van Dijk, 2012). This has opened a career pathway for nurses as qualifications were developed which aimed at capacitating them in prescribing a wide range of medication for various conditions under certain guidelines (Bradley, Campbell & Nolan, 2005). In South Africa, professional nurse prescribing has also started to be prominent in the

past few years and it is undertaken in accordance with STGs/EML which focuses on evidence - based medicine (DoH, 2008). It has opened a career pathway for nurses as new qualifications such as post basic PHC and dispensing courses were developed which capacitated them in prescribing and dispensing a wide range of medication for various conditions (Bateman *et al*, 2009). The use of nurses for prescribing is based on the assumption that it will reduce the burden on doctors, improve patients' compliance, increase access to health services, reduce patient waiting time and cost of delivering health services (Kroezen *et al*, 2012).

In South Africa, progress towards the legislation permitting nurses to prescribe medicines stemmed from the recognition that there were insufficient prescribers to deal with community health needs. The original right of nurses to prescribe was dealt with in Section 38A of the old Nursing Act 1978, which has now been amended to Section 56A of the new Nursing Act of 2005 (Kruger, 2009).

General Regulations issued in terms of the Medicine and Related Substance Act (Act 101 of 1965) Section 22A (17) define an authorised prescriber as any person authorised by the Act to prescribe any medicine. In Section 22A (5) of this Act, the prescribing of any schedule 2 to schedule 6 substances is limited to a medical practitioner, dentist, veterinarian and to "a practitioner, a nurse or a person registered under the Health Professions Act, 1974 other than a medical practitioner or dentist". According to this Act, the nurses may prescribe only the schedule substances identified in the Schedule for that purpose. Section 22A (14) of this Act state that no nurse may prescribe a medicine or scheduled substance unless he or she has been authorised to do so by his or her Professional Council concerned.

The Nursing Act (DoH, Nursing Act 33 of 2005) enables nurses to be able to assess, diagnose, prescribe treatment, keep and supply medication only on proof of completion of a prescribed qualification and they can only do this in accordance with the Medicine and Related Substance Act (DoH, Medicine and Related Substance Act 101 Of 1965). Nurses

are authorised by section 56 (6) of the Nursing Act to keep, prescribe and supply medicine in the absence of a medical practitioner or pharmacist only if they are in possession of a special permit (DoH Government Gazette, 2011b).

According to Section 22A of the Medicine and Related Substance Act 101 of 1965 as amended, pharmacists may dispense medicine prescribed by an authorised prescriber. Section 56A of the new Nursing Act of 2005 gives conditions under which nurses are recognised as authorised prescribers, however Section 22A of the Medicines and Related substance Act does not recognise nurses as authorised prescribers. The qualification that will enable nurses to gain access to the specialities register with the list of medicine to be listed in the Schedules for each specialist category in order for nurses to be recognised as authorised prescriber needs to be formalised by the South African Nursing Council (Gray, 2010).

The South African Pharmacy Council (SAPC) in the correspondence directed to Mr. A.S. Cassim District Pharmacy Manager for Amajuba Health District dated 16 August 2011 confirmed that in its interpretation of Section 22A of the Medicine and Related Substance Act, 101 of 1965 pharmacists can only dispense prescriptions from a medical practitioner or an authorised prescriber and that nurses registered under the old Nursing Act Section 38 A and new Nursing Act Section 56 are permitted to dispense medicine they have prescribed. Resistance to accept nurses as prescribers have been experienced from other professionals; however these professionals can be the ones that can assist nurses to improve on their prescribing habits (Kroezen *et al*, 2012).

Nurses can provide quality of care if there are well developed clinical guidelines that they can follow, implementation strategies for the guidelines to include training and educational outreach visits (Pagaiya & Garner, 2005). Nurse prescribers have an important role in the health sector and more information is needed about factors that could encourage effectiveness of nurse prescribing and organisational support is also key (Bradley, Campbell

& Nolan, 2005). Understanding the current nurse prescribing practices is of fundamental importance for future policy developments in support of legislation, training and organizational conditions that will enable nurse prescribing (Kroezen *et al*, 2012). Twenty first century policy makers are beginning to look beyond established professional boundaries for the benefit of both public health and health care economy (Bhanbhro *et al*, 2011).

2.4 STANDARD TREATMENT GUIDELINES/ESSENTIAL MEDICINE LIST

STGs are systematically developed clinical statements that provides evidence based information on the diagnosis and treatment of a specific health condition; aiming at assisting health care practitioners in choosing the best therapeutic, cost-effective treatment for the patients (Mayers, 2010). STGs/EML reduces variations in clinical practice and encourages best practices thus improving quality, equity and efficacy of patient care (Quiros, Lin & Larson, 2007).

In South Africa the NDP led to the development of the three STGs/EML manuals namely PHC 2008 edition, Adult hospital level 2012 edition and Paediatric hospital level 2006 edition. In this HIV era it is common for patients to present at PHC with multiple complaints that necessitate an integrated disease management approach (Bateman *et al*, 2009). This has led to the development of a Practical Approach to Lung Health (PALSA PLUS) guideline which consists of an evidence-based primary health care guideline accompanied by an on-site training programme that equips nurses to diagnose and manage respiratory diseases including TB, HIV/AIDS and Sexually Transmitted Infections (STIs) in primary care settings (Mayers, 2010).

In addition to the above guidelines the WHO and United Nations Children's Fund (UNICEF) have developed the Integrated Management of Childhood Illness (IMCI) aiming at improving effectiveness and efficiency of managing childhood illnesses in both community and PHC in response to the rising incidents of mortality rates of children under five years in Sub-Saharan African countries (Chopra, Patel, Cloete, Sanders & Peterson, 2005). The South African

DoH has adopted the implementation of the IMCI and PALS PLUS guidelines with all PHC nurses expected to undergo training (Mayers, 2010).

Irrational medicine use particularly poor antibiotic prescribing habits has been shown to be of great concern in the provision of health care services with emergence of resistance (WHO, 2012). Less than 40% of patients in public sector and 30% in the private sector are treated in accordance with approved STGs/EML (Holloway & van Dijk, 2011). The non-adherence to STGs/EML is a serious concern in the provision of health services and apart from a negative therapeutic impact it also bears financial impacts as the treatment cost is found to be higher if the guidelines are not followed (Danysz, 2010; Makhado, 2009; WHO 2012). Medicine is costing the government a lot of money. It is the second cost driver after the compensation of employees therefore properly skilled personnel are required for cost-effective prescribing (Bradley, Campbell & Nolan, 2005).

Adherence to STGs/EML is an important element of the quality of care as it assures rational case management (Boonstra, Lindbaek & Ngome, 2005). The WHO has developed a set of prescribing indicators that each country can use to assess medicine prescription habits however, these indicators fail to specify diagnostic quality of the prescribing process and the degree of adherence to STGs/EML as these indicators differ from country to country (Boonstra *et al*, 2002). STGs/EML provides evidence based knowledge that can be translated into clinical practice benefiting humans (Mayers, 2010). Several studies have also demonstrated that the development of guidelines can be a valid tool to improve clinical practice (Cucinotta, Mazzaglia, Toscano, Arcoraci, Tempera, Salmeri, Rosignoli, Bottaro, Boccazzi, Nicoletti & Caputi, 2002).

2.5 IRRATIONAL MEDICINE USE AND PREVIOUS STUDIES

Irrational use of medicine occurs when patients are prescribed medication inappropriate to their clinical condition, and in doses that do not meet their individual needs. This also includes over and under-prescribing and often not adhering to STGs/EML (WHO, 2012).

Non-adherence to STGs/EML with specific to inappropriate antibiotic prescribing for respiratory tract infections and diarrhoea is a global public health crisis especially in primary care (Holloway & van Dijk, 2011). Irrational prescribing is a global trend as supported by the findings from the literature below.

A systematic review revealed a substantial increase in the non-medical prescribing of antibiotics which is sometimes inappropriate and not evidence based, but this review did not give information on the medical prescribing patterns in the similar type of setting (Bhanbhro *et al*, 2011).

In Iran irrational prescribing of antibiotics was found where cough and cold medicines were prescribed together with antibiotics for management of ARTI (Cheraghali, Nikfar, Behmanesh, Rahimi, Habibipour, Tirdad, Asadi & Bahrami, 2004). In the same study low adherence levels to STGs/EML for ARTI (23%) and mild to moderate pneumonia (66%) were seen.

In Thailand over-prescribing of antibiotics for ARTI (34%) and diarrhoea (91%) in children was found (Pagaiya & Garner, 2005).

Cucinotta *et al* (2002) found poor adherence to STGs/EML and an inconsistent approach for the treatment of Respiratory Tract Infections (RTIs) in Italy.

In Sudan low adherence to STGs/EML with irrational prescribing of antibiotics for the management of the common cold, pneumonia and diarrhoea was revealed by Cheraghali & Idries (2009).

Gabra, Kisalu & Hazembas (2000) findings of irrational antibiotic prescribing in Uganda showed that 91% no pneumonia cases were prescribed antibiotics.

Full adherence to recommended National Treatment Guidelines (NTG) occurred in 44% and acceptable adherence in 20% of prescriptions written by PHC nurses in Botswana (Boonstra

et al, 2002). In another study, Boonstra, Lindbaek & Ngome (2005) discovered a high level of inappropriate antibiotic prescribing for ARTI and diarrhoea. In this study 79% of the non-pneumonia cases were prescribed antibiotics.

Prescriptions audits by Chitsike (2001) in Harare, Zimbabwe showed that only 30% of prescriptions complied with STGs/EML for treatment of severe pneumonia in children with HIV infection.

Studies conducted in South Africa revealed better rational antibiotic prescribing compared to global trends. A study in Cape Town by Chopra *et al*, (2005) found rational antibiotic prescribing in 62% of prescriptions before IMCI intervention and 84% after the IMCI interventions. In the same study 78% and 80% pneumonia prescriptions were prescribed appropriately before and after IMCI interventions respectively. In another study it was found that about 84.9% prescriptions written by PHC nurses in Gauteng Province Military clinics adhered to the Military Medicine Code List (MMCL) (Engelbrecht, 2010).

Irrational antibiotic prescribing was also found at Themba hospital, Kabokweni sub-district, Mpumalanga province. Only 10% of the antibiotic prescriptions adhered to STGs/EML and four percent LRTI (pneumonia and acute bronchitis) prescriptions adhered to the STGs/EML (Danysz, 2010). Only 29.2% prescriptions with antibiotics complied with STGs/EML in Vhembe district, Limpopo province (Makhado, 2009).

It is evident from the literature above that the challenge of poor adherence to STGs/EML for the treatment of respiratory conditions in children exists. Antibiotics are prescribed for common colds which can be treated with cough and cold medication. This is of great concern as non-adherence to STGs/EML with irrational prescribing of antibiotics could lead to the emergence of resistance (WHO, 2012). Therefore, there is no doubt that interventions to improve irrational prescribing are more than necessary. The first step in any intervention is to identify possible factors that affect deviations.

2.6 FACTORS IMPACTING ON PRESCRIBERS' ADHERENCE TO GUIDELINES

Lack of adherence to STGs/EML and marked variability of antibiotic prescription rates appear to be related to factors other than bacterial resistance (Cucinotta *et al*, 2002). Factors influencing the use of STGs/EML include clinical nurse training, agreement with STGs/EML, positive perception of the changes, development of STGs/EML in a health policy framework, the understanding and manageable STGs/EML contents and availability of supporting measures (Higuchi, Okumura, Aoyama, Suryawati & Porter, 2012).

Possible barriers to STGs/EML adherence found from the literature are discussed below.

2.6.1 Prescribers' perception

The prescriber may perceive being adherent whereas the actual results of prescription audits show non-adherence to STGs/EML (Steinman, Fischer, Shlipak, Bosworth, Oddone, Hoffman & Goldstein, 2004). The perceived information may hinder adherence to guidelines as over optimistic assessment of one's current practice can result in failure to recognise the need for improvement.

Contrary positive perception due to increased self-confidence and knowledge after introduction of STGs/EML assisted the nurses to use STGs/EML for ARTI, malaria and diarrhea (Higuchi *et al*, 2012).

2.6.2 Medicine and STGs/EML availability

The availability of STGs/EML and medicine in facilities plays an important role in ensuring adherence to the STGs/EML, but this alone does not translate to rational prescribing (UNHCR, 2006). Cheraghali *et al* (2004) in Iran found STGs/EML to be available but high irrational prescribing of antibiotics was seen. Insufficient medicine supply was found to be negatively affecting adherence to STGs/EML in Nigeria (Desalu, Kushimo & Akinlaja, 2006)

although this is contrary to what has been discovered by Cheraghali & Idries (2009) in Sudan.

2.6.3 Existence of more than one guideline

Another factor that affects adherence is the existence of more than one guideline for the management of the same condition. Where more than one guideline exists there is a likelihood of non-adherence to one or the other, if the guidelines are not harmonised (Mayer, 2010).

2.6.4 Failure to properly diagnose

Proper diagnosis ensures that the patient receives the correct treatment and if the prescriber is unsure of the diagnosis it is unlikely that the correct guideline will be followed (WHO, 2012). Irrational prescribing of antibiotics for ARTI by PHC nurses was found to be as a result of failure to accurately diagnose respiratory conditions in children (Boonstra, Lindbaek & Ngome, 2005). Prescribing of antibiotics for pharyngotonsillitis was found to be due to diagnostic uncertainty (Cucinotta *et al*, 2002). Unspecified diagnosis affects rational prescribing (Boonstra *et al*, 2002).

2.6.5 Prescribers' attitudes towards guidelines

Cabana, Rand, Powe, Wu, Wilson, Abboud & Rubin, (1999); Haagen, Nelen, Hermens, Braat & Grol, (2005); Quiros, Lin & Larson (2007) assessed the following six possible barriers to adherence related to prescribers' attitudes:

- Lack of familiarity or awareness,
- Lack of agreement with guidelines in general or with specific guidelines recommendations,
- Lack of outcome expectancy,
- Lack of self-efficacy,
- Lack of motivation and

- External barriers such as patient characteristics e.g. age or environmental factors.

Prescribers with more positive attitudes towards practice guidelines are more adherent than those with less positive attitudes (Quiros, Lin & Larson, 2007). Low familiarity, low self-efficacy and time constraints were found to be significantly associated with non-adherence to Chronic Obstructive Pulmonary Disease (COPD) guidelines among primary care providers (Perez, Wisnivesky, Lurslurchachai, Kleinman & Kronish, 2012). Clinical nurse training was found to positively influence the knowledge and attitudes of nurses towards the STGs/EML for respiratory infections, malaria and diarrhea (Higuchi *et al*, 2012).

2.6.6 Prescribers' experience

Ability to overcome inertia of previous practice is amongst the factors that impact on prescribers' adherence to STGs/EML (Menendez, Reyes, Martinez, dela Cuadra, Manuel Valles & Vallterra, 2007). Boonstra *et al*, 2002 discovered prescribers' practice years to be independently associated with full adherence to the National Treatment Guidelines in Botswana as adherence of nurses with four to 11 years of experience were found to be better than of those with less practice experience. The group with 12 to 30 years of practice lacked opportunities for updating their knowledge. This is contrary to the findings by Luker, Hogg, Austin, Ferguson & Smith, (1998) who identified that intuitive knowledge gained by past experience versus objective knowledge sources has a major role in nurses' adherence to guidelines as the novice stage of developing skills follow taught guidelines while expert nurses make decisions intuitively.

2.6.7 Practice environment

Practice environmental factors that impact on prescribers' adherence to STGs/EML include high workload, practitioner's anxiety, time constraints, availability of support or supervision and physical infrastructure of that facility (Mayers, 2010). In resource limited settings facilities still lack the basic needs for effective case management such as evidence based training, facilitated referrals, medicine and supplies (Graham *et al*, 2008). Location of facility

has an impact on adherence to STGs/EML as it was found to be low in remote health posts as opposed to clinics; attributed to failure in recruiting experienced and better qualified nurses. (Boonstra *et al*, 2002).

2.6.8 Factors impacting on quality of prescribing

Mayers (2010) and Boonstra, Lindbaek & Ngome, (2005) discovered the following complexity of factors impacting on quality of medicine prescribing and adherence to STGs/EML:

- Nurses' training,
- Availability of medicine and other supplies,
- Patients' expectations,
- Social circumstances,
- Expected patient compliance,
- Cost of medicine,
- Supervision,
- Motivation and
- Quality of the NTG.

Local data on factors related to irrational use of medicine are still lacking in many parts of the world (WHO, 2012). Once the factors are identified it becomes crucial to put in place corrective strategies to close the gaps.

2.7 LITERATURE RECOMMENDATIONS

Prescribers' adherence to STGs/EML may be hindered by a variety of factors as discussed above. Knowledge of these factors can assist guideline developers, practice directors and health services researchers to design interventions targeting the specific barriers (Perez *et al*, 2012). Several recommendations for improving adherence to STGs/EML exists from the literature based on the identified factors affecting adherence and are discussed below.

2.7.1 Education and training of prescribers

Known intervention strategies to improve adherence to guidelines are education and performance feedback (Danysz, 2010; Engelbrecht, 2010). The provision of training in case management has shown positive outcomes and reduced unnecessary antibiotic use (Graham *et al*, 2008). Rational prescribing can be improved through strengthening of training on the STGs/EML and this should be included in the undergraduate and postgraduate programmes of all health care practitioners whose tasks involves prescribing and dispensing (WHO, 2012; Mayers 2010)

The effectiveness of training alone is not always optimal in ensuring adherence to STGs/EML since theoretical knowledge does not always translate into best practice (Mayers, 2010; Desalu, Kushimo & Akinlaja, 2006). Therefore the recommendation by Goldstein, Lavori, Coleman, Advani & Hoffman (2005) that multifaceted quality improvements have been found to be more effective than single-component strategies in improving adherence becomes crucial in this case.

Rational prescribing can be improved during basic and in-service training of the nurses based on the solid diagnostic and treatment skills as well as strengthening of supervision (Boonstra *et al*, 2002). Provision of training that includes case management reduces diagnostic uncertainty and improves outcomes (Graham, *et al*, 2008).

2.7.2 Improve diagnostic uncertainty

In the case of diagnostic uncertainty clinical case definition should be evidence based in order for treatment interventions to promote rational antibiotic prescribing thus minimising cost, especially when there are co-infections (Graham *et al*, 2008). Validity of algorithms can also improve diagnostic uncertainty (Boonstra, Lindbaek & Ngome, 2005).

2.7.3 Improving guidelines implementation strategies

Guidelines are not self-implementing, stepwise planned implementation should aim at integrating the guidelines into daily performance of health care professionals (Mayers, 2010). Clinical practice normally deviates from guidelines and implementation methods such as passive dissemination of guidelines in written form only are found not to be effective in improving adherence to STGs/EML (Goldstein *et al*, 2005; Gray, 2011).

More intense intervention strategies are necessary to promote implementation; these should be based upon the assessment of potential barriers that can impact on the adherence of health care professionals to STGs/EML (Haagen *et al*, 2005). Dissemination of guidelines must be followed by firm implementation strategies that include the use of Pharmacy and Therapeutic Committees (PTC); problem based basic professional training and in-service training (Gray, 2011).

Involvement of the end user in developing STGs/EML and utilisation of rational medicine use flow charts and posters have been found to be effective in the implementation of STGs/EML (Gabra, Kisalu & Hazemba, 2000; UNHCR manual, 2006). Implementation strategies should include harmonising of the treatment protocols where there is existence of more than one STGs/EML for the same condition/s that are not harmonised (Mayers, 2010).

Sustainability after any interventions is always a challenge and Trap *et al* (2001) recommended on-going reinforcement of the interventions as part of the integral program and not as a project that will start and end. This is supported by the recommendations of Cucinotta *et al* (2002) of reinforcing STGs/EML as part of a continuing program.

2.7.4 Monitoring and evaluation strategies

Rational medicine use has been found to improve by regular monitoring and evaluation through supervision, prescription audits with feedback sessions, self-audits encouraged by

health authorities and scientific bodies and establishment of functional PTCs (Makhado, 2009; UNHCR manual, 2006).

Feedback can be used as a “priming” strategy, alerting clinical practitioners that they are not adhering to guidelines and is best done at a point of service (Steinman *et al*, 2004). Constant supervision using one-on-one onsite interaction as opposed to once off centralised training facilitates clinical practitioners’ behaviour change thus improving adherence to STGs/EML (Stein, Lewin, Fairall, Mayers, English, Bheekie, Bateman & Zwarenstein, 2008). The shortage of human resources is a major challenge in most of the public health facilities making supervision difficult. As a result of supervision, using pharmacy technicians, positive changes in clinical practice of prescribers at PHC level were seen thus improving adherence to STGs/EML (Trap *et al*, 2001).

2.8 SUMMARY

Most of the studies in the literature review above focused on the adherence of physicians on various guidelines with little emphasis on nurses’ adherence as authorised prescribers at PHC. There are very few studies found that assessed nurses’ adherence to STGs/EML. This could be attributed to the fact that prescribing is a new activity in the nurses’ profession. PHC is the setting where access to safe and appropriate medicine is most critical for the wellbeing of any community (Bhanbhro, *et al*, 2011).

The next chapter describes the methodology used in this research in assessing PHC nurses’ adherence to STGs/EML and the factors impacting on their adherence.

CHAPTER 3

METHOD

3.1 INTRODUCTION

This chapter presents the methodology of the study:

Investigating adherence of authorised prescribers to STGs/EMLs when treating children presenting with respiratory conditions at PHC level in Umkhanyakude Health District, KZN

The broad overview of the study sites and sampling methods used are discussed. The discussion of the ethics of the study concludes this chapter.

3.2 STUDY DESIGN

An investigational study was conducted. It was the first time that a study of this nature was conducted in KZN within the Umkhanyakude Health District. A retrospective, quantitative with qualitative aspects, descriptive study approach was used.

3.3 STUDY SETTING AND SITE

The health service area of this district is made up of five hospitals, 54 PHC clinics and six mobile bases functioning as clinics. In total there were approximately 208 authorised prescribers working in all the above PHC facilities. In each PHC facility there were two to three or more authorised prescribers depending on the work load in a specific facility. Each authorised prescriber had his/her own prescription register where he/she records all prescriptions during consultation.

The prescribing and dispensing competencies of these authorised prescribers varied from PHC training to dispensing course training. Some prescribers were trained on both and some prescribers had no training.

3.4 SAMPLE SELECTION

Multi-stage sampling was used in this study as follows:

- The first stage was the sampling of the PHC facilities to be studied.
- The second stage was the sampling of the authorised prescribers with their prescription registers to be studied.
- The last stage was the sampling of the prescriptions from each prescription register to be studied.

The sampling procedures that were used in each stage are explained below.

3.4.1 Sampling of PHC facilities

A sample size of 20 PHC facilities was randomly selected from the 60 PHC facilities; see appendix B for an overview of study site. The sampled PHC facilities are highlighted in appendix C.

Firstly; the 60 PHC facilities were listed alphabetically in an ascending order. A number from one to 60 was assigned numbers in the same ascending order to the respective PHC facilities. Twenty numbers were randomly selected namely: 2, 8, 9, 12, 18, 23, 24, 25, 31, 32, 35, 38, 44, 47, 49, 50, 52, 54, 57, and 60. These numbers were matched with numbers assigned to PHC facilities to select a sample of 20 PHC facilities. All 20 sampled PHC facilities were visited for data collection.

3.4.2 Sampling of authorised prescribers with their prescription registers

The sampling of the authorised prescribers was done on site during the data collection period. In each of the 20 randomly selected PHC facilities, three prescribers were randomly selected by the researcher for the structured interview and auditing of their prescription registers. The authorised prescribers were listed alphabetically in an ascending order using their surnames and first names. Numbers from one to the number of the authorised prescribers on site were then assigned in an ascending order according to the surnames. In

one facility random sampling was not possible due to the high workload and other commitments at the time of visit; as a result the Operational Manager (OPM) for that PHC facility allocated the authorised prescriber to participate in the study as per the availability to participate.

3.4.3 Sampling of prescriptions

Five prescriptions from each of the sampled prescription registers of the selected authorised prescribers, with any of the children's respiratory conditions to be studied, were audited. A total of 15 prescriptions from each of the selected PHC facilities were audited.

If only two authorised prescribers were available on site during the visit, the first eight prescriptions were taken from the first authorised prescriber that was available for the structured interview. The balance of seven prescriptions was taken from the second authorised prescriber. Where there was only one authorised prescriber available all 15 prescriptions were taken from his/her prescription register. Therefore, a total of 300 prescriptions from all randomly selected prescription registers were audited for adherence to the 2008 PHC STGs/EML (DoH, 2008).

3.4.4 Inclusion criteria

Only the prescriptions of the authorised prescribers interviewed were included in the study. Where there were less than three authorised prescribers with their prescription registers to be audited, the 15 prescriptions were taken only from the prescription registers of those authorised prescribers available on site at time of visit.

The diagnoses under study included pneumonia, bronchospasm, chronic asthma, acute bronchiolitis, croup, common cold and influenza. If the prescription included other disease conditions that are not mentioned above; only the diagnoses that are part of the study disease conditions were assessed for adherence to the 2008 PHC STGs/EML.

3.5 PILOT STUDY

A pilot study was conducted at a clinic that was not part of the sample but closest to the researcher to test the data collection tools following ethical clearance from Medunsa Campus Research and Ethics Committee (MCREC) (appendix D) and approval granted by the KZN DoH Research and Knowledge Management Committee (HRKMC) (appendix E). The same on site sampling method that was to be applied in the main study was used in the pilot study. Minor adjustments to the tools were made following the pilot study before the main study was conducted.

3.6 DATA COLLECTION

Data collection was done from the 10th August 2011 to the 2nd of September 2011. The data for the prescription audits was collected retrospectively from the prescription registers of all randomly selected PHC facilities using the adapted WHO prescription audit tool (appendix F). The tool has specific indicators that measure drug use and is recommended by the WHO to assist health facilities in investigating drug use (WHO, 1993). The first respiratory conditions' prescriptions per prescription register were recorded until the required sample size of 15 prescriptions per PHC facility was reached. For the prescription audit the following data was collected: Date, Age, diagnosis or symptom complex, medicine prescribed (strength, frequency and quantity) and duration of treatment.

Structured interviews were conducted by researcher using a semi-structured questionnaire (appendix G) to all authorised prescribers whose prescription registers were audited for compliance. All authorised prescribers were proficient in English therefore the questionnaire was not translated into their mother languages and the interview was conducted in English. The questionnaire had open ended and closed questions. The questions were developed using possible factors affecting adhering to STGs/EML found from the literature. Open ended questions gave allowance to add any factors that were not identified from the

literature. The data on the qualifications obtained (PHC and dispensing license training) by the authorised prescribers was also collected. The questionnaire consisted of the following seven sections

- Section 1: Biographic information,
- Section 2: Prescribers' perception on adherence,
- Section 3: Drugs availability and prescribers' knowledge of their use,
- Section 4: Prescribers' understanding and availability of 2008 PHC STGs/EML,
- Section 5: Diagnosis,
- Section 6: Attitudes towards guidelines,

Section 7: Implementation strategy and monitoring and evaluation.

The selected PHC facilities were informed about the study through the office of the District Manager, see attached appendix H. Appointments for data collection visits were made telephonically following the letter to the district manager requesting her to inform the facilities about the study. The facilities confirmed receipt of the letter from the District Manager and were expecting the data collection visit. The contact details of the researcher were made available in order to allow PHC staff members to ask questions to ensure clarity on all issues before and after the study commenced.

A session was held with all the authorised prescribers in each selected site briefing them about the:

- Study,
- Procedure followed in selecting their facility,
- Procedure that was followed in selecting the prescription registers and the authorised prescribers to be interviewed and

- Ethical clearance issues.

The collection of data for the prescription audits and authorised prescribers' interviews was done by the researcher on the same day of the visit to the selected PHC facility.

Consent forms were obtained from all the authorised prescribers who participated in the study (appendix I). Patient and prescriber anonymity was guaranteed throughout the study as no names were recorded on the PHC facility data collection form or in the questionnaire.

The data collected was safely stored and access to it was limited. In line with general ethical practice, PHC facilities will be given the summary of results/ feedback upon the completion of the study (Beaglehole, Bonita & Kjellstrom, 1993).

3.7 DATA ENTRY AND ANALYSIS

All data collected in the study was captured in an Excel spread sheet. Validity checks were performed i.e. the data for the prescription audits was captured, verified and proof read by the researcher.

The prescriptions audited were then analysed for adherence by the authorised prescribers to the 2008 PHC STGs/EML (DoH, 2008). The questionnaire was analysed to determine the factors impacting on the adherence of the authorised prescribers to the 2008 PHC STGs/EML (DoH, 2008). The statistical analysis was of a descriptive nature.

Data generated from open-ended questions was classified into categories and recoded into categorical variables. These categorical variables were then summarised by frequency counts and percentages. Continuous variables were also summarised by mean, standard deviation, median, minimum and maximum values for statistical purposes. All statistical procedures were performed on Statistical Analysis System (SAS) Release 9.2 or higher, running on Microsoft Windows Vista.

3.8 RELIABILITY

According to Dawson and Trapp (2004) reliability is an estimation of how reproducible the findings will be if the same measurement were repeatedly made on the same object. According to these authors different types of reliability include test-retest, internal consistency, alternative, intra-observer and inter-observer. In order to ensure reliability in the proposed study the measurement procedure was standardised and procedures followed at each PHC facility were the same. The same researcher collected data at all PHC facilities. The researcher also practiced a sequence of events so that all questionnaires were administered in the same way. Sample size was calculated by the statistician in order to ensure that issues of reliability were addressed.

3.9 VALIDITY

Validity is an approximation of how well an instrument measures what it purports to measure (Dawson & Trapp, 2004). The tool used for prescription audits was valid based on the adapted source being the WHO (UNHCR, 2006) and the fact that some adjustments were made in full cognisance of local context in which the study was conducted. The questionnaire administered to authorised prescribers was field-piloted and accordingly adjusted to ensure validity (Tredoux & Smith, 2006).

Validity was affected by the fact that the researcher that administered the questionnaire was the supervisor of the participants. The prescribers were assured that the survey was not for evaluating their performance but the results will be used in finding solutions to the factors impacting on their adherence to the 2008 PHC STGs/EML. The questionnaire was designed in such a way that the questions were repeated in different approaches but measuring the same concept in order to ensure validity.

3.10 BIAS

Bias is defined as the systematic error that can affect scientific investigations and distort the measurement process (Sica, 2006). Various forms of bias exist ranging from selection procedures, methodology, measurement instruments and attitudes or preferences of investigators and it can lead to results that are different from the true results. Since bias cannot be completely eliminated, it can be mitigated through proper study designs (Sica, 2006).

In as far as observer bias is concerned; data was collected by the researcher, with a sound scientific background and who understood the repercussions for unscientific conduct in data collection processes. The researcher's involvement in data collection was also helping in ensuring that the problem of interpreting questions differently was addressed when necessary. Measurement bias was addressed through the use of the WHO adapted concept data collection form (UNHCR, 2006) and also through ensuring that the questionnaire was field-piloted (Beaglehole, Bonita & Kjellstrom, 1993).

The questionnaire did not include leading questions, ambiguous questions and questions with lengthy recall periods to minimise bias. The most important threat to responder bias was the fact that the researcher worked in the same setting where the study was conducted and interviewing the people she knew may have constituted responder bias, whereby a research participant may have told what he/she thinks the researcher expected to hear. This was minimised by emphasising to the research participants the importance of giving honest answers as it was going to assist in improving their capacity to correctly prescribe treatment to the patients.

One of the common well-documented useful tools in mitigating sampling bias is randomisation and it is best implemented if coordinated by a person not involved with the

study (Sica, 2006). In the study random sampling was used to select PHC facilities to be studied and it was also used to determine participants in the field. The procedures for random sampling were done with the help of the statistician. In selected facilities random sampling as described above was not possible due to the high workload and other commitments at the time of visit; as a result the OPM allocated the authorised prescriber to participate in the study as per the availability to participate.

3.11 LIMITATIONS

Although all efforts were made to ensure that all authorised prescribers were on duty on the appointment dates, in some facilities it was not possible to get the sample of three authorised prescribers due to unforeseen circumstances. This was anticipated during the development of the research proposal as a threat especially in those facilities where the allocated authorised prescribers were three or less as the target sample size may have not been reached. In cases where this happened it was dealt with as described above under sampling.

Although all possible measures were taken to ensure that only the prescriptions within the period as specified in the research proposal were audited and also that only the prescriptions of the authorised prescriber interviewed were included. With all the limitations due to sharing of prescription registers and mixing records of prescription dates in response to short supply of prescription registers and personal preferences to share, it was not always possible to audit only the prescriptions of the authorised prescribers interviewed and to stick to the prescriptions with the date specified in the research proposal.

The method used to audit only the prescriptions of the participant interviewed was to check the handwriting of that participant from the various prescriptions within that prescription register if it was used by more than one authorised prescribers.

In asthma prescriptions prescribers were not stating if the diagnosis was chronic or acute asthma. The prescriptions were assessed based on treatment issued. If the nebuliser was prescribed then it was assumed the prescription was for acute asthma. Other strategies to minimise limitations were dealt with above under sampling and data collection.

In the research proposal, it was stated that the date of the prescriptions to be included in the study was going to be all of the prescriptions from six months prior to the MCREC approval. The study was approved by MCREC in April 2011 therefore only prescriptions from October 2010 to April 2011 were to be included in the study. However during data collection accessibility of prescriptions for the above specified period was a challenge due to the following reasons:

- Poor filing and record keeping at these selected facilities.
- More frequent movement of authorised prescribers from one facility to another.

As a result of the above prescriptions from January 2011 to July 2011 were included because prescriptions for this period were easily retrieved.

3.12 ETHICAL CONSIDERATIONS

Ethical clearance for this research was obtained from the MCREC (appendix D). Approval to conduct the study was also obtained from the KZN HRKMC (appendix E).

A formal letter was written to the District Manager requesting his/her authority to use PHC facilities within his/her district (appendix J). In the letter the aim of the study and the procedure to be followed in collecting the data in each selected site was included. The letter also included all ethical steps that will be followed. Permission to conduct the study was granted by the District Manager (appendix K).

3.13 SUMMARY

Processes and procedures followed before and during data collection were discussed above. The results of the data collected are presented in the next chapter.

CHAPTER 4

RESULTS

4.1 INTRODUCTION

A detailed report of the data collection findings is presented in this chapter. The data presented is from the two tools used for data collection i.e. the prescription audits and questionnaire. The results of the questionnaire analysis are presented per section as in the questionnaire and per question in that section of the questionnaire. The aim of the data collection process was to determine whether authorised prescribers at PHC facilities adhere to the 2008 PHC STGs/EML when treating respiratory conditions in children up to 12 years of age.

4.2 RESULTS OF THE PRESCRIPTION AUDITS (INSTRUMENT 1)

Data collection included prescriptions from January 2011 to July 2011 as the prescription registers for this period were easily retrieved and most of the prescribers were still employed in the facility during this period. A minimum of five prescriptions and maximum of 15 prescriptions were audited per prescriber.

Nurses specialising in specific categories of patients e.g. Antiretroviral Therapy (ART) patients, Anti-Natal Care (ANC) patients, Immunisation and Geriatrics were not included as part of the participants for this research. The results of the prescription audits are presented as follows:

- Respiratory conditions seen at Umkhanyakude Health District PHC facilities stratified by conditions and age of patients.
- Treatment prescribed to children up to 12 years of age at Umkhanyakude Health District PHC facilities.
- Adherence to STGs/EML for the respiratory conditions studied.

- Prescribers' adherence to STGs/EML for the respiratory conditions studied stratified by prescribers' job and training profiles such as prescribing experience, training received, job ranking and designation.

4.2.1 Respiratory conditions seen at Umkhanyakude Health District

Table 4.1: Respiratory conditions/symptoms stratified by diagnostic group and adherence to 2008 PHC STGs/EML per diagnosis and diagnostic group (n=300)

Diagnostic category	Diagnosis	Prescriptions recorded	% occurrence	Non-adherent	Partial adherent	Fully adherent
Common Cold	Cough or cold	53	17.7	15	2	36
	Nasal congestion	1	0.3	0	0	1
	URTI	7	2.3	4	1	2
	Total	61	20.3	19	3	39
Cough	Chronic cough	1	0.3	1	0	0
	Cough	47	15.7	11	0	36
	Dry Cough	1	0.3	1	0	0
	Total	49	16.3	13	0	36
Influenza	Cough with fever	1	0.3	1	0	0
	Fever	23	7.7	13	7	3
	Flu	36	12	10	21	5
	Flu with sore throat	1	0.3	1	0	0
	Total	61	20.3	25	28	8
Pneumonia	Broncho Pneumonia	1	0.3	0	1	0
	Chest infection	36	12.0	2	25	9
	LRTI	10	3.3	4	6	0
	Mild Pneumonia	2	0.7	0	1	1
	Pneumonia	66	22	0	53	13
	Severe Pneumonia	4	1.3	3	1	0
	Total	119	39.7	5	85	29
Bronchospasm /Bronchiolitis	Asthma	6	2.0	1	4	1
	Bronchitis	1	0.3	0	0	1
	Chest wheeze	1	0.3	1	0	0
	Tight chest	1	0.3	1	0	0
	Total	9	3.0	3	4	2
Other	Chest Pain	1	0.3	1	0	0
	Total	300	100	66	120	114
	Percent adherent	300	100	22%	40.0%	38%

Key: URTI – Upper Respiratory Tract Infection
LRTI – Lower Respiratory Tract Infections

Note:

Diagnosis

In some cases authorised prescribers were not recording the diagnosis as in the approved STGs/EML. They recorded symptoms instead of the final diagnosis. The following symptoms which appeared as diagnoses in the prescriptions were included in the results:

- **Fever** – a symptom as a result of a response to infection, which could have been respiratory infections. Some prescribers misnamed common cold and influenza as fever.
- **Cough** – a symptom in many of the respiratory infections. Cough mixture was accepted as the correct treatment for symptomatic relief of cough even if it is not indicated as a diagnosis in the STGs/EML, but this guideline gives an allowance of cough syrup for symptomatic relief. If nothing was given for cough the prescription was still considered adherent as the cough mixture is not advocated by the 2008 PHC STGs/EML. The dosages for cough mixtures were not assessed since the 2008 PHC STGs/EML does not indicate the cough mixture dosages to be prescribed.
- **Chest infection** – was included when prescribers were unsure of the diagnosis and chest infection was recorded. This was assessed as pneumonia.
- **URTI** – non-specific diagnosis and may refer to pharyngitis, laryngitis, sinusitis, otitis media and common cold. It was also used if the prescriber was unsure of the specific respiratory conditions' diagnosis. All URTI prescriptions were assessed as common cold prescription since pharyngitis, laryngitis, sinusitis and otitis media were not part of the conditions studied. However, although antibiotics are indicated for sinusitis and otitis media, in this case, if antibiotics were prescribed for URTIs; then the

prescription was considered non-adherent since antibiotics are not recommended for common cold.

- **LRTI** – non-specific diagnosis. Used as a synonym of pneumonia. If the prescription was written LRTI then it was assessed as a pneumonia prescription.
- **Chest wheeze** – a symptom of conditions which can include bronchospasm, asthma, COPD and bronchiolitis in children. These should be treated with oxygen, a bronchodilator and a steroid. No antibiotics are indicated. When antibiotics were prescribed without key medication then the prescription was assessed as being non-adherent. If key medication was prescribed with antibiotics then the prescription was assessed as being partial compliant.
- **Cough or cold** – Prescriptions with this diagnosis were assessed as common cold prescriptions and the treatment was symptomatic. No antibiotics indicated for this, if antibiotics were prescribed then the prescription was considered non-adherent.
- **Nasal congestion** – a symptom and included since it is one of the signs and symptoms for a common cold and Influenza.
- **Chest pain** – part of the symptoms for respiratory conditions.

Table 4.1 above presents the common respiratory infection diagnoses as identified in the prescription audits with adherence levels of the prescribers in treating these conditions. The respiratory infections were further sub-divided into diagnostic groups namely: common cold, cough, influenza, bronchospasm and pneumonia.

The following diagnoses listed in the data were not listed as diagnoses or conditions in the 2008 STGs/EML. The reasons for inclusion are explained:

- Cough or cold, nasal congestion and URTI – may be referring to common cold.

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- Cough – not as a standalone diagnosis but symptom of an underlying disease.
- Fever – Maybe referring to influenza.
- LRTI and Chest infections – Maybe referring to pneumonia.
- Tight chest and chest wheeze – Maybe referring to bronchospasm or bronchiolitis.
- Chest pain – classified as other.

Table 4.2: The most common respiratory diagnoses/symptoms (n=300)

Condition	Number occurrence	Percentage occurrence
Pneumonia	73	24.3%
Cough or Cold	53	17.70%
Cough	47	16.3%
Flu	36	12%
Chest infection	36	12%
Fever	23	8%
LRTI	10	3%

The rest of the disease conditions of which each were below three percent included:

- Nasal congestion,
- Bronchitis,
- Chest wheeze,
- Chest pain,
- Tight chest,
- URTI and
- Asthma.

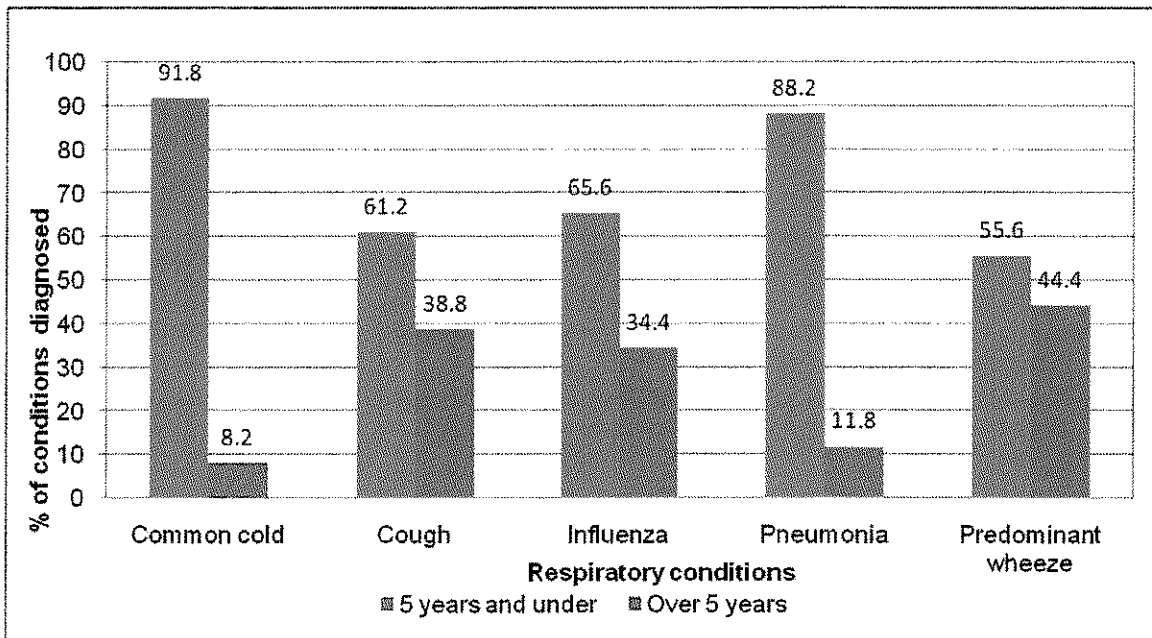


Fig 4.1: Conditions diagnosed in children stratified by age (n=300)

Respiratory conditions/symptoms were found to be more prevalent in the prescriptions for children five years and under than for those of children above five years up to 12 years, especially in the common cold and pneumonia cases, as illustrated figure 4.1 above.

4.2.2 Treatment prescribed for respiratory conditions

Table 4.3: Medicine commonly used for respiratory conditions (n=300)

Item prescribed	Common Cold (n=61)	Cough (n=49)	Influenza (n=61)	Pneumonia (n=119)	Bronchospasm /Bronchiolitis (n=9)	Chest pain (n=1)	Total (n=300)	%
Allergex [®] syrup	5	0	0	5	0	0	10	3%
Amoxicillin capsules and suspension	14	8	22	109	3	1	157	52%
Augmentin [®] suspension	0	0	0	1	0	0	1	0.33%
Berotec [®] nebulizer	0	0	0	0	1	0	1	0.33%
Budeflamide [®]	0	0	0	0	3	0	3	1%
Ceftriaxone	1	0	1	10	1	0	13	4%
Cocillana syrup	3	9	6	0	0	0	18	6%
Cotrimoxazole suspension	0	0	0	0	1	0	1	0.33%
Erythromycin suspension	0	0	0	7	0	0	7	2%
Illiadin [®] nasal solution	1	0	2	0	0	0	3	1%
Lemon & honey	15	4	1	1	0	0	21	7%
Multivitamin syrup	5	1	1	4	1	0	12	4%
Paracetamol tablets and elixir	25	3	27	54	1	1	111	37%
Penicillin VK syrup	2	1	5	0	0	0	8	3%
Salbutamol inhaler	0	0	0	0	5	0	5	2%
Mist tussi infans	22	20	9	8	0	0	59	20%

Note:

1. *Although Mist tussi infans was commonly prescribed, its availability was never assessed since this medicine does not form part of the 2008 STGs/EML, it is available at PHC for symptomatic treatment but not strongly advocated as part of the STGs/EML.*
2. *The items prescribed are written as recorded in the prescriptions i.e. trade names vs. generic names.*
3. *Prescriptions for croup, chronic obstructive bronchitis and acute bronchiolitis were not found from the prescription registers.*
4. *Chest pain was recorded because some prescribers record symptoms not diagnosis as it can be part of the symptoms for respiratory conditions.*

The most commonly prescribed medicines for respiratory conditions in children that appeared in the 2008 PHC STGs/EML were:

- Amoxicillin capsules and suspension (52%; 157/300),
- Paracetamol tablets and elixir (37%; 111/300) and
- Mist Tussi Infans (20%; 59/300).

Mist Tussi Infans was prescribed for

- Common cold (37.2%; 22/59),
- Cough (33.8%; 20/59),
- Influenza (15.3%; 9/59) and
- Pneumonia (13.6%; 8/59).

The following medicines were prescribed for respiratory conditions in children while not appearing on the 2008 STGs/EML treatment regimens for respiratory diseases:

- Allergex[®] syrup (3%; 10/300),
- Augmentin[®] suspension (0.33%; 1/300),
- Cotrimoxazole suspension (0.33%; 1/300),
- Illiadin[®] nasal solution (1%; 3/300),

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- Multivitamin syrup (4%; 12/300) and
- Penicillin VK syrup (3%; 8/300).

Amoxicillin capsules and suspension were prescribed for:

- Pneumonia (69%; 109/157),
- Influenza (14%; 22/157),
- Common cold (8.9%; 14/157),
- Cough (5.1%; 8/157),
- Bronchospasm/ bronchiolitis (1.9%; 3/157) and
- Chest pain (0.6%; 1/157).

Paracetamol tablets and elixir were prescribed for:

- Pneumonia (48.6%; 54/111),
- Influenza (24%; 27/111),
- Common cold (22.5%; 25/111),
- Cough (2.7%; 3/111),
- Bronchospasm/ Bronchiolitis (0.9%; 1/111) and
- Chest pain (0.9%; 1/111).

4.2.3 Adherence to the 2008 PHC STGs/EML

The adherence assessment was done in two folds:

- Assessing adherence to STGs/EML per diagnosis as recorded from the prescriptions and then grouped per diagnostic complex **without being specific to the prescriber** of those prescriptions as presented in table 4.1 above and figure 4.2 below.
- Assessment of adherence to STGs/EML **specific to prescribers** looking at individual prescriber's prescriptions without being specific to the respiratory conditions as presented in figure 4.4 and table 4.12 to 4.14 below. In this assessment prescribers had a combination of prescriptions for various respiratory conditions. The aim here was to assess whether individual prescribers were adherent or not to the 2008 STGs/EML then compare that with prescribers' job and training profiles.

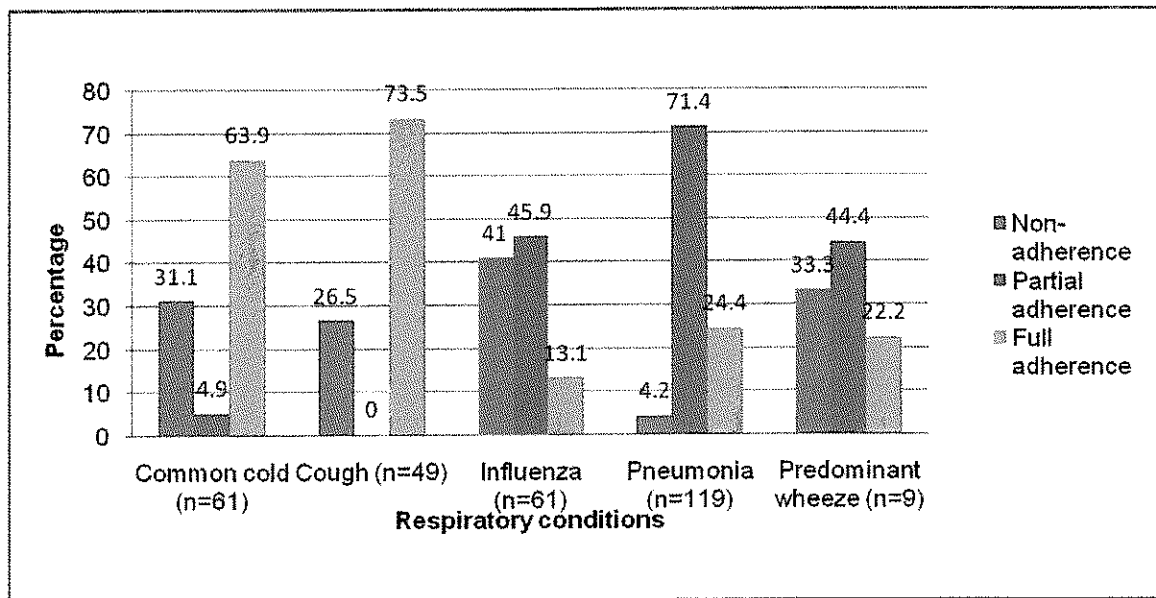


Figure 4.2: Adherence to the 2008 PHC STGs/EML in each diagnostic group

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Non-adherence was observed in the treatment of influenza (41.1%; 25/61), predominant wheeze (33.3%; 3/9), common cold (31.1%; 19/61), cough (26.5%; 13/49) as well as in pneumonia (4.2%; 5/119).

Partial adherence was high in pneumonia (71.4%; 85/119), influenza (45.9%; 28/61) and bronchospasm/bronchiolitis (44.4%; 4/9) prescriptions.

Full adherence was found in the majority of the prescriptions for cough (73.5%; 36/49) and the common cold (63.9%; 39/61). Full adherence was comparatively low in prescriptions for pneumonia (24.4%; 29/119), bronchospasm/bronchiolitis (22.2%; 2/9) and Influenza (13.1%; 8/61).

Overall, 22% (66/300) and 40% (120/300) of the prescriptions were non-adherent and partially adherent respectively, whereas 38% (114/300) of the prescriptions were fully adherent as illustrated in Table 4.1.

Criteria used for assessing adherence

- **Full Adherence = 1 (100%)**

- If the treatment and dosages for the main diagnosis was correct although the duration of treatment was not written, the prescription was considered fully adherent. This was accepted because not all prescribers wrote treatment duration in the prescription book due to space constraints but some reported that they do mention it to the patient when dispensing.
- If the core treatment was prescribed with or without the symptomatic treatment like paracetamol, the prescription was still regarded as fully adherent. This was accepted because the symptoms will disappear once the main diagnosis is cured.

- The prescriptions with treatment written in trade names were also accepted as full adherent since the assessment was not focusing on generic prescribing. That is the reason trade names were used in this report.
- **Partial adherence = 0.5 (50%)**
 - If the treatment for the main diagnosis was correct but the dosages of the treatment were not correct, the prescription was regarded as partial adherent. Some prescribers were not indicating treatment dosages, if the treatment was correct these were assessed as partial adherent. Illegible prescriptions; such as those with diagnosis and some of the treatment prescribed that was readable but difficult to read dosages were assessed as partial adherent. This was done so because legally the prescription should be readable.
- **Not adherence = 0 (0%)**

Prescriptions with incorrect treatment, missing the core treatment for the respiratory condition even if symptomatic treatment was prescribed were considered non-adherent. An exception was made for influenza; if paracetamol was not prescribed it was marked partially adherent since influenza is self-limiting. Prescriptions with antibiotics where they are not indicated like in URTI, common cold or cough/cold were assessed as non-adherent.

Note:

- **Influenza/flu prescriptions:** In influenza pain and fever exists therefore Paracetamol can be prescribed. If paracetamol was not prescribed the prescription was assessed as partially adherent since influenza is self-limiting within seven days, if paracetamol doses were incorrect it was also assessed as partially adherent.

- **Common cold prescriptions:** Treatment for common cold depends on the symptoms that patients present with. A prescriber may opt not to give treatment since the condition is self-limiting. If the prescription did not have any treatment for the common cold symptoms it was still regarded as full adherent since guidelines do not strongly advocate for treatment since the condition is self-limiting.
- **Dosing using age limits:** The STGs/EML uses different age ranges and some patients may fall in two age bands if on the borderline of the age range, e.g. for a three months old child the age bands according to STGs/EML is as follows: First age band- one to three months and second age band three to six months. In this case the second age band was considered. The reasoning behind taking the second age band is that the child may not be exactly three months but also not yet four months but somewhere between three and four months. Therefore the closest age the child will be is in the second age band.
- **Prescriptions written in ml vs. mg:** Items like amoxicillin has two strengths available i.e. 125mg/5ml and 250mg/5ml and some prescriptions were in ml not mg, in this case the closest to the correct dosage was considered for assessment.

Table 4.4: Reasons for partial adherence according to prescription audits (n=120)

Reason for Partial adherence	Number	%
Incorrect antibiotic dose	80	66.7
Incorrect Paracetamol dose	12	10
Failure to prescribe key medicine	12	10
Failure to record dosages in a prescription	14	11.7
Prescribing Ceftriaxone 250mg injection for non-severe pneumonia	1	0.8
Amoxicillin prescribed together with Erythromycin in the same prescription	1	0.8

The main reason for partial adherence was incorrect antibiotic dosages (66.7%).

4.3 RESULTS OF THE QUESTIONNAIRE (INSTRUMENT 2)

The results of the questionnaire are presented per section as in the tool used during data collection. The data from prescription audits is compared with the questionnaire responses in some sections.

Section 1: Biographic information

Table 4.5: Age in years (n=51)

Characteristics	Number of respondents	Percentage (%)
Age in years		
<36	19	37.3
36 – 45	19	37.3
46 – 55	6	11.8
>55	7	13.7

Prescribers' ages ranged from 26 to 73 years with a mean age of 45.25.

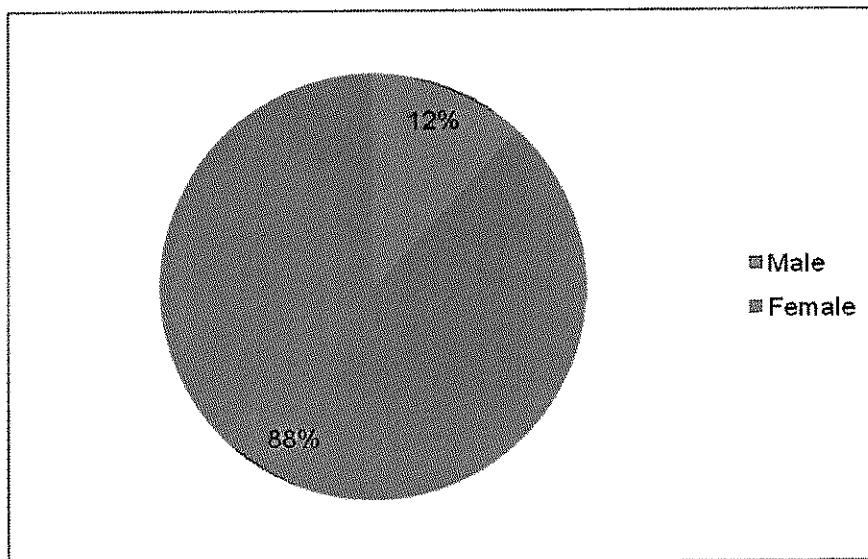


Figure 4.3: Prescribers gender distribution (n=51)

The majority of the prescribers were females.

Table 4.6: Post Matriculation qualifications (n=51)

Post matriculation qualifications (multiple options allowed)	Number	%
Enrolled Nurse	28	54.9
General Nurse	51	100
Midwifery	44	86.3
Community	29	56.9
PHC	25	49.0
Psychiatry	20	39.2
Other	11	21.6

Note: The above responses allowed multiple options that mean respondents mentioned more than one qualification from the above list.

The "Other" option (21.6%) represents the following courses completed: Orthopaedics, family planning and a financial management course.

Table 4.7: Job ranking (n=51)

Job ranking	Number	%
Operational Manager	13	25.5
Acting Operational Manager	1	2.0
Non-Operational Manager	37	72.5

Note: Operational Managers are those nurses who have managerial responsibility in that PHC facility, these nurses spend bigger percentage of their time doing administrative duties more than clinical duties. Non-Operational Managers are those nurses who spend bigger percentage of their time doing clinical duties more than administrative.

The majority (72.5%) of the prescribers were non-Operational Managers.

Comments:

Job Ranking, job designation/level

There were some misunderstandings in answering the questions pertaining to job ranking, job designation/ levels due to the changes in nurses' profession ranking that came with the introduction of OSD. The questions were developed with the previous ranking in mind. The following adjustments were made to clear the misunderstanding:

- Job ranking referred to managerial responsibility. At PHC level a nurse can either be an Operational Manager or a non-Operational Manager.
- Job designation/level referred to two streams of nursing categories that were introduced with OSD. Nurses with PHC qualifications are regarded as Clinical Nurse Practitioners while a nurse without a PHC qualification is regarded as a professional nurse. The grading of the levels were dependent on the number of years of experience but most of the nurses were not clear of the grade category they fall in as OSD was recently introduced.

Table: 4.8 Job designations (n=51)

	Number	%
Clinical Nurse Practitioner	25	49.0
Professional Nurse	26	51.0

Note: For the purposes of this study Clinical Nurse Practitioners are those nurses who have obtained PHC qualifications. Professional nurses are those who don't have PHC qualification.

Table 4.9 Prescribing experience (n=51)

Years of experience in prescribing: post-training	Number	%
<6	9	17.6
6 – 10	14	27.5
11 – 15	15	29.4
>15	13	25.5
Minimum experience	0	
Maximum experience	44	
Mean	12.49	
Standard deviation	8.26	

Note: Some of the nurses started prescribing while they were enrolled nurses not qualified as professional nurses. In this case they were practicing outside their scope of practice since only professional nurses are allowed to consult patients and prescribe medication at PHC level. This was done due to the shortage of professional nurses. Their length of experience in prescribing was counted from the time they started prescribing even if they were not yet qualified as professional nurses.

Prescribers' prescribing experience ranged from 0 to 44 years with a mean of 12.49 years.

Table 4.10: PHC experience (n=51)

Years of experience in PHC: post-training	Number	%
<6	11	21.6
6 – 10	15	29.4
11 – 15	14	27.5
>15	11	21.6
Minimum experience	0	
Maximum experience	31	
Mean	11.29	
Standard deviation	6.91	

Length of experience in PHC ranges from 0 to 31 years with a mean of 11.29 years.

Table 4.11 Training received (n=51)

Training received by prescribers (multiple options allowed)	Number	%
PHC training	7	13.7
Dispensing course training	8	15.7
Training in both PHC and dispensing	19	37.3
No training obtained	17	33.3
IMCI trained	30	58.8
IMCI not trained	21	41.2

Note: IMCI training was marked as other in addition to the first four choices in the above table, therefore all respondents indicated if IMCI trained or not.

More prescribers (37.3%) were trained in both PHC and dispensing than in either one of the courses alone. The majority of the prescribers were also IMCI trained.

4.3.1 Specific prescribers' adherence to the 2008 PHC STGs/EML

The individual prescriber's results of his/her own prescriptions audited were linked with the questionnaire responses for that particular prescriber. The prescriptions were coded with the same code as the questionnaire that was answered by that prescriber.

Table 4.12: Full adherent prescribers (n=50)

Number	Prescriber
1	NN 02
2	JJ 01
Total full adherent prescribers	2 (4%)

Table 4.13 Partial adherent Prescribers (n=50)

Number	Prescriber	Number	Prescriber	Number	Prescriber
1	KK 02	13	QQ 02	25	PP 02
2	LL 01	14	RR 01	26	QQ 01
3	MM 01	15	FF 01	27	II 02
4	MM 02	16	SS 01	28	JJ 02
5	AA 01	17	SS 02	29	JJ 03
6	AA 02	18	TT 01	30	KK 01
7	AA 03	19	CC 02	31	DD 01
8	BB 02	20	DD 02	32	OO 02
9	NN01	21	EE 02	33	OO 03
10	CC 01	22	GG 01	34	FF 03
11	NN03	24	HH 01	35	HH 03
12	OO 01	24	HH 02	36	II 01
Total partial prescribers					36 (72%)

Table 4.14: Non adherent prescribers (n=50)

Number	Prescriber	Number	Prescriber
1	BB 01	7	EE 03
2	KK 03	8	PP 01
3	LL 02	9	FF 02
4	LL 03	10	RR 02
5	MM 03	11	SS 03
6	EE 01	12	TT 02
Total prescribers	12 (24%)		

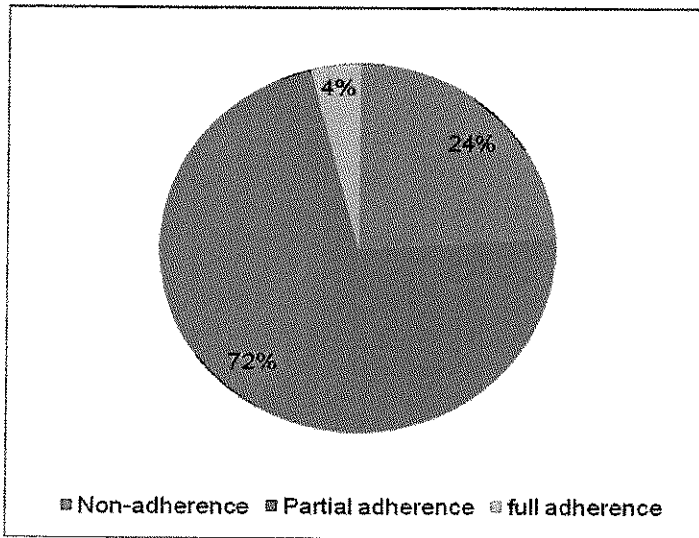


Figure 4.4: Overall prescribers' adherence levels (n=50)

The majority of the prescribers (72%; 36/50) were partial adherent.

4.3.2 Adherence compared to prescribers' job and training profiles

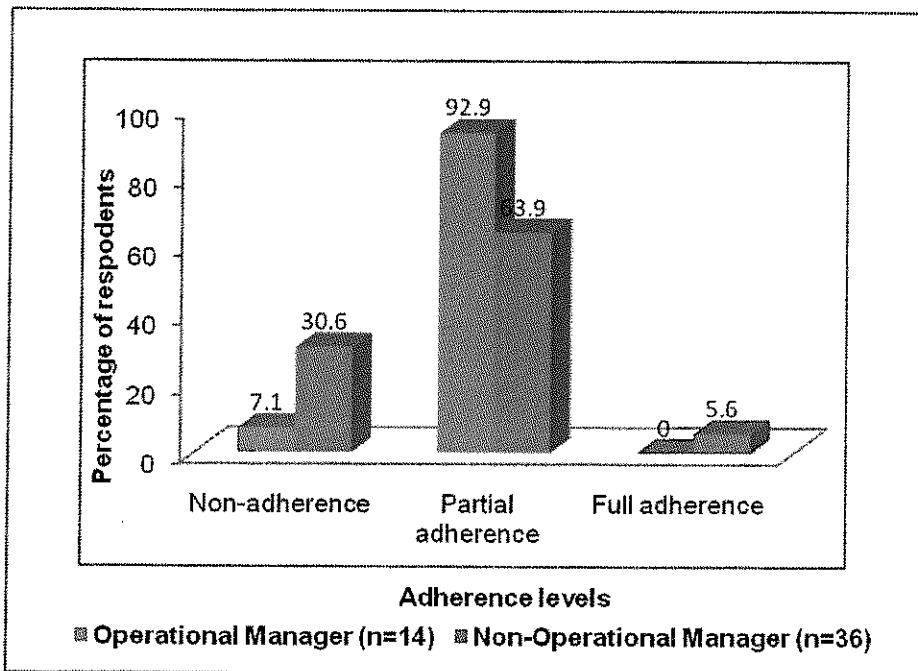


Figure 4.5: Prescribers' adherence compared to job ranking

The majority of OPMs (92%; 13/14) were partial adherent to the 2008 PHC STGs/EML for respiratory conditions in children. More non-OPM (five point six percent) than OPMs displayed full adherence.

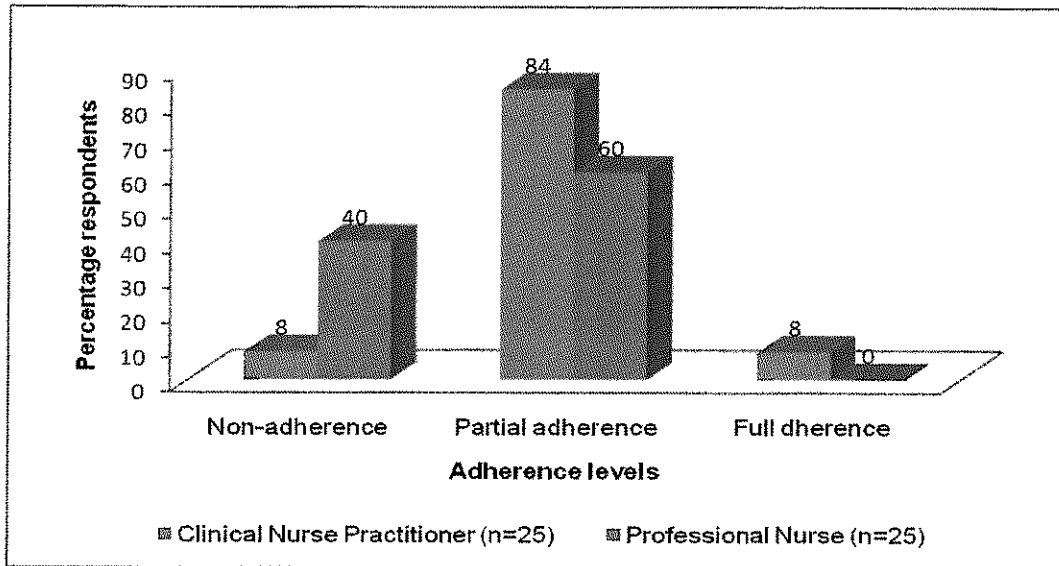


Figure 4.6: Prescribers' adherence compared to job designations

The majority of Clinical Nurse Practitioners (84%; 21/25) were found to be partial adherent to the 2008 PHC STGs/EML for respiratory conditions in children.

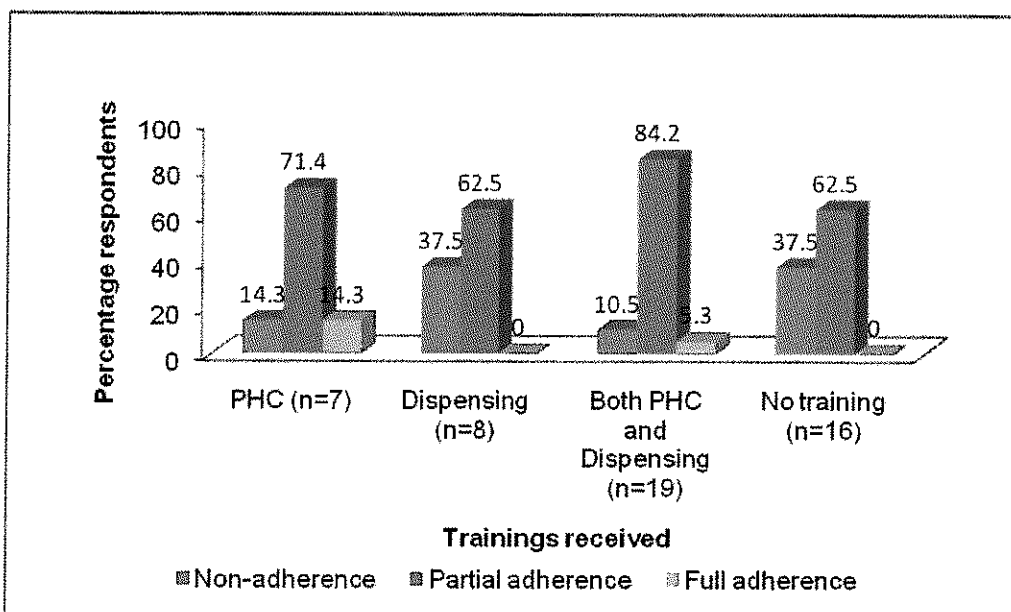


Figure 4.7: Prescribers' adherence compared to training received

More prescribers (76.5%; 26/34) were partially adherent to 2008 PHC STGs/EML for respiratory conditions in children irrespective of the training received.

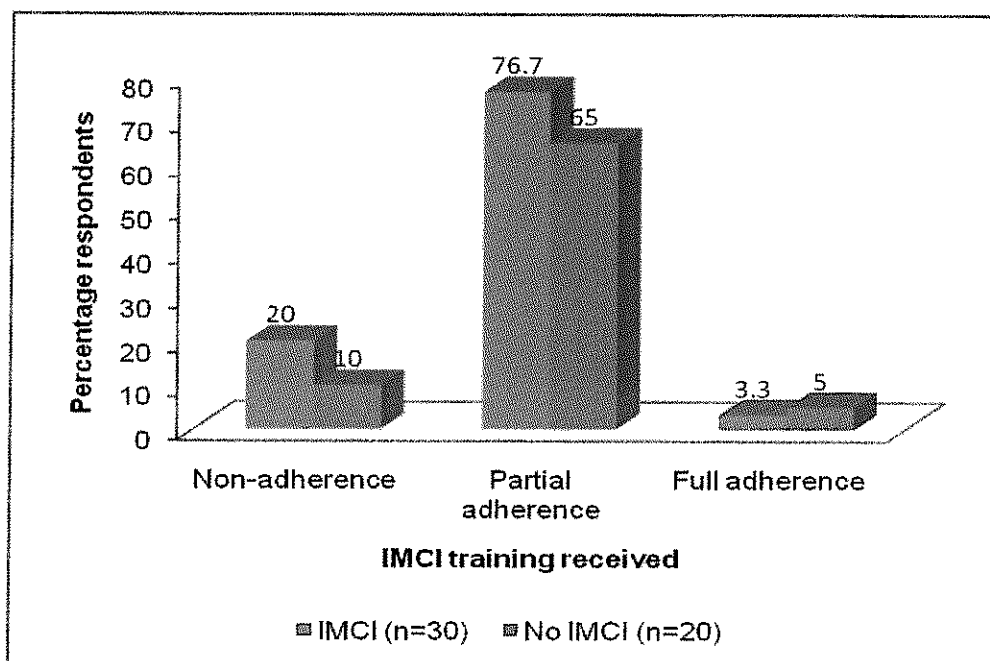


Figure 4.8: Adherence levels compared to IMCI training

Prescribers with IMCI training were 76.7% (23/30) partial adherent and 65% (13/20) of prescribers with no IMCI training were partial adherent to the 2008 PHC STGs/EML for respiratory conditions in children.

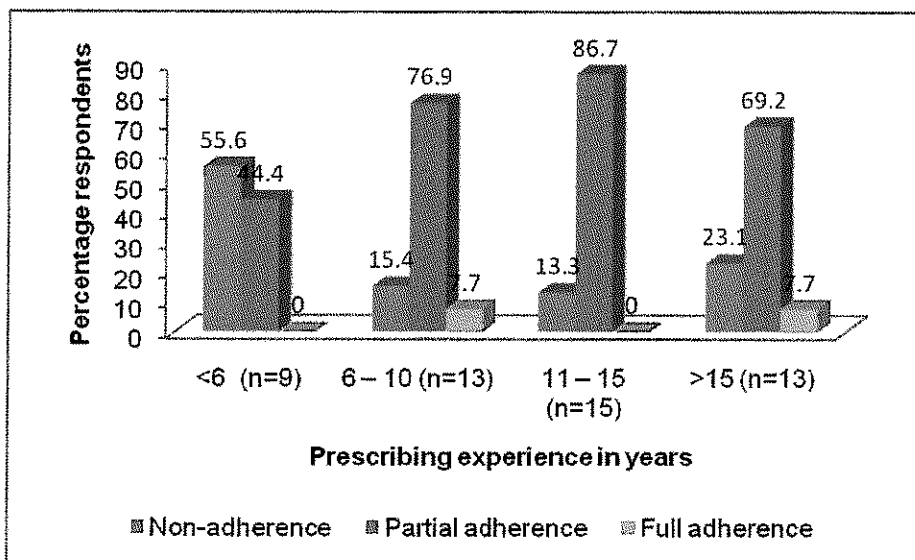


Figure 4.9: Prescribers' adherence compared to experience

The percentage of prescribers who were partial adherent to the 2008 PHC STGs/EML for respiratory conditions in children increased with an increase in prescribing experience, as illustrated in Figure 4.9 above. The trend changed among the prescribers with over 15 years of experience.

Conversely, percentage of prescribers who were non-adherent to the 2008 PHC STGs/EML for respiratory conditions in children decreased with an increase in their prescribing experience, with the exception of those with over 15 years of prescribing experience.

4.3.3 Possible factors impacting on prescribers' adherence

Section 2: Prescribers' perception on their adherence

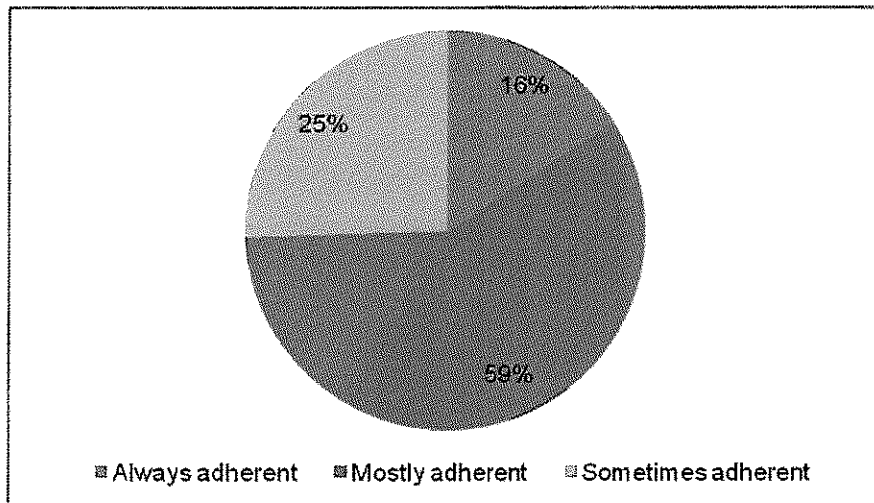


Figure 4.10: Prescribers' perceived frequency of adherence (n=51)

The majority of the prescribers (59%) thought they mostly adhere to respiratory condition guidelines. Prescribers (53.5%) listed the following as amongst the reasons that impacted on their adherence to the 2008 PHC STGs/EML:

- Failure to accurately diagnose especially if they don't understand the condition.
- High patient work load which makes it difficult to open the 2008 PHC STGs/EML during consultation and end up using previous knowledge.
- Using IMCI guidelines.

In addition to the above reasons some prescribers mentioned the following reasons as impacting on their adherence:

- Inadequate 2008 STGs/EML availability and medicine "stock-outs".
- Poor therapeutic response from the recommended treatment regimen or re-occurring condition forces them to deviate from the 2008 PHC STGs/EML, especially if speedy recovery is desired then they opt to give stronger antibiotics.
- Suspected penicillin allergy as part of the factors impacting on their adherence.

Section 3: Medicine availability and prescribers' knowledge of their use

Table 4.15: Prescribers' rating of medicine availability (n= 51)

Item	Always		Mostly		Sometimes		Never		Unsure	
	n	%	n	%	n	%	n	%	n	%
Adrenaline 1mg/ml (1:1000) injection	49	96.1	1	2.0	1	2.0	0	0	0	0
Amoxicillin 250mg/ 500mg capsules	44	86.3	7	13.7	0	0	0	0	0	0
Amoxicillin for oral suspension 125mg/5ml or 250mg/5ml	44	86.3	7	13.7	0	0	0	0	0	0
Budesonide 100mcg inhaler 300 doses	43	84.3	4	7.8	4	7.8	0	0	0	0
Ceftriaxone 250mg injection	49	96.1	2	3.9	0	0	0	0	0	0
Co-trimoxazole suspension 100ml	50	98.0	1	2.0	0	0	0	0	0	0
Erythromycin Estolate 250mg tablets	42	82.4	8	15.7	1	2.0	0	0	0	0
Erythromycin Estolate 125mg/5ml suspension 100ml	42	82.4	7	13.7	2	3.9	0	0	0	0
Fenoterol inhalation solution 0.5mg/2ml	37	72.6	7	13.7	0	0	6	11.8	1	2.0
Hydrocortisone Sodium Succinate injection 100mg/vial	48	94.1	1	2.0	2	3.9	0	0	0	0
Ipratropium bromide inhalation solution 0.25mg/2ml	33	64.7	5	9.8	3	5.9	6	11.8	4	7.8
Paracetamol elixir 125mg/5ml 50ml	44	86.3	6	11.8	1	2.0	0	0	0	0
Paracetamol 500mg tablets	46	90.2	5	9.8	0	0	0	0	0	0
Prednisone 5mg tablets	46	90.2	4	7.8	0	0	0	0	1	2.0
Salbutamol metered inhaler 300 doses	43	84.3	5	9.8	3	5.9	0	0	0	0
Sodium Chloride 0.9% nose drops	41	80.4	5	9.8	5	9.8	0	0	0	0

On average over 85% of the prescribers reported that all respiratory medicines were always available. The availability was reported by prescribers during the structured interview. However, a verification of the records on stock cards to confirm the stock availability was not included in this study. Amoxicillin was reported to always be available by 86.3% (44/51) of the prescribers in both formulations. Paracetamol elixir and paracetamol tablets also had high availability with 86.3% and 90.2 % respectively.

Table 4.16: Practices when prescribed medicine not available (multiple responses allowed) (n = 22)

Alternative practices	Number	%
Do nothing	2	9.1
Prescribe another drug	14	63.6
Refer the patient to another health facility	7	31.8
Refer the patient to the hospital	4	18.1
Other	2	9.1
Not applicable	29	56.9

Note: Some of the respondents undertook more than one action from the above list

Not applicable refers to respondents who did not experience stock out

The term drug is used instead of medicine in this table as it was written like that in the questionnaire

Only 43% (22/51) of the prescribers experienced non availability of medicines. Table 4.16 above illustrates alternatives provided by prescribers who experienced "stock-out" of medicine used to treat respiratory conditions.

Other alternatives included borrowing from other health facilities and placing emergency orders, which would be delivered the next day.

Not applicable referred to prescribers who did not experience "stock-out" of the medicine used to treat respiratory conditions and these were excluded when percentages were calculated. The most common alternatives were to prescribe another drug (63.6%) and to refer the patient to another facility (31.8%).

Table 4.17 Choice of replacement medicine (n=17)

Medicine ran out of stock	First choice replacement	Second choice replacement
Amoxicillin (13)	Erythromycin (11)	Penicillin VK (1), Ceftriaxone (1)
Erythromycin (1)	Amoxicillin (1)	
Adrenalin injection (1)	Salbutamol Nebuliser (1)	
Cotrimoxazole (1)	Penicillin VK (1)	
Penicillin VK (1)	Amoxicillin (1)	

Note: Multiple responses allowed where responded mentioned two items being out of stock and chose more than one replacement medicine, i.e. for one patient may run out of Amoxicillin and replace it with Erythromycin and in other patient ran out of Amoxicillin and replace it with Penicillin VK or Ceftriaxone.

Prescribers (43%; 22/51) who experienced medicine stock out reported amoxicillin (76.5%; 13/17) to be out of stock and in 85% (11/13) of the time it was replaced with erythromycin.

Table 4.18: Criteria for choosing replacement medicine

Reason for choosing replacement medicine	n=17	%
It works the same	2	12
Broad spectrum antibiotic	4	24
Second line antibiotic	1	6
Used in penicillin allergy	2	12
Wanted to dilate bronchi	1	6
Used in the previous guideline for respiratory condition	1	6
Also an antibiotic	3	18
Drug of choice	1	6
All work in respiratory conditions as per patient information leaflet	1	6
Fall on same category	1	6
Only item available	1	6

Note: Reasons given by respondents who prescribed another medicine when item prescribed was out of stock, some prescribers gave more than one reason.

There is wide variation in the reasons given by prescribers in the choice of replacement medicine.

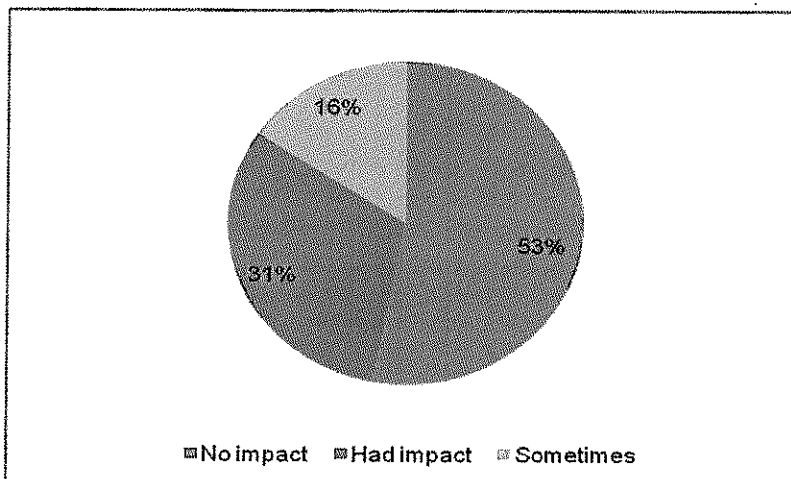


Figure 4.11: Perceived impact of medicine availability on adherence

The majority of prescribers (53%; 27/51) reported that the availability of medicine had no impact on their adherence.

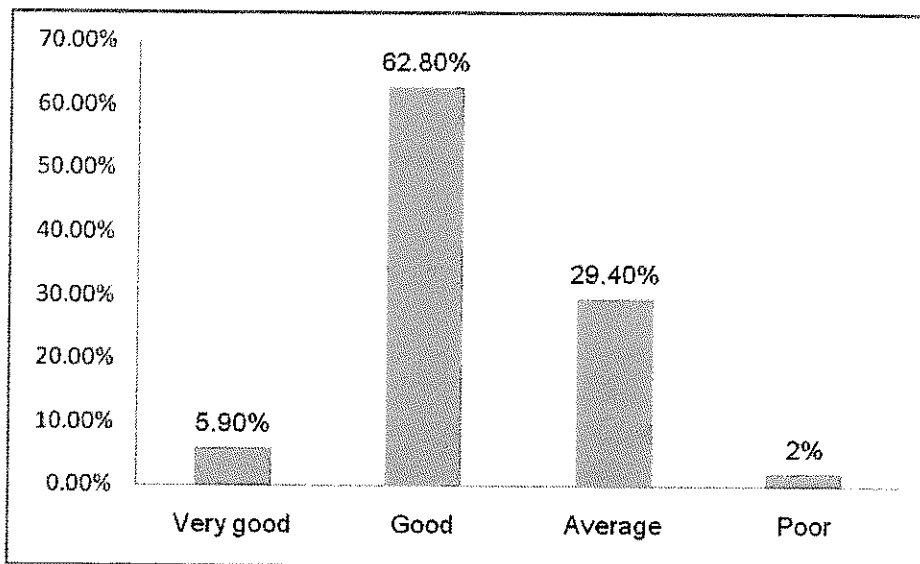


Figure 4.12: Perceived knowledge of medicine for respiratory conditions (n=51)

Prescribers' self-evaluation of their knowledge of medicine in relation to respiratory conditions indicated that most prescribers (62.8%; 32/51) perceived their knowledge as good.

Section 4: Prescribers' understanding of the 2008 PHC STGS/ EML

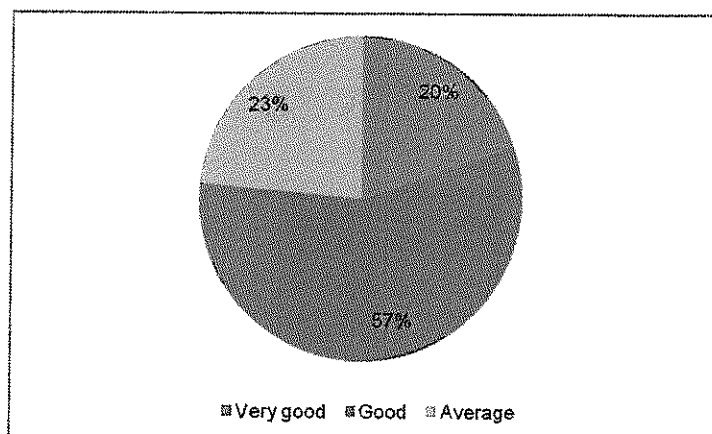


Figure 4.13: Perceived 2008 PHC STGs/EML content understanding (n=51)

Most prescribers (57%; 29/51) described their content understanding of the 2008 PHC STGs/EML to be good.

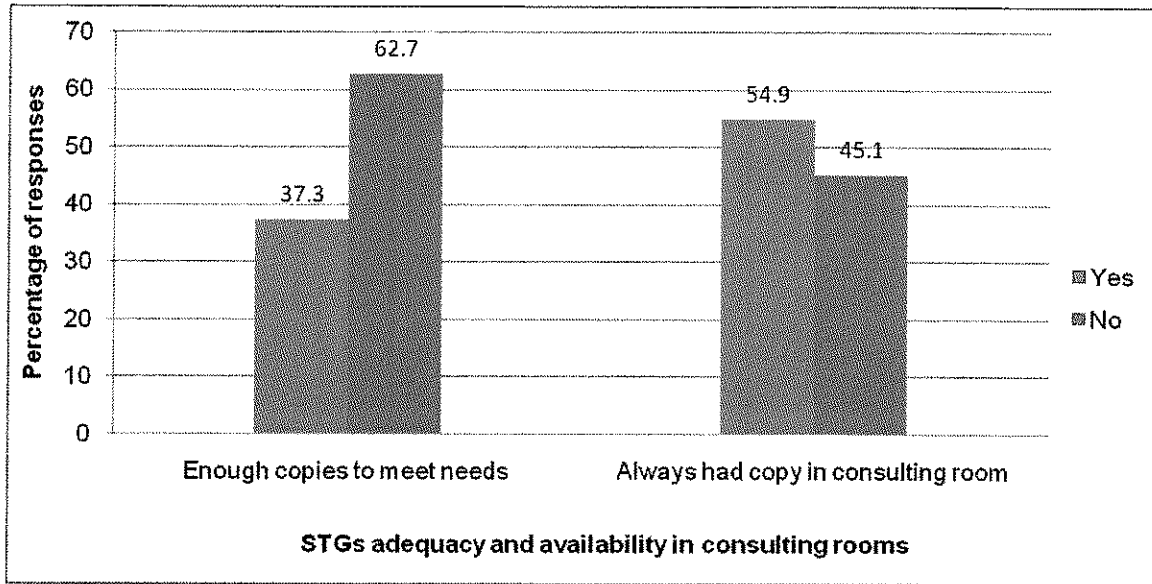


Figure 4.14: Adequate availability of 2008 PHC STGs/EML copies (n=51)

All (100%; 51/51) interviewed prescribers reported that they had copies of the 2008 PHC STGs/EML books in their facilities. However, the majority of the prescribers (62.7%; 32/51) stated that the 2008 PHC STGs/EML copies were not enough to meet their prescribing needs. These guidelines were also not always available since only 54.90% (28/51) had a copy of the 2008 PHC STGs/EML in their consulting rooms during the consultation.

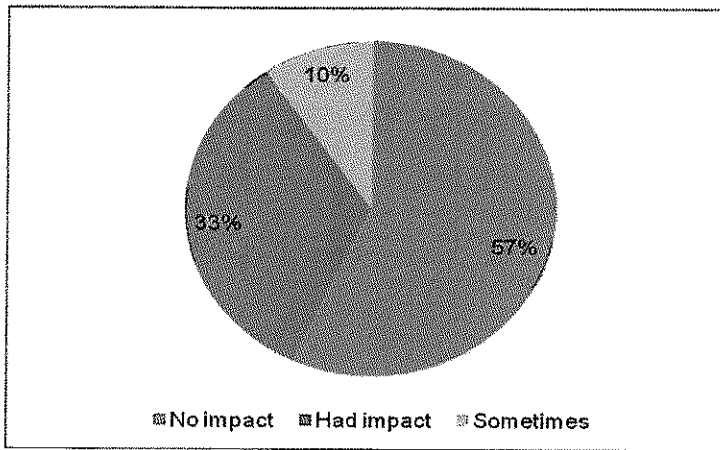


Figure 4.15: Perceived impact of the 2008 PHC STGs/EML availability (n=51)

The majority of prescribers (57%) claimed that the availability of 2008 PHC STGs/EML had no impact on adherence.

The majority of the prescribers (94%; 48/51) were also aware of other guidelines (IMCI) and PALSA PLUS (21.6%) used for the treatment of respiratory conditions. Of the prescribers that were aware of these other guidelines 95.8% (46/48) used these other guidelines as a supplementary resource for the treatment of respiratory conditions.

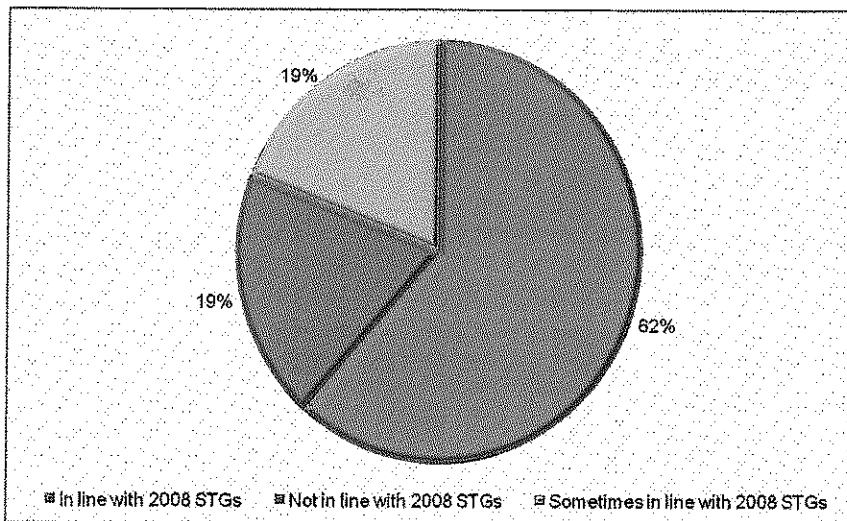


Figure 4.16: Alignment of the PALSA PLUS and IMCI guidelines to the 2008 PHC STGs/EML (n=47)

Prescribers' comparison of the other guidelines, which were mainly IMCI and PULSA PLUS, to the 2008 PHC STG/EDL book varied as illustrated by Figure 4.16. The majority of the prescribers (62%; 29/47) reported that these other guidelines were in line with the 2008 PHC STGs/EML.

Of the prescribers that found the other guidelines not to be always in line with 2008 PHC STGs/EML, 77.8% (14/18) preferred IMCI guidelines as opposed to 22.2% (4/18) that preferred the 2008 PHC STGs/EML. The reasons for their preference of IMCI varied widely, including that it is clearer, more detailed and updated.

Section 5: Diagnosis

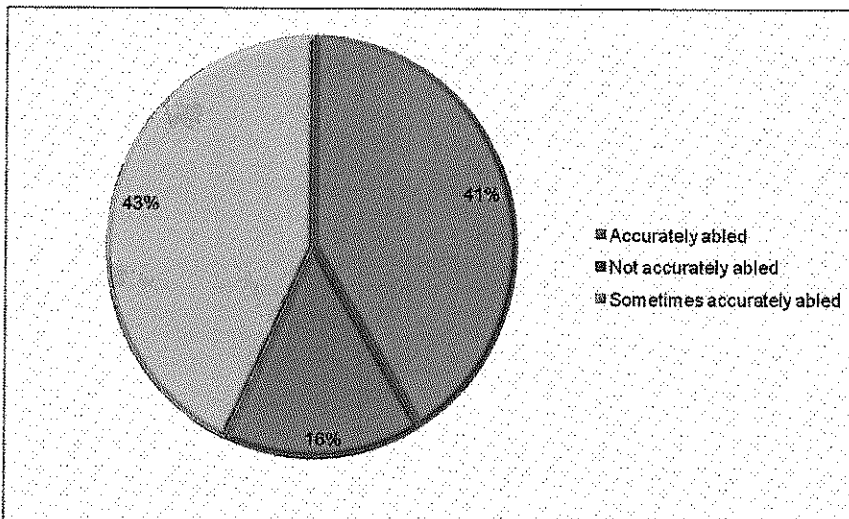


Figure 4.17: Perception of the ability to accurately diagnose respiratory conditions (n=51)

Only 41% (21/51) and 43% (22/51) of the prescribers reported that they are accurately able and sometimes accurately able to diagnose respiratory conditions respectively.

Reports of difficulty to accurately diagnose different respiratory conditions in children were attributed to:

- Cheer lack of experience or knowledge to diagnose respiratory conditions,
- Concomitant disease,

- Difficult clinical features not clearly defined in the 2008 PHC STGs/EML,
- Patients providing unclear history,
- Complicated signs and symptoms due to severity of the condition and difficulty in listening to chest wheeze when the child is crying.

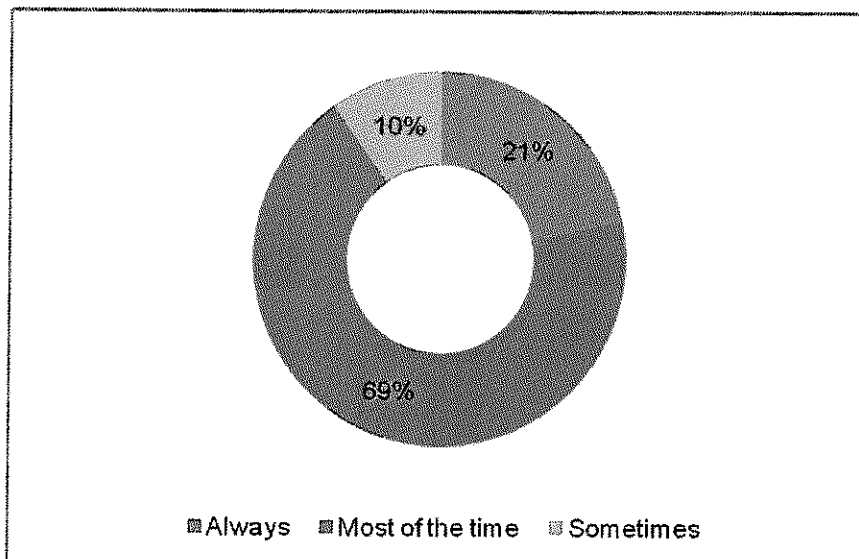


Figure 4.18: Perceived frequency of prescribing the correct treatment (n=51)

Of all the prescribers, 69% thought they were prescribing the correct treatment for respiratory conditions in children most of the time. Sixty percent of the prescribers reported failure to accurately diagnose the respiratory condition and the possible severity of disease due to concomitant diseases like HIV/AIDS and TB, high workload and unclear/ unreliable patient history as part of the reasons for not prescribing the correct treatment.

Few (7.3%; 3/41) prescribers reported medicine stock outs, inadequate 2008 PHC STGs/EML, lack of experience, information updates and training (PHC and IMCI) as part of the reasons for not adhering to 2008 PHC STGs/EML.

Section 6: Attitudes towards guidelines

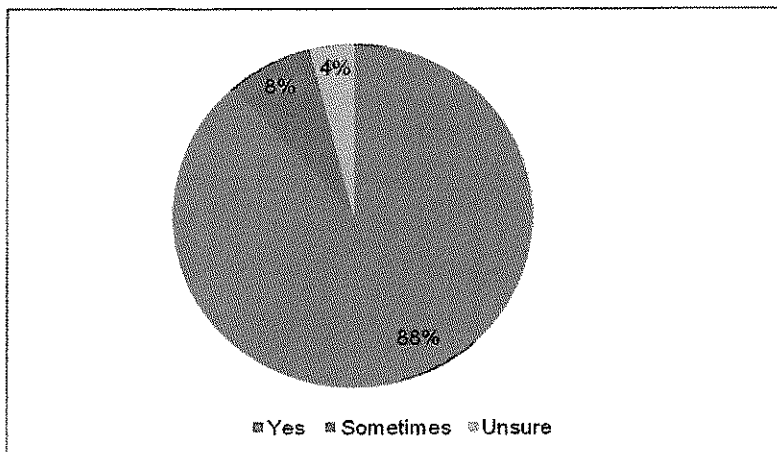


Figure 4.19: Rating of the help received from the 2008 PHC STGs/EML (n=51)

A majority (88%; 45/51) of prescribers thought that the 2008 helped them as the authorised prescribers to best treat respiratory conditions in children less than 12 years of age.

The majority of the prescribers (65.3%; 32/49) thought the 2008 PHC STGs/EML helped them because it guides them to the correct diagnosis and treatment; they don't have to think what to prescribe and the 2008 PHC STGs/EML also has non-drug treatment options. Some prescribers (22.4%; 11/49) thought the 2008 PHC STGs/EML helped them to best treat respiratory conditions because they saw positive patients' therapeutic outcomes confirmed by patients not coming back when asked to return if not better.

Other prescribers (37%; 18/49) even mentioned that they always refer to it during consultation as it helps in confirming the tentative diagnoses. According to these prescribers the 2008 PHC STGs/EML has all the information needed including medicine strengths and doses which helps them to prescribe the correct treatment regimen. They also found it to be simple, easy to understand, helpful, well classified and good for children above five years. Others considered the 2008 PHC STGs/EML to be helpful as it updates their knowledge in the current clinical practice.

However, prescribers (25%; 1/4) who thought the 2008 PHC STGs/EML are not always helpful because sometimes patients don't get better and as a result they use another antibiotic. Some (50%; 2/4) said it is because they are used to IMCI guidelines and they assumed that IMCI guidelines were developed from the 2008 PHC STGs/EML. Of the prescribers that do not always find it helpful (25%; 1/4) considered it to have scanty information when comparing it with IMCI guidelines.

Prescribers who were uncertain if the 2008 PHC STGs/EML helped them reported that they felt it was compiled by people who are not perfect and who can also make mistakes. They also felt that it is mandatory to follow this guideline. Others (50%; 1/2) reported that they don't normally come across various respiratory conditions except for pneumonia.

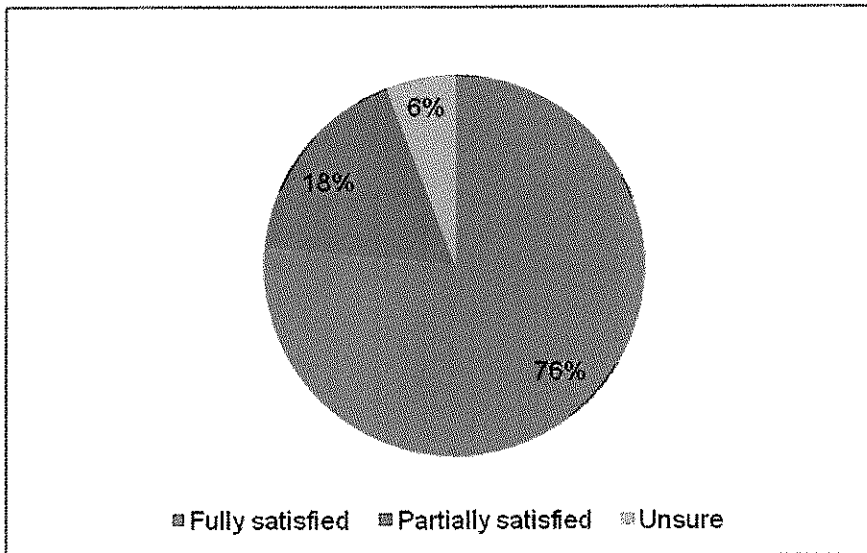


Figure 4.20: 2008 PHC STGs/EML treatment regimens satisfaction levels (n=51)

Most (76%; 39/51) prescribers were fully satisfied with the combination of treatment regimens. Prescribers (95%; 37/39) reported to be satisfied with the 2008 PHC STGs/ EML because they could notice improvement in patients' condition when prescribing according to the treatment regimens as in this guideline. According to these prescribers the improvement

in patients' condition is confirmed by patients not coming back if asked to return when not better or in some instances patients did come back to appreciate that they have been cured.

These prescribers were also satisfied with the 2008 PHC STGs/ EML because the signs and symptoms always tally with treatment regimens which are always relevant and effective. This guideline also includes symptomatic treatment and differentiates between treatment of children and adults. Their high satisfaction level is also attributed to the fact that they found this guideline to be clear, understandable, user friendly and helpful in such a way that there is nothing they feel like removing or adding to this guideline. They even added that if you know the book very well it is easy to use.

Some felt that the current version of the 2008 PHC STGs/EML has more information than the previous one and it helps to treat patients as it is also aligned to other wellness programs such as vitamin A supplementation and routine deworming. In addition, the satisfaction of prescribers with the 2008 PHC STGs/EML was based on the assumption that it was compiled after thorough research and as a result they trusted it.

Partial satisfaction of the prescribers (22%; 2/9) was based on the feeling that the 2008 PHC STGs/EML used the same medicine for different respiratory conditions i.e. amoxicillin. However, prescribers (11%; 1/9) sometimes felt that treatment recommended was not enough and as a result they were tempted to add more. In certain instances prescribers (22%; 2/9) were even aware of useful medicine but not in the 2008 PHC STGs/EML and fear to prescribe if not recommended in the guideline. Some of the prescribers (11%; 1/9) were dissatisfied because patients were not responding to treatment having followed the 2008 PHC STGs/EML. Other prescribers (11%; 1/9) were partial satisfied because the 2008 PHC STGs/EML only focuses on bacteriostatic and not bactericidal antibiotics.

The partial satisfaction of other prescribers (11%; 1/9) was due to the lack of relevant training (PHC and IMCI training). Others (11%; 1/9) indicated that they don't normally see various respiratory conditions except pneumonia.

Adhering to the 2008 PHC STGs/ EML was seen by most prescribers (92.2%; 47/51) as certainly helpful in achieving treatment outcomes of respiratory conditions in children while seven point eight percent thought it sometimes helped them. At the time of this study, about 31.4% (16/51) prescribers reported an experience of children not responding to treatment, despite having correctly followed the 2008 PHC STGs/ EML. This trend was infrequent since most of these prescribers (43.8%; 7/16) reported having this experience once.

Reasons for non-response to treatment having followed the 2008 PHC STGs/EML were associated with among other things, presence of underlying causes, incorrect diagnosis, concomitant disease and patients not adhering to prescribed treatment. When such an experience occurred, prescribers (87.5%; 14/16) normally referred the patients to hospital.

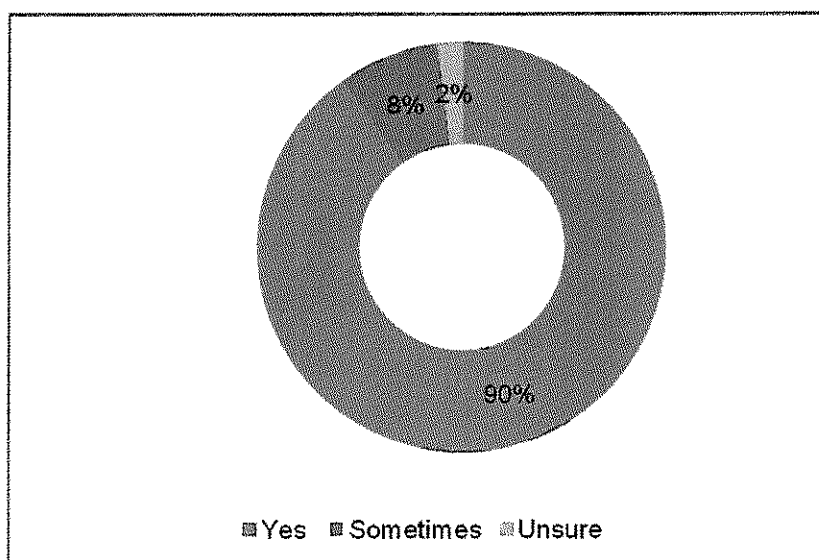


Figure 4.21: Motivational levels to use the 2008 PHC STGs/EML (n=51)

Most prescribers were definitely (90%; 46/51) motivated to use the 2008 PHC STGs/ EML when treating children with respiratory conditions and eight percent (4/51) were only sometimes motivated.

The main reason given by prescribers for their motivation to use 2008 PHC STGs/ EML was due to the fact that the patients' condition improved and this was confirmed by the patients'

feedback. Prescribers that were still new in the field felt that the use of these guidelines provides an avenue for professional growth; while those that have been in the practice longer felt that it updated their knowledge with the current treatment practices and helped them to diagnose the patients as they enter the consulting room. Others (four percent; 2/46) even felt that these guidelines put them at the same level as the doctors and they don't experience problems when using it.

Supervision also played an important role as some prescribers felt motivated by the fact that their seniors gave them these guidelines and constantly encouraged them to use the latest versions. These guidelines helped them to best manage the patients when supervisors are not around to give guidance. Training was found to motivate prescribers as these guidelines were part of the lectures in the PHC course.

Some prescribers (43%; 20/46) felt motivated to use the 2008 PHC STGs/EML because it is clear, understandable, serves time, well classified according to disease condition and very much helpful. The prescribers felt guided to the correct diagnosis and treatment; this boosted their confidence as they knew exactly what to do when using these guidelines.

Prescribers who were partially motivated to use the 2008 PHC STGs/EML felt that these guidelines used the same treatment for all conditions especially with the antibiotics, unlike the previous editions. Others felt partially motivated by the fact that patients' conditions were not improving when using the 2008 PHC STGs/EML and as a result they ended up using other guidelines. Lack of familiarity with the 2008 PHC STGs/EML also contributed to the feeling of partially motivated and these prescribers preferred to use the IMCI guidelines since they found them to be clearer. Absence of PHC and IMCI training resulted in some of the prescribers feeling partially motivated to use the 2008 PHC STGs/EML.

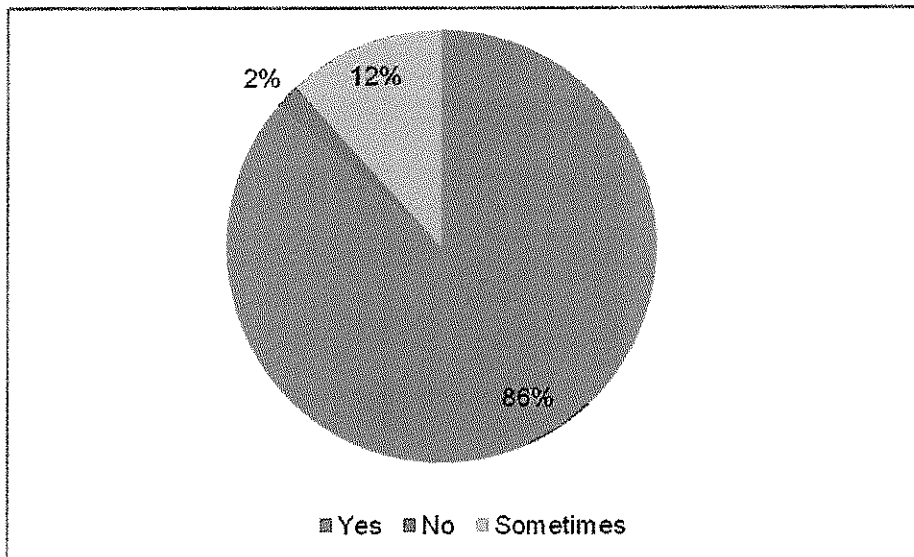


Figure 4.22: Rating of finding it easy to use the 2008 PHC STGs/EML (n=51)

Eighty six percent (44/51) of the prescribers found it easy to refer to 2008 PHC STGs/ EML during consultation. Enabling factors which assisted the prescribers to find it easy to refer to the 2008 PHC STGs/ EML during the consultation include the following:

- Availability of the 2008 PHC STG/EML.
- Index and the way the 2008 PHC STG/EML is arranged.
- Having a tentative diagnosis.
- Assessments of patients' signs and symptoms then compare it with what is in the 2008 PHC STGs/ EML to arrive at a final diagnosis.
- Familiarity with the 2008 PHC STGs/ EML in such a way that you even know the page numbers.
- Telling the patient that *"I will use the STGs/EML book so that I will be sure that I am giving the correct treatment."*

For those who did not always find it easy to refer to these guidelines, the main reasons were due to high patient volume, patient being impatient and insufficient copies of guidelines.

Section 7: Implementation strategy and monitoring and evaluation

From the 51 prescribers 80.4% were not orientated on the 2008 PHC STGs/ EML when the latest version was introduced. For prescribers orientated on the 2008 PHC STGs/ EML (19.6%; 10/51) reported that it was never conducted formally, some reported it was conducted within two to three hours by the supervisor or senior nurse while other said it was introduced to them as a revised guideline. Only 2/10 prescribers reported that it was done as part of their in-service training.

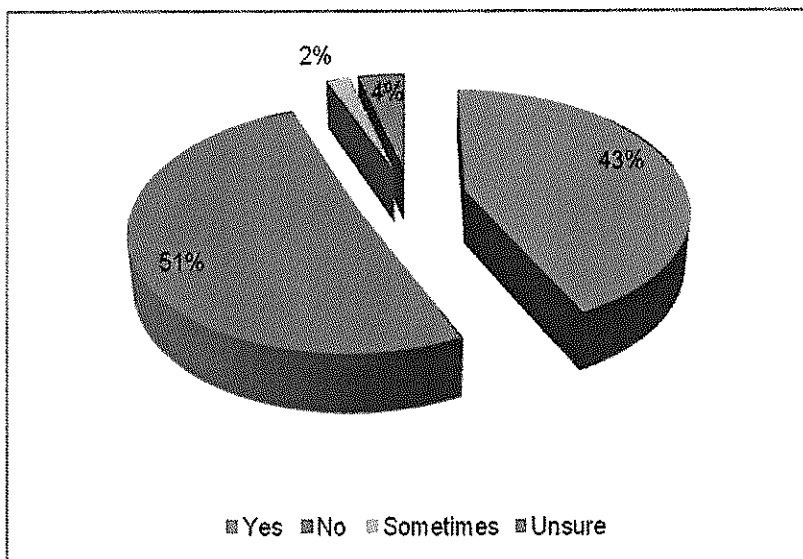


Figure 4.23: Prescribers’ whose prescriptions were audited (n=51)

At least more than half (51%; 26/ 51) of the prescribers never had their prescriptions audited by their supervisors for adherence with the 2008 PHC STGs/ EML. Prescribers who reported their prescriptions being audited (43%; 22/51) or sometimes audited (two percent; 1/51) for adherence to the PHC STGs/ EML said that it was done monthly while others reported non routine prescription audits performed either once or twice a year. These audits were reported to be last done in 2011 and some between 2009 and 2010. Most (87%; 20/23)) reported to have received feedback from the prescription audits. All prescribers 100% (20/20) who received feedback from the prescription audits believed that the prescription audits helped

them to improve their prescribing habits. Only 35.3% (18/51) prescribers have conducted self-audits to check how they have been prescribing against the 2008 PHC STGs/EML.

Prescribers reported that they decided to conduct self-audits in order to reflect on their prescribing practices with the aim of correcting their mistakes so that they don't repeat them. Some wanted to verify the feedback given by their supervisors and also did it as part of the preparation for another supervisory visit. Others conducted self-audits when they failed to refer to the 2008 PHC STGs/EML during consultation or have encountered a difficult case during consultation. Prescribers who received PHC training reported to have developed interest in the 2008 PHC STGs/EML as it is taught during classes and as a result they were motivated to conduct self-audits to reflect on their prescribing practices. The majority of the prescribers (94.1%; 48/51) also believed that self-audits could help them to adhere to 2008 PHC STGs/EML.

Prescribers believed that self-audits could assist them to reflect on their prescribing practices, identify their shortcomings and make corrections before exposing patients to danger or even before someone else identifies their non-adherence to the guidelines. They also felt that self-audits could boost their confidence level since it would enhance their knowledge and be able to assist them to treat respiratory conditions with useful medicine that is recommended by the guidelines. Some thought that self-audits could motivate them to use the 2008 PHC STGs/EML if the results of the self-audit indicated that they were adhering to the guidelines.

Contrary to the above, five point nine percent (03/51) prescribers didn't see value of the self-audit since they believed that they are always adhering and if in doubt they referred to the 2008 PHC STGs/EML during consultation. Others felt that it would be better if someone else assessed their prescribing habits because they are unsure what to look for when conducting a self-audit.

4.4 SUMMARY

The chapter presented the results of the prescriptions audited with adherence levels of the prescribers. Factors impacting on the adherence of prescribers at Umkhanyakude health district in treating respiratory conditions in children less than 12 years were also presented. Discussion on the above findings will follow in the next chapter.

CHAPTER 5

DISCUSSION

5.1 INTRODUCTION

The results of the study are discussed in this chapter. The discussion is done per objective of the study. The three objectives of the study were:

- To document the treatment prescribed to children up to 12 years of age for pneumonia, bronchospasm, chronic asthma, acute bronchiolitis, croup, common cold and influenza.
- To assess adherence of the authorised prescribers to the 2008 PHC STGs/ EML (DoH, 2008) in the treatment of the above mentioned conditions.
- To determine the factors which impact on deviations from the 2008 STGs/EML (DoH, 2008) by authorised prescribers in the treatment of the above mentioned conditions.

OBJECTIVE 1

5.2 TREATMENT PRESCRIBED TO CHILDREN UP TO 12 YEARS OF AGE FOR RESPIRATORY CONDITIONS ACCORDING TO PRESCRIPTION AUDITS

5.2.1 Respiratory disease conditions seen

Table 4.1 represented all respiratory conditions seen at Umkhanyakude Health District PHC facilities. Table 4.2 represented the commonly diagnosed respiratory conditions at Umkhanyakude Health District PHC facilities. Treatment prescribed to children up to 12 years of age for pneumonia, bronchospasm, common cold and influenza at Umkhanyakude Health District PHC facilities is presented in Table 4.3. Pneumonia was found to be the main respiratory condition seen at Umkhanyakude Health District PHC facilities accounting for

39.7% of the cases followed by the common cold, influenza (20.3% each) and cough (16.3%) as shown in Table 4.1.

The incidence of respiratory conditions was more prevalent in the prescriptions of children under five years of age as shown in figure 4.1. This confirms that in South Africa pneumonia and other LRTIs are still amongst the top five diseases that account for more than 50% of deaths in children less than five years of age (Worku, 2011). This has necessitated interventions such as the development of IMCI guidelines to reduce the high mortality and morbidity rate in children under five years of age (Woods, 2010). Survival of these children can be improved by improving access to basic health care services which includes strengthening clinical case management of respiratory conditions at PHC level especially in the rural areas (Kauchali, Rollins, Bland & van den Broeck, 2004).

During the prescription audits prescribers were mainly documenting symptom complexes rather than the diagnosis as outlined in the 2008 PHC STGs/EML. As a result some of the diagnoses appearing in Table 4.1 do not appear in the 2008 PHC STGs/EML. This practice was also found by Makhado, (2009) in the Limpopo province. Symptomatic diagnosis as opposed to specific diagnosis is believed to be as a result of diagnostic uncertainty where the prescriber is unable to come out with a proper diagnosis (Boonstra *et al*, 2002; Boonstra, Lindbaek & Ngome, 2005).

5.2.2 Treatment prescribed for respiratory conditions seen

The most commonly prescribed medicine for the above respiratory conditions at Umkhanyakude Health District was amoxicillin (52%) followed by paracetamol (37%) and mist tussi infans (20%) as seen in Table 4.3. This compared well with the study by Makhado (2009) in the Limpopo Province, Vhembe District where amoxicillin was prescribed in 57% of the prescriptions which were audited. Another study at Themba hospital in Mpumalanga Province by Danysz (2010) also showed that amoxicillin accounted for 21% of antibiotics prescribed. Unnecessary prescribing of multivitamins, antihistamines and cough mixtures

was also seen at Umkhanyakude Health District PHC facilities (Table 4.3). Prescribing of items unnecessarily increases cost and items per prescription should be kept as low as possible (Makhado, 2009).

5.2.2.1 Treatment prescribed for pneumonia

In the documented cases of pneumonia cases amoxicillin was prescribed in 92% of these cases (Table 4.3). This is in line with the 2008 PHC STGs/EML which recommends amoxicillin as the first line agent for pneumonia. Although amoxicillin was prescribed as the first line agent for pneumonia as per the 2008 PHC STGs/EML, prescribers (35%; 55/157) failed to document the dosage strengths that were prescribed and dispensed for amoxicillin suspensions which were supplied in 125mg/5ml and 250mg/5ml (Table 4.4). Amoxicillin was prescribed 157 times as shown in Table 4.3.

When prescribing amoxicillin suspension some prescribers were recording 5ml or 10ml but did not indicate the dosage strength (125mg/5ml or 250mg/5ml). The majority of the prescribers (66.7%) were also not prescribing the correct doses according to the age limits as set in the 2008 PHC STGs/EML for this antibiotic. Prescribers had knowledge of the first line agent for pneumonia but lacked knowledge of the dosages to be prescribed as seen in Table 4.4. The study in Limpopo, Vhembe district by Makhado (2009) found that prescribers were not appropriately recording frequency of dosing and duration of treatment.

Erythromycin suspension was prescribed in six percent of the pneumonia cases (Table 4.3). In the 2008 PHC STGs/EML erythromycin is reserved for penicillin allergic patients. These prescribers did not indicate the reasons for prescribing erythromycin in place of amoxicillin. Ceftriaxone IM (eight percent) was also amongst the agents that were prescribed for pneumonia (Table 4.3). In the 2008 PHC STGs/EML, ceftriaxone is indicated for severe pneumonia. However when this antibiotic was prescribed, some of the prescribers did not indicate whether the pneumonia was severe or not. It is important for prescribers to indicate whether pneumonia was severe or not for prescription audit purposes and also for patient

records, should the patient be consulted with a similar condition in future. These prescribers were not adhering to the requirements for legal prescriptions.

Paracetamol (45%) was mostly prescribed together with amoxicillin for pneumonia in line with the 2008 PHC STGs/EML (Table 4.3). The dosages for paracetamol were not prescribed according to age limits as recommended by the 2008 PHC STGs/EML.

The following treatment was prescribed for pneumonia but it is not recommended in the 2008 PHC STGs/EML (Table 4.3): Mist tussi infants (seven percent), Allergex[®] syrup (four percent) and multivitamin syrup (three percent). This practice was found by Boonstra *et al* (2002) in Botswana.

5.2.2.2 Treatment prescribed for common cold and influenza

Colds present with nasal stuffiness and throat irritation and in addition influenza presents with headache, muscular pain and fever (DoH, 2008). Some prescribers were documenting fever as a diagnosis whereas in the 2008 PHC STGs/EML fever is not indicated as a diagnosis, but rather as an underlying symptom of a disease condition. This practice was found by Makhado (2009) in the Vhembe District, Limpopo Province. Fever is very common in childhood but can indicate serious illness (Kerry, 2005). For the purpose of this study a fever diagnosis was classified under the influenza diagnostic group since it is one of the symptoms for influenza (Table 4.1).

The 2008 PHC STGs/EML recommends non medicine measures like steam inhalation and adequate hydration for common colds. This guideline further recommends paracetamol and sodium chloride 0.9% nose drops for influenza. Paracetamol was prescribed in 41% and 44% of the cases for common cold and influenza respectively (Table 4.3). Paracetamol is only recommended in the 2008 PHC STGs/EML for influenza and not for the common cold. Illiadin[®] nasal solution was prescribed in two percent of common cold cases and in three percent of influenza cases instead of sodium chloride 0.9% nose drops as shown in Table

4.3. The 2008 PHC STGs/EML recommends oxymetazoline nose drops (Illiadin®) for sinusitis therefore prescribing this agent for common cold and influenza was not in line.

Symptomatic treatment was mostly prescribed for common cold at Umkhanyakude Health District and included the following (Table 4.3): Allergex® (eight percent), cocillana (five percent), mist tussi infants (36%) and multivitamins (eight percent). Similar treatment was also prescribed in influenza cases (Table 4.3): cocillana (10%), multivitamins (two percent) and mist tussi infants (15%). Few influenza cases were prescribed symptomatic treatment when compared to the common cold except for cocillana. Prescribing of the symptomatic treatment for common cold and influenza was not in line with the 2008 PHC STGs/EML. Cough mixture is only recommended for bronchitis, acute in adults and adolescents in the 2008 PHC STGs/EML. Lemon & honey (25%) was also prescribed for common cold and influenza (two percent) in accordance with the IMCI guidelines as seen in Table 4.3. This indicates that some prescribers were using the IMCI guidelines in treating respiratory conditions in children.

Influenza and the common cold do not require antibiotics (DoH, 2008). However, amoxicillin (23%), ceftriaxone (two percent) and penicillin VK (three percent) were prescribed for the common cold (Table 4.3). These antibiotics were also prescribed for influenza (Table 4.3): amoxicillin (36%), ceftriaxone (two percent) and penicillin VK (eight percent) which is not in line with the 2008 PHC STGs/EML. According to the 2008 PHC STGs/EML penicillin VK is recommended for rheumatic fever, acute tonsillitis and pharyngitis. This practice of antibiotic misuse is similar to what was found by Alumran, Hurst & Hou in 2011 who found this antibiotic misuse significantly frequent in children, especially when presenting with viral URTIs. Similar treatment was prescribed for the common cold and influenza and one of the reasons might have been that the prescribers couldn't differentiate between the common cold and influenza.

5.2.2.3 Treatment prescribed for cough

Cough is one of the most common complaints that children present with at a health facility and the health practitioner needs to be efficiently able to identify the underlying disease course of the cough (Kerry, 2005). In the 2008 PHC STGs/EML cough is not indicated as a diagnosis but as an underlying symptom of a disease condition. The following cough mixtures were prescribed for cough: Cocillana in 18% of the times and mist tussi infans in 41% of the times as shown in Table 4.3. The 2008 PHC STGs/EML only allowed prescribing of cough mixture for symptomatic relief of bronchitis in acute adults and adolescents. Paracetamol was prescribed in six percent cough cases (Table 4.3) and this is not in line with the 2008 PHC STGs/EML. Lemon and honey was also prescribed eight percent of the cases (Table 4.3) in accordance with the IMCI guidelines to sooth the throat. IMCI guidelines have been implemented at PHC in more than 100 countries and it has improved the clinical practice skills especially for PHC nurses thus resulting in the improved quality of patient care (Woods, 2010). Amoxicillin was prescribed irrationally for cough in 16% of the cases as seen in Table 4.3.

5.2.2.4 Treatment prescribed for bronchospasm

Bronchospasm in children is usually associated with asthma, bronchopneumonia or bronchiolitis (DoH, 2008). Bronchospasm related conditions contributed three percent of all the respiratory conditions seen at Umkhanyakude Health District PHC facilities as presented in Table 4.1. Sixty seven percent of bronchospasm were associated with asthma as shown in Table 4.1. Treatment recommended for bronchospasm by the 2008 PHC STGs/EML include oxygen, salbutamol 0.5% solution, prednisone IV followed by oral, hydrocortisone IV, ipratropium bromide solution and budesonide or beclomethasone inhalation. The commonly prescribed medicine for bronchospasm related respiratory conditions was salbutamol which was prescribed in 56% of the documented cases followed by amoxicillin and Budeflam[®] (budesonide) which were prescribed 33% of the times each as shown in Table 4.3. Berotec[®]

nebulizer (fenoterol), ceftriaxone IV, cotrimoxazole suspension, multivitamin syrup and paracetamol were prescribed in 11% of the documented cases each (table 4.3). This was not in line with the 2008 PHC STGs/EML.

Salbutamol, Berotec® nebulizer and Budeflam® were prescribed in line with the 2008 PHC STGs/EML. Antibiotic prescribing (amoxicillin, cotrimoxazole and ceftriaxone) for bronchospasm related respiratory conditions was not in line with the 2008 PHC STGs/EML especially since the prescribers did not document the presence of infection. Prescribing of multivitamin and paracetamol was unnecessary since it had no value but increased the items per patient and the cost (Makhado, 2009).

5.2.3 Irrational use of antibiotics

URTIs like influenza and the common cold are usually caused by viruses and do not require antibiotics (WHO, 2012). There is insufficient evidence to support the prescribing of antibiotics in these respiratory conditions (Gray, 2008). A similar trend of prescribing antibiotics in URTIs was seen in Asia, America and Europe where 90% of children consulting for a common cold and acute bronchitis were prescribed antibiotics as a result of parents' demand (Huang *et al*, 2005). Inappropriate antibiotic prescribing for ARTI was also found in Botswana by Boonstra, Lindbank & Ngome in 2005. This is a serious global challenge as it does not only have cost implications but could lead to poor therapeutic outcomes and antibiotic resistance (WHO, 2012).

From the above results it is evident that inappropriate prescribing of antibiotics was seen at Umkhanyakude Health District PHC facilities for the following respiratory conditions: common cold and influenza, cough and bronchospasm (Table 4.3). This challenge of inappropriate prescribing of antibiotics for URTI is not only peculiar to PHC nurses but similar trends were seen in doctors (Holloway & van Dijk, 2011; Zoutman, Ford, Bassili, Cosby & Nakatsu, 2008). Contrary to the qualitative research findings by Higuchi *et al*, 2012 nurses displayed knowledge of appropriate antibiotics use. Misuse of antibiotics is a

worldwide challenge contributing to increased health costs, bacterial resistance, unnecessary adverse events ultimately resulting to increased morbidity and mortality (Holloway & van Dijk, 2011). There is a need to identify factors associated with inappropriate antibiotic prescribing in order to develop effective interventions such as professional education, public awareness campaigns, health practitioner-patient interactions and policy changes targeting antimicrobial resistance (Alumran, Hurst & Hou, 2011).

OBJECTIVE 2

5.3 ADHERENCE OF AUTHORISED PRESCRIBERS

The discussion below on the adherence of the authorised prescribers to the 2008 PHC STGs/EML overlaps between the prescription audits and the questionnaire results. Therefore it is done in two fold as presented in the results in chapter 4 above. The discussion will be as follows:

- Discussion on general adherence of authorised prescribers to the 2008 PHC STGs/EML for respiratory conditions in children up to 12 years of age from prescription audits as presented in Table 4.1 and Figure 4.2.
- Discussion on specific prescribers' adherence to the 2008 PHC STGs/EML for respiratory conditions in children up to 12 years of age from questionnaire results as presented in Tables 4.12 to 4.14 and Figures 4.4 then compared that to job and training profiles as presented in Figures 4.5 to 4.9 in the results chapter. Further discussion on this will be dealt with under objective 3.

5.3.1 Results of the prescription audits – general adherence

In order for an intervention to be effective a baseline study on adherence to recommended STGs/EML is important (Holloway & van Dijk, 2011). Adherence to the 2008 PHC STGs/EML for treatment of respiratory conditions seen at Umkhanyakude Health District

PHC facilities were presented in Table 4.1 and Figure 4.2. The adherence of PHC prescribers at Umkhanyakude Health District facilities to the 2008 PHC STGs/EML was categorised as full, partial and non-adherent and is discussed below.

5.3.1.1. Full adherence

Full adherence was seen in only 38% of the prescriptions for respiratory conditions in children at Umkhanyakude Health District PHC facilities (Table 4.1). Full adherence to the STGs/EML was found to be low in the Vhembe District PHC facilities, Limpopo where only 29.2% prescriptions adhered to the STGs/EML (Makhado, 2009). In Mpumalanga Danysz (2010) also found low adherence levels to STGs/EML at Themba hospital, where only four percent of antimicrobials prescribed for LRTI adhered to STGs/EML. Less than 40% of patients in the public sector are treated in accordance with the approved STGs/EML (Holloway & van Dijk, 2011). Contrary to the above studies, in Gauteng Military Health Services it was found that 84.9% of prescriptions by nurses adhered to the Military Medicine Code list (Engelbrecht, 2010).

Full adherence as depicted in Figure 4.2 was observed in the majority of the prescriptions for the treatment of cough (73.5%) and common cold (63.9%) and it was found to be low in the prescriptions for pneumonia (24.4%), bronchospasm (22.2%) and influenza (13.1%). The low percentage of full adherence indicates that the challenge of prescribers' adherence to the STGs/EML still exists.

5.3.1.2. Partial adherence

Partial adherence was seen in 40% of the prescriptions for respiratory conditions in children up to 12 years of age at Umkhanyakude Health District PHC facilities as presented in Table 4.1. Partial adherence was observed in the prescriptions for pneumonia (71.4%), influenza (45.9%) and bronchospasm (44.4%) as shown in Figure 4.2. Very few prescriptions for the common cold (4.9%) were partially adherent (Figure 4.2).

Only 70% of the pneumonia cases were treated with appropriate antibiotics and half of the acute viral respiratory tract infections were treated inappropriately with an antibiotic globally (Holloway & van Dijk, 2011). The above results from Umkhanyakude Health District PHC facilities compares well with the Holloway & van Dijk (2011) findings.

Incorrect dose prescribing (76.6%) was found to be the common reason for partial adherence as shown in Table 4.4, even if the medicine prescribed was correct for that particular respiratory condition. Rational use of medicine requires that appropriate medicine is prescribed for the correct condition in doses that meet individual patients' requirements for an adequate period of time and at lowest cost to the health service delivery (WHO, 2012). PHC prescribers at Umkhanyakude Health District were not practicing rational use of medicine when prescribing for respiratory conditions. Correct doses were not prescribed especially for paracetamol and antibiotics (amoxicillin and erythromycin) as seen in Table 4.4. There is a need to educate PHC prescribers at Umkhanyakude Health District facilities on the correct dosing for different antibiotics. Under dosing of antibiotics was found at Umkhanyakude Health District PHC facilities and this could result in poor therapeutic outcomes and has potential of developing resistance while overdosing results in wasteful expenditure and potential harm to the patient. This could be one of the reasons some prescribers felt the 2008 PHC STGs/EML treatment regimens were ineffective for treating respiratory conditions.

Failure to record doses prescribed and dispensed was another reason for partial adherence at Umkhanyakude Health District PHC facilities as shown in Table 4.4. This challenge of poor recording of information on patient files is normally experienced when conducting prescription audits to assess adherence to STGs/EML (Cheraghali *et al*, 2004). This study did not focus on the legal requirements of the prescriptions which includes amongst other things, recording frequency of dosing, generic prescribing, items per patient and duration of treatment; however the above was noted to be a challenge in most of the prescriptions

audited including brand name prescribing (Table 4.3) which was similar to findings by Makhado (2009).

5.3.1.3. Non-adherence

Twenty two percent of prescriptions were non-adherent to the 2008 PHC STGs/EML for the treatment of respiratory conditions in the Umkhanyakude Health District PHC facilities as shown in Table 4.1. Failure to adhere to the 2008 PHC STGs/EML was observed in the treatment of influenza (41.1%), bronchospasm (33.3%), common cold (31.1%), cough (24.5%) and pneumonia (four point two percent) as seen in Figure 4.2. Prescribing of antibiotics where not indicated was the main reason for non-adherence to the STGs for the above conditions. Non-adherence to STGs increases cost and decreases therapeutic outcomes (WHO, 2012). There is a need to identify factors contributing to inappropriate prescribing of antibiotics and to develop possible intervention/s to reduce this practice (Alumran, Hurst & Hou, 2011).

5.3.2 Specific prescribers' adherence

Most prescribers (72%) were partially adherent to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children up to 12 years of age at Umkhanyakude Health District PHC facilities as depicted in Figure 4.4 and Tables 4.12 to 4.14. The data from the previous studies only assessed adherence to the STGs/EML from randomly sampled prescription records of various prescribers, without much focus on individual prescribers' prescriptions.

OBJECTIVE 3

5.4 FACTORS IMPACTING ON PRESCRIBERS' ADHERENCE: RESULTS OF QUESTIONNAIRE

5.4.1 Biographic data

The majority (74.6%) of the prescribers were between ages 26-45 years and 88% were female as show in Table 4.5 and Figure 4.3 respectively. The nursing profession is still predominantly feminine and most are still within the reasonable employable workforce age. Most prescribers (78.4%) have more than six years prescribing experience which is reasonable to have gained enough PHC clinical practice experience (Boonstra *et al*, 2002). OPM accounted for 27.5% at the facilities sampled (Table 4.7), some of the OPMs were not sampled but all PHC facilities had one OPM as required by Department of Health.

All prescribers have received a general nursing qualification with varying percentages that have completed additional courses in midwifery, community nursing, psychiatry, and financial management (Table 4.6). Almost equal percentages of prescribers were clinical nurse practitioners (PHC trained) and professional nurses (not PHC trained) as seen in Table 4.8. This representation of clinical nurse practitioners at Umkhanyakude PHC facilities is not enough to meet the health needs of the population. Prescribers also completed IMCI training (58.8%) and PHC training (51%) as seen in Table 4.11. These are some of the additional courses required by nurses at PHC to enable them to best perform their clinical duties. Some prescribers also completed a dispensing course which is a legal requirement (DoH Government Gazette, 2011b).

The general nurse qualifications that the nurses at Umkhanyakude PHC facilities have do not prepare them well for the task of providing diagnostic and treatment care. Nurses working at PHC facilities should be properly trained in order to ensure quality patient care

(Mayers, 2010). There is still a need of more PHC trained nurses at Umkhanyakude Health District PHC facilities.

5.4.2 The association of adherence and prescribers' job and training profiles

A study by Boonstra *et al* (2002) in Botswana compared adherence to the STGs/EML with prescribers' job and training profiles i.e. training received, years of experience, job ranking, level of care and the geographic location of the health facility. Other studies have compared adherence levels of doctors vs. nurses (Engelbrecht, 2010). In this study doctors were more adherent than nurses. Danysz (2010) compared adherence levels per prescribing group i.e. Community Medical officers, Medical Officer Interns, Medical officer, Senior Medical Officer, Principal Medical Officers and Specialist Medical Officer. The results of this study were found to be erratic and difficult to draw deductions from.

Assessing overall adherence of prescriptions without focusing on individual prescriber's adherence may miss an opportunity to identify prescribers' job and training profiles that may impact on adherence to the STGs/EML. Factors influencing the use of STGs/EML include clinical nurse training, agreement with the STGs, positive perception of the changes coming with STGs/EML, development of the STGs/EML in a health policy framework, the understanding of and manageable STGs/EML contents and availability of supporting measures (Higuchi *et al*, 2012). However, limited literature was available for comparing prescribers' adherence to STGs/EML with prescribers' job and training profiles. The discussion on the results of the Umkhanyakude PHC prescribers' adherence to the 2008 PHC STGs/EML compared with prescribers' job and training profiles follows:

5.4.2.1. Prescribers' adherence compared to job ranking

The OPM previously called the clinic manager pre-OSD, at a PHC facility is the one who is in-charge of the clinic. In addition to patient consultation, the role of the OPM is to coordinate patient care activities together with administrative, financial and human resource management functions (Wentzel, 2008). In the OSD implementation, the OPM at PHC level should spend the majority of his/her time on administrative duties rather than consulting patients while non-OPM are expected to spend more time on patient clinical consultations. Due to challenges of increased workload and understaffing these managers find themselves doing less of the managerial responsibilities and spend most of their time on clinical patient management (Pillay, 2009).

The majority (92.9%) of the OPMs were partial adherent to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children as compared to non-OPM (63.9%) as seen in Figure 4.5. Full adherence was only seen in non-OPMs (five point six percent) although numbers were too small to draw any conclusion from. More non-OPMs (30.6%) were non-adherent compared to OPMs (seven point one percent). No definitive connection between job ranking and adherence could be found.

5.4.2.2. Prescribers' adherence compared to job designations

Job designation refers to a clinical nurse practitioner versus a professional nurse. A clinical nurse practitioner is a registered nurse who has received extra training that enables him/her to make a diagnosis and treat conditions at PHC level (Bateman *et al*, 2009). The clinical nurse practitioner have a level of autonomy which is different from that of a registered professional nurse who received just basic nursing training which do not prepare them sufficiently for the task of diagnosing and treating patients at PHC level (Mayers, 2010).

The majority of the clinical nurse practitioners (84%) were partially adherent to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children compared to the

professional nurses who were found to be 60% (partially) adherent as illustrated in Figure 4.6. Full adherence was only seen in clinical nurse practitioners and clinical nurse practitioners had fewer non-adherences (eight percent) than professional nurses. The higher adherence of clinical nurse practitioners to STGs compared to professional nurse's suggest that additional PHC post-basic training received by clinical nurse practitioners enables them to provide better care to patients at PHC.

5.4.2.3. Prescribers' adherence compared to training received

The PHC course is a post basic one year training course in diagnostics and pharmacology. This course provides nurses with additional knowledge, skills and attitudes to assess and treat patients at PHC (Mayers, 2010). Most prescribers were partially adherent to the 2008 PHC STGs/EML irrespective of the training as seen in Figure 4.7. However, prescribers who completed a dispensing course had the same non-adherence (37.5%) as the prescribers who received no training. Full adherence was only found in prescribers with PHC training (14.3%) and in those with both PHC and dispensing course (five point three percent) training. This confirms that the PHC training does provide to some degree nurses with additional skills that enables them to assess, diagnose and treat patients (Mayers, 2010). However there is still a need to improve as these nurses were not fully adherent. This study does not support claims by Bateman *et al* (2009) that the PHC post basic training received by nurses has not led to improvement in the quality of care provided.

IMCI training was introduced in South Africa in 1996 by WHO and UNICEF and it empowers clinical practitioners to make evidence based decisions in the clinical management of sick children aiming at reducing mortality and morbidity in children under five years of age (Kerry, 2005). Although the majority of prescribers were partially adherent to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children irrespective of IMCI training received or not as depicted in Figure 4.8. No comparative conclusion could be made.

5.4.2.4. Prescribers' adherence compared to prescribing experience

Table 4.9 and Figure 4.9 show that as the number of years in prescribing increased the percentage of partially adherent prescribers to the 2008 PHC STGs/EML for respiratory conditions in children increased up to 15 years of experience. The trend changed among the prescribers with more than 15 years of experience. This suggests that the more experienced prescribers may not be updating their knowledge when the STGs/EML changes every five years.

Conversely, the percentage of prescribers who were non-adherent decreased with an increase in their prescribing experience, with the exception of those with more than 15 years of prescribing experience. The pattern for full adherence seemed to be erratic and difficult to draw any conclusion from and this may be due to a low number of fully adherent prescribers. The more experienced the prescriber the higher the adherence thresholds up to a certain level of experience. Prescribers with less practice years possibly lack experience in implementing STGs and those with more practice experience probably lack opportunities for updating their knowledge (Boonstra *et al*, 2002).

5.4.3 Prescribers' perceived adherence

In Figure 4.10 the majority of the prescribers (59%) perceived themselves as mostly adherent to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children. This is contrary to the results of the prescription audits above as only a four percent of the prescribers were found to be fully adherent as illustrated in Figure 4.4. Similar findings by Steinman *et al* (2004) showed perceived adherence to be higher than actual adherence. The over optimistic perception of prescribers' adherence to the STGs/EML prevents an opportunity to recognise need for improvement.

The prescribers listed high workload, the use of IMCI guidelines, failure to diagnose, inadequate 2008 STGs/EML availability and medicine “stock outs” as impacting on their adherence to the 2008 PHC STGs/EML for treatment of respiratory conditions. Improved knowledge of diagnosing respiratory conditions and harmonising IMCI guidelines with the PHC STGs/EML may enhance self-confidence of these prescribers and ultimately result in improved adherence to recommended STGs (Higuchi et al, 2012).

5.4.4 Medicine availability

Medicine availability was reported by over 85% prescribers to be always available. The most commonly prescribed medicine (amoxicillin and paracetamol) was also reported by over 85% prescribers to be always available. Only 43% prescribers had an experience of respiratory medicine being out of stock and had to explore other options of patient clinical management as seen in Table 4.16. The majority of these prescribers (63.6%) opted to prescribe another available medicine while others (31.8%) referred the patient to the next nearest health facility. The PHC STGs/EML does not provide alternative medicine in the event of “stock-out” because the goal of the NDP (1996) is to ensure adequate and reliable supply of safe, cost effective medicine. Other health objectives of this policy is to ensure that essential medicine is always available at all times, in adequate amounts and in proper dosage forms especially at PHC level. Out of the 43% prescribers that reported “stock-out”, amoxicillin (76.5%) was reported being out of stock and was replaced by erythromycin 85% of the times as shown in Table 4.17. This is in line with the 2008 PHC STGs/EML as erythromycin is used in cases of penicillin allergy.

Medicine “stock-out” at Umkhanyakude Health District PHC facilities had a minimal impact on the adherence of PHC prescribers to the 2008 PHC STGs/EML for treatment of respiratory conditions in children up to 12 years of age as seen in the results above. The reasons for poor adherence were associated with quality of prescribing other than medicine

“stock-outs” as discussed above. This is also supported by the prescribers’ perceived impact of medicine availability on their adherence to the 2008 PHC STGs/EML for treatment of respiratory conditions in children as 53% of prescribers reported it to have no impact as illustrated in Figure 4.11.

Although the availability of medicine plays an important role in adherence to the STGs/EML availability does not always translate to adherence to the STGs/EML (UNHCR, 2006). This is supported by findings of Cheraghali & Idries (2009) in Sudan; where medicine was found to be available but poor adherence to STGs/EML was found especially with antibiotic prescribing. However, Desalu, Kushimo & Akinlaja (2006) found that insufficient medicine supply contributed to poor adherence to the STGs/EML. Findings of medicine availability in relation to adherence to STGs/EML at Umkhanyakude Health District PHC facilities compares well with the findings by Cheraghali & Idries (2009) in Sudan.

5.4.5 Prescribers’ perceived knowledge of medicine use

The PHC STGs/EML does not provide alternative medicine in the event of “stock-out”. The action by most prescribers (85%) to use erythromycin in stock out situations in the place of amoxicillin was correct. There were wide variations amongst prescribers on their reason for choosing the replacement medicine as seen in Table 4.18.

The reasons for choosing the replacement medicine provided by most prescribers include some of the following:

- It is a broad spectrum antibiotic (24%),
- Also an antibiotic (18%) and
- It works the same (12%).

Although the above reasons may be correct, they are not accurate for the replacement of amoxicillin with erythromycin. Only 12% gave the most accurate reason for replacing amoxicillin with erythromycin that is it is used in penicillin allergy, and in the absence of

amoxicillin erythromycin can be used. Therefore the prescribers' perception of themselves having good (62.8%) and average (29.4%) knowledge of respiratory medicine as seen in figure 4.12 is contrary to the reasons they gave above for choosing the replacement medicine. Some of the medicines reported out of stock by these prescribers were not recommended as first line agents for the respiratory conditions studied. In addition, the salbutamol nebulizer which one prescriber chose as a replacement for adrenalin injection was not only an incorrect replacement but was also not supplied in KZN.

The prescribers' lack of knowledge on the use of respiratory medicine is supported by their poor adherence to the 2008 PHC STGs/EML as shown in the prescription audit results above. The prescribers own high perception of their knowledge on the use of respiratory medicine may hinder the opportunity to improve their knowledge and adherence to STGs.

5.4.6 Prescribers content understanding of the 2008 PHC STGs/EML

Fifty seven percent of prescribers perceived their understanding of the content of the 2008 PHC STGs/EML as good and 20% of prescribers perceived it as very good as shown in Figure 4.13. Since this was self-reporting it might be inaccurate or biased as most of the prescribers were not adhering to the 2008 PHC STGs/EML for treatment of respiratory conditions as depicted by the results of the prescription audits above. The over optimistic perception of prescribers' understanding of the content of these STGs/EML minimise an opportunity for them to improve adherence. Lack of STGs/EML content understanding due to lack of training was found to be associated with low adherence (Perez *et al*, 2012).

Enhanced knowledge of the STGs/EML content through intensive training improves attitudes and self-confidence thus facilitating the use of STGs (Higuchi *et al*, 2012) but Desalu, Kushimo & Akinlaja (2006) found clinicians aware of what to prescribe but not prescribing correctly. On the other hand Mayers (2010) argued that theoretical knowledge is not always used in practice, therefore in addition to training, recommends supervision and support

which reduces anxiety and enables the clinical practitioner to manage patients effectively. Multifaceted interventions have been found more effective in improving quality than single component strategies (Goldstein *et al*, 2005).

5.4.7 STGs/EML availability

A low 37.3% of prescribers reported that copies of 2008 PHC STGs/EML were available in facilities (Figure 4.14) but not enough to meet the prescribing needs and 54.9% said they were available in the consulting rooms during patient consultation. Cheraghali *et al* (2004) found availability of the STGs/EML to be good but prescribers' adherence to the STGs/EML poor. Availability of the STGs/EML alone does not lead to better adherence, but reinforcement, training and supervision play an important role in improving adherence to the STGs/EML (UNHCR, 2006).

Prescribers (57%) perceived availability of the 2008 PHC STGs/EML as having no impact on their adherence (Figure 4.15), but the findings of the prescription audits above does not support this perception; as prescribers were most of the time not adhering to the 2008 PHC STGs/EML. The inadequate availability of the copies of the 2008 PHC STGs/EML in each consulting room might be a contributing factor to prescribers' adherence as shown by the poor adherence results of the prescription audits.

Prescribers (33%) who perceived the availability of the 2008 STGs/EML as impacting on their adherence (Figure 4.15) said they believed so because it was not always with them whenever they wanted to use it. A similar experience was found by Mayers (2010) in the Free State when assessing experience of PHC nurses in using the STGs/EML. In this case prescribers ended up using previous knowledge or old versions of the STGs/EML if available. Inertia of previous practice may also hinder adherence to STGs/EML (Menendez *et al*, 2007).

The impact of the availability of 2008 STGs/EML on the prescribers' adherence is also felt by some, especially on busy days as they end up moving out of the consulting rooms to look for the 2008 STGs/EML book. Some indicated that they were even lazy to move out of the consulting rooms and while others fear patients because they know that patients don't like someone who moves up and down, as a result end up asking colleagues for an opinion or use the outdated version.

This was also found by Mayers (2010) to be affecting effectiveness and efficiency of PHC nurses as these Free State nurses sometimes had to leave the patients and go to look for the guideline, while others opted to manage the patients without the guideline if not available during consultation. PHC nurses are working under severe stressful conditions due to an increasing workload and time has to be utilised efficiently. There is no time to move up and down looking for the STGs/EML in another consulting room. Perez *et al* (2012) had found time constraints to be significantly associated with non-adherence to the STGs/EML.

5.4.8 Existence of more than one guideline

Most prescribers (94%) were not only aware of the other guidelines for treatment of respiratory conditions but also used (95.8%) these as resources to treat respiratory conditions in children. IMCI (94%) was reported to be the well-known and used guideline for management of respiratory condition as compared to PALS PLUS (21.6%). IMCI has been implemented in PHC facilities in more than 100 countries (Woods, 2010). The PALS PLUS guideline was introduced as a result of a need to strengthen an integrated approach in disease management and it has shown improvement in the quality of respiratory and HIV care provided by PHC nurses (Colvin, Fairall, Lewin, Georgeu, Zwarenstein, Bachmann, Uebel & Bateman, 2010).

Existence of more than one guideline for the treatment of the same conditions is not only time consuming to the clinical practitioners but could contribute to the poor adherence to

STGs/EML if not harmonised (Mayers, 2010). The IMCI and PALS PLUS guidelines were reported by most of the prescribers (62%) to be in line with the 2008 PHC STGs/EML although there were some prescribers (19%) who still felt that these guidelines were not in line as shown in Figure 4.16. Similar experience of IMCI guidelines, PALS PLUS and PHC STGs/EML not in line with each other was also shared by PHC nurses in Free State Province (Mayers, 2010). Umkhanyakude PHC prescribers preferred the IMCI guideline as they found it clearer, detailed and up to date. The preference to use IMCI guidelines might be a contributing factor that impacts on the adherence of these prescribers to the 2008 PHC STGs/EML. This is not only supported by the results of the prescription audits but also the perception of some prescribers who perceived themselves as not adhering to the 2008 PHC STGs/EML (Figure 4.10) because they were using IMCI guidelines.

5.4.9 Diagnosis

It is evident from Figure 4.17 that PHC prescribers were experiencing difficulty in diagnosing respiratory conditions. The majority of the prescribers (43%) were not always able to accurately diagnose respiratory conditions and 16% were unable to diagnose these conditions. In the HIV era it is common for patients to present with multiple complaints at PHC (Bateman *et al*, 2009). The existence of concomitant disease (TB and HIV/AIDS) is amongst the reasons reported by Umkhanyakude PHC prescribers that affected their ability to accurately diagnose respiratory conditions in children in addition to lack of experience. This challenge of failure in diagnosing respiratory conditions due to co-morbidities has also been identified by Graham *et al*, (2008). Child survival strategies encourages strengthening of proper recognition and case management of pneumonia thus leading to correct treatment after accurate disease classification (Kauchali *et al*, 2004). An integrated approach to disease management and strengthening implementation of the PALS PLUS guidelines are recommended as it has shown positive results in the Free State Province (Colvin *et al*, 2010; Mayers, 2010).

Some (8%) prescribers felt that the 2008 PHC STGs/EML is not always assisting them to diagnose respiratory conditions accurately. A proper diagnosis ensures that the patient receives the correct treatment as it is unlikely that the correct guideline will be followed if diagnosis is not correct (WHO, 2012). Failure to diagnose respiratory conditions in children contributed to poor adherence to the 2008 PHC STGs/EML in Umkhanyakude Health District PHC facilities. This is also supported by the perception of some prescribers that attributed difficulty in accurately diagnosing respiratory conditions as the cause of their failure to prescribe the correct treatment thus not adhering to the 2008 PHC STGs/EML. Decision about respiratory symptoms was found to be a challenge in Free State PHC services as well (Mayers, 2010). Boonstra, Lindbaek & Ngome (2005) had a similar finding in Botswana where irrational prescribing of antibiotics was found to be a result of failure to diagnose respiratory conditions at PHC.

5.4.10 Perception of prescribing correct treatment

Sixty nine percent of prescribers (Figure 4.18) perceived themselves as most of the time prescribing the correct treatment for the correct respiratory condition but the actual result of prescription audits showed the opposite. Prescribers lacked self- awareness of recognising their failure to adhere to the 2008 PHC STGs/EML for treatment of respiratory in children as well as the need for their improvement. One of the reasons prescribers mentioned as the cause of not always prescribing the correct treatment for the correct respiratory condition was that if the child came with the same condition all the time or has been treated with first line antibiotics but not responding to treatment they then deviate from the STGs/EML. This lack of outcome expectancy was also found by Haagen *et al*, (2005) to be a contributing factor to non-adherence to the STGs/EML.

Prescribers working in mobile health facilities reported absence of nebulising machines as impacting on their adherence since they end up not keeping nebulizers as part of their medicine stock. The 2008 PHC STGs/EML recommends nebulisers for the management of

bronchospasm associated with asthma and chronic obstructive bronchitis. The lack of machines is also a contributing factor to non-adherence. Many facilities still lack basic equipment for effective case management (Graham *et al*, 2008).

5.4.11 Attitudes towards guidelines

The prescribers at Umkhanyakude Health District PHC facilities displayed a positive attitude towards the 2008 PHC STGs/EML as a high percentage of prescribers (88%) thought the 2008 PHC STGs/EML helped them to best treat respiratory conditions in children (Figure 4.19). In addition, 76% of prescribers were satisfied with treatment regimens (Figure 4.20), 92.2% of prescribers thought adhering to the 2008 PHC STGs/EML helped them to achieve treatment outcomes and 90% of prescribers were motivated to use this guideline (Figure 4.21).

In all the above areas of measuring prescribers' attitudes towards the 2008 PHC STGs/EML for treatment of respiratory conditions in children, similar supporting statements were given to emphasise prescribers' feeling about the 2008 PHC STGs/EML and these included the following:

- Positive therapeutic outcomes noticed.
- Guideline useful with all relevant information.
- Guides diagnosis and treatment.
- Reduces stress and anxiety as it tells you what to do.
- Facilitate professional growth, enhance knowledge and boost confidence.
- Familiar with it.
- It also had nondrug treatment options.
- Good for the children above five years.

Prescribers who displayed positive attitudes towards the 2008 PHC STGs/EML also found it easy to use (86%) as seen in Figure 4.22. This is attributed to it being available, simple,

helpful, clear, and understandable, saves time and is well arranged with an index. Others even mentioned that they trusted and believed this 2008 PHC STGs/EML as they assume it was compiled after several research projects. Some prescribers even felt they were at the same level as doctors when using the 2008 PHC STGs/EML for treatment of respiratory conditions in children. Supervision and training also played a major role in ensuring the positive attitudes of some of the prescribers.

The prescribers' positive attitude towards the 2008 PHC STGs/EML was also seen when prescribers were providing an explanation for non-response to treatment having followed the 2008 PHC STGs/EML. Although the incidents were few and infrequent none of the prescribers attributed poor therapeutic responses to the 2008 PHC STGs/EML, instead prescribers felt the non-response to treatment was due to underlying disease conditions, incorrect diagnosis and patients not adhering to treatment prescribed. Most prescribers referred patients who failed to respond to treatment having followed the 2008 PHC STGs/EML to hospital.

Prescribers with more positive attitudes towards practice guidelines are more adherent to the STGs/EML than those with less positive attitudes (Quiros, Lin & Larson, 2007). At Umkhanyakude Health District PHC facilities more prescribers displayed positive attitudes towards the 2008 PHC STGs/EML as seen in Figures 4.19 to 4.22 but the results of the prescription audits showed poor adherence to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children. Attitudes towards the 2008 PHC STGs/EML were not found as part of the major factors impacting on adherence of the PHC prescribers at Umkhanyakude Health District PHC facilities for the treatment of respiratory conditions up to 12 years. This compares well with findings by Perez *et al* (2012) who found that disagreement with COPD guidelines and lack of perceived benefit were not part of major barriers to the adherence of these guidelines. Poor adherence to the 2008 PHC STGs/EML by these prescribers as seen in Figure 4.2, 4.4 and Table 4.1 may have been affected by

using previous practice without updating it with current knowledge as it was also found by Menendez *et al* (2007) to be amongst the factors that impact on prescribers' adherence to STGs/EML.

There were low percentages of prescribers that displayed negative attitudes towards the 2008 PHC STGs/EML for treatment of respiratory conditions in each attitude measure below as depicted in Figures 4.19 to 4.22.

- Eight percent prescribers thought the 2008 PHC STGs/EML sometimes helped them to best treat respiratory conditions in children and 4% were unsure (Figure 4.19).
- Only 18% of prescribers were partially satisfied with treatment regimens and six percent were unsure (Figure 4.20).
- Seven point eight percent prescribers that thought adhering to the guidelines sometimes helped them to achieve treatment outcomes.
- Only eight percent prescribers were sometimes motivated to use this guideline and two percent were unsure (Figure 4.21).
- Prescribers who do not find easy to refer to the 2008 PHC STGs/EML were only two percent and 12% prescribers sometimes find it easy to refer during consultation as seen in Figure 4.22.

The reasons given by these prescribers included: poor treatment response, lack of familiarity, guideline recommending same medicine i.e. amoxicillin for all conditions, preferred IMCI guidelines since they were familiar with it, scanty information and treatment recommended not enough. Others mentioned that they were not seeing many various respiratory conditions except for pneumonia. Some felt mandated to follow it although they were unhappy about it. Lack of training, especially in IMCI and PHC, was mentioned by some of these prescribers as the reasons for the negative attitude. The prescribers who had a negative attitude towards the 2008 PHC STGs/EML also reported not finding it easy to use

due to high patient work load, not comfortable in using the STGs/EML in the presence of the patients, impatient patients and shortage of STG/EML copies. Some of the prescribers also reported that they fail to refer during consultation because they fear that patients might think that they don't know which medicine to prescribe if they refer to the STGs/EML book. This is similar to the experience observed by Mayers (2010) in Free State PHC facilities.

Perez *et al* (2012) found lack of awareness, low self-efficacy and time constraints amongst the factors impacting on the adherence of prescribers and to be significantly associated with non-adherence to COPD guidelines among primary care providers. Higuchi *et al* (2012) reported that clinical nurse training is recommended for these prescribers as it was found to positively influence the knowledge and attitudes of nurses towards the STGs/EML for respiratory infections, malaria and diarrhoea.

5.4.12 Implementation strategy and monitoring and evaluation

The majority of the prescribers (80.4%) were never orientated on the 2008 PHC STGs/EML. This could also explain poor adherence to this guideline as seen in the prescription audit results. Orientation was never done formally as prescribers (19.6%) who were orientated when this guideline was introduced reported. Poor implementation strategy is a contributing factor of the poor adherence to the 2008 PHC STGs/EML by prescribers at Umkhanyakude Health District PHC facilities. Guidelines are not self-implementing therefore stepwise planned implementation should aim at integrating the guidelines into daily performance of health care professionals (Mayers, 2010).

Monitoring and evaluation of prescribers' adherence to the 2008 PHC STGs/EML was found to be lacking at Umkhanyakude Health District PHC facilities as most prescribers (51%) indicated that their prescriptions had never been audited (Figure 4.23).

Poor performance to guidelines implementation is associated with lack of health system support and supervision (Woods, 2010). Some prescribers (43%) reported their prescriptions

being audited but the frequency varied from monthly to once a year. Prescribers have reported to have benefited from the feedback given after these audits. Some prescribers (35.3%) have taken an initiative to do self-audit as they saw a need. Prescribers reported the positive value of conducting prescription audits either self-auditing or done by a supervisor. Poor adherence to the 2008 PHC STGs/EML as seen in the results above can be improved by regular monitoring and evaluation through supervision, prescription audits with feedback sessions and self-audits (Makhado, 2009).

5.5 SUMMARY

This chapter summarised the key findings of the study. Results were discussed according to the objectives of the study and the instruments (prescription audits and questionnaire) used for data collection. The key recommendations and conclusion will be discussed in the next chapter.

CHAPTER 6

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

The chapter includes the summary of study objectives, conclusion and limitations to the study. It concludes with recommendations which could be implemented to improve adherence of PHC authorised prescribers to the PHC STGs/EML.

6.2 SUMMARY OF OBJECTIVES

All three objectives of the study were met. The first objective was to document the treatment prescribed for respiratory conditions at Umkhanyakude Health District PHC facilities and amoxicillin was found to be the most prescribed antibiotic, followed by paracetamol and mist tussi infans. This treatment was mostly prescribed for pneumonia which was also found to be the most common respiratory condition followed by the common cold, influenza and cough.

The second objective was to assess adherence of the authorised prescribers to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children up to 12 years of age at Umkhanyakude Health District PHC facilities. The results of the study showed that only 38% of the prescriptions were fully adherent to the 2008 PHC STGs/EML for the treatment of respiratory conditions in children up to 12 years of age as illustrated in Table 4.1. Only four percent of the prescribers were fully adherent to the to the 2008 PHC STGs/EML as seen in Figure 4.4.

The third objective was to determine the factors which impacted on adherence to the 2008 PHC STGs/EML by the authorised prescribers in the treatment of respiratory conditions at Umkhanyakude Health District PHC facilities.

The following were factors identified by this study as having a possible major impact on the adherence to the 2008 PHC STGs/EML:

- A false perception of prescribers on their own adherence, content understanding of the 2008 PHC STGs/EML and knowledge of medicine used for respiratory conditions.
- Inadequate availability of the 2008 PHC STGs/EML.
- Existence of more than one guideline that are not harmonised.
- Failure to accurately diagnose respiratory conditions.
- Lack of implementation and monitoring strategies.

The following factors were found to have minimal impact on the deviations from the 2008 PHC STGs/EML:

- Negative attitude by some prescribers towards the 2008 PHC STGs/EML
- Medicine availability as only a few prescribers perceived medicine “stock-out” as impacting on their adherence although it was self-reported and not verified with stock cards records.

6.3 CONCLUSION

Poor adherence was found by prescribers at Umkhanyakude PHC facilities to the 2008 PHC STGs/EML when treating respiratory conditions in children up to 12 years of age. Irrational prescribing of antibiotics was also identified as a challenge when treating children presenting with respiratory conditions.

STGs/EML is effective in reducing child mortality and morbidity. Prescribing according to STGs/EML for antibiotic use can have a significant impact on reducing treatment costs; minimise resistance and improving patient safety (Danysz, 2010; WHO, 2012). The District Health Management Team at Umkhanyakude Health District should consider employing

multifaceted interventions from the recommendations of this study below in order to improve adherence of prescribers to the PHC STGs/EML. PHC trained prescribers were found to be more adherent than the non-PHC trained. It is recommended that nurses employed at PHC must have PHC training as a pre-requisite.

6.4 LIMITATIONS OF THE STUDY

Medicine availability was reported by the prescribers and stock verification on stock cards was not done.

6.5 RECOMMENDATIONS

Based on the results of this study the following recommendations are proposed to relevant role players at all levels of management in the provision of PHC health services:

- Strengthen support through supervision of PHC prescribers by monitoring and evaluation of prescribing practices, which must include regular prescription audits with feedback sessions. This will reinforce implementation and adherence to the PHC STGs/EML.
- Promote targeted education and training of PHC prescribers by introducing the STGs/EML at the pre-registration level of training. This will enable PHC prescribers to understand the content and appropriate use of the STGs/EML.
- Employ integrated approaches to the development and dissemination of guidelines thus ensuring harmonisation of different guidelines when disseminated at the same time.
- Provide regular compulsory in-service training targeted at familiarising PHC prescribers with the content of the PHC STGs/EML including dosages, updating their medicine knowledge and enhancing diagnostic skills thus reducing anxiety that may lead to non-adherence.

- Develop implementation strategies that will include proper dissemination of STGs/EML with enough copies and a planned orientation and induction programme.
- Address staff shortages at PHC by ensuring adequate staffing that is appropriate for the workload at each PHC facility thus reducing the pressure on PHC prescribers.
- Advocate for changes in the legislation to support health service delivery by recognising nurses as authorised prescribers. This will enable the allocation of PBPA at PHC facilities that will be responsible for dispensing nurses' prescriptions thus facilitating the adherence assessment to the PHC STGs/EML at the time of dispensing.
- Carry out studies assessing adherence of prescribers to both PHC STGs/EML and IMCI guidelines in order to draw a conclusion as to which guideline is being followed and also to assess if these guidelines are harmonised or not.
- Future studies focusing on assessing adherence of PHC nurses' prescriptions to legal requirements.
- Ensure availability of necessary equipment like nebulising machines at mobile PHC facilities as the absence of this equipment impacted on adherence to the 2008 PHC STGs/EML.
- Ensure adequate medicine supply although it was not found as a major contributing factor to the adherence of the prescribers but it was not reported by all prescribers as always available.

REFERENCES

1. Abdulraheem, I. S., Olapipo A. R. & Amodu M. O. 2012. Primary health care services in Nigeria: Critical issues and strategies for enhancing the use by the rural communities.
2. Alumran, A., Hurst, C. & Hou, X. 2011. Antibiotics Overuse in Children with Upper Respiratory Tract Infections in Saudi Arabia: Risk Factors and Potential Interventions. *Clinical Medicine and Diagnostics*, 1(1): 8-16.
3. Bateman, E., Feldman, C., Mash, R., Fairall, L., English, R. & Jithoo, A. 2009. Systems for the management of respiratory disease in primary care – an international series: South Africa. *Primary Care Respiratory Journal*, 18 (2): 69-75. Available from World Wide Web: www.thepcrj.org. (Accessed 10 September 2011).
4. Beaglehole, R., Bonita, R. & Kjellström, T. 1993. Basic Epidemiology, *World Health Organisation*, Geneva.
5. Bhanbhro, S., Drennan, V.M., Grant, R. & Harris, R. 2011. Assessing the contribution of prescribing in primary care by nurses and professionals allied to medicine: a systematic review of literature. *BMC Health Services Research*, 11:330. Available from World Wide Web: <http://www.biomedicalcentral.com/1472-6963/11/330>. (Accessed 08 September 2012).
6. Boonstra, E., Lindbaek, M., Khulumani, P., Ngome, E. & Fugelli, P. 2002. Adherence to treatment guidelines in primary health care facilities in Botswana. *Tropical Medicine and International Health*, 7(2): 178-186.
7. Boonstra, E., Lindbaek, M. & Ngome, E. 2005. Adherence to management guidelines in acute respiratory infections and diarrhoea in children under 5 years old in primary health care in Botswana. *International Journal for Quality in Health Care*, 17(3): 221-227.
8. Bradley, E., Campbell, P. & Nolan, P. 2005. Nurse prescribers: who are they and how do they perceive their role? *Journal of Advanced Nursing*, 51(5):439-448.

Appendices

9. Cabana, M.D., Rand, C.S., Powe, N.R., Wu, A.W., Wilson, M.H., Abboud, P.C. & Rubin, H.R. 1999. Why Don't Physicians Follow Clinical Practice Guidelines? *JAMA*, 282(15): Available from World Wide Web: www.jama.ama-assn.org. (Accessed 24th August 2011).
10. Chopra, M., Patel, S., Cloete, K., Sanders, D. & Peterson, S. 2005. Effect of an IMCI intervention on quality of care across four districts in Cape Town, South Africa. *Arch Dis Child*, 90:397-401.
11. Cheraghali, A.M., Nikfar, S., Behmanesh, Y., Rahimi, V., Habibipour, F., Tirdad, R., Asadi, A. & Bahrami, A. 2004. Evaluation of availability, accessibility and prescribing pattern of medicines in the Islamic Republic of Iran. *East Mediterranean Health Journal*, 10 (3).
12. Cheraghali, A.M. & Idries, A.M. 2009. Availability, affordability, and prescribing pattern of medicines in Sudan. *Pharmacy World and Science*, 31(2).
13. Christopher, J.B., May, A.L., Lewin S. & Ross, D.A. 2011. Thirty years after Alma-Ata: a systematic review of the impact of community health workers delivering curative interventions against malaria, pneumonia and diarrhoea on child mortality and morbidity in sub-Saharan Africa. *Human Resources for Health*, 9:27.
14. Colvin, C.J., Fairall, L., Lewin, S., Georgeu, D., Zwarenstein, M., Bachmann, M., Uebel, K.E. & Bateman, E.D. 2010. Expanding access to ART in South Africa: The role of nurse-initiated treatment. *SAMJ*, 100(4).
15. Correspondence from Mr. TA Masango (Registrar: South African Pharmacy Council) to Mr. A Cassim (Manager: Pharmaceutical Services, Amajuba District, KwaZulu-Natal), 16 August 2011 (D Hoffmann/nu/0155).
16. Cucinotta, G., Mazzaglia, G., Toscano, M., Arcoraci, V., Tempera, G., Salmeri, M., Rosignoli, M., Bottaro, G., Boccazzi, A., Nicoletti, G. & Caputi, A.P. 2002. Exploring the variability in antibiotic prescribing profiles among paediatricians from two different areas of Italy. *Pharmacological Research*, 45(5), Available from World Wide Web: <http://www.idealibrary.com>. (Accessed 05 May 2010).

Appendices

17. Cullinan, K. 2006. Health services in South Africa: a basic introduction. Health e-News service.
18. Danysz, K.Z. 2010. The investigation of antimicrobial prescribing patterns at Themba hospital, Kabokweni.
19. Dawson, B. & Trapp, R.G. 2004. Basic and Clinical Biostatistics. *McGraw-Hill companies incl.*, USA.
20. Declaration of Alma-Ata. International conference on Primary Health Care, Alma-Ata. 1978. *USSR*, 6-12 September 1978. Available from World Wide Web: http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf. (Accessed 01 July 2010).
21. Department of Health. Medicine and Related Substance Act (Act 101 of 1965), as amended. Republic of South Africa.
22. Department of Health. Nursing Act (Act 33 of 2005). Republic of South Africa.
23. Department of Health. Pharmacy Act (Act 53 of 1974). Republic of South Africa.
24. Department of Health. Proposed scope of practice for pharmacy support personnel in manufacturing, wholesale, institutional and community pharmacies. *Government Gazette*. July 2011. Vol. 553. No. 34428. Republic of South Africa.
25. Department of Health. Regulations related to the keeping, supply, administering, prescribing or dispensing of medicine by registered nurses. *Government Notice No. R. 1044*, 14 December 2011. Vol. 558. No. 34851. Republic of South Africa.
26. Department of Health. 1996. South African National Drug Policy. Pretoria.
27. Department of Health. 2003. Standard Treatment Guidelines and Essential Medicines List, Primary Health Care. Pretoria, South Africa.
28. Department of Health. 2008. Standard Treatment Guidelines and Essential Medicines List, Primary Health Care. Pretoria, South Africa.
29. Department of Health. 2012/2013. Umkhanyakude District Health Plan.
30. Department of Health. 2008/2009. Umkhanyakude District Health Disease profile Report.

31. Desalu, I., Kushimo, O. & Akinlaja, O. 2006. Adherence to CPR guidelines during perioperative cardiac arrest in a developing country. *Resuscitation*, 69. Available from World Wide Web: www.elsevier.com/locate/resuscitation. (Accessed 05 May 2010).
32. Dookie, S. & Singh, S. 2012. Primary health services at district level in South Africa: a critique of the primary health care approach. *BMC Family Practice*, 13:67. Available from <http://www.biomedicalcentral.com/1471-2296/13/67>. (Accessed 08 September 2012).
33. Engelbrecht, S. 2010. Adherence to the Medicine Code List in Primary Health Care Military Clinics in Gauteng.
34. Gabra, M., Kisalu, A. & Hazemba, O. 2000. Uganda Assessment: Drug Management for Childhood Illnesses. *Management Sciences for Health*, USA.
35. Goldstein, M.K., Lavori, P., Coleman, R., Advani, A. & Hoffman, B.B. 2005. Improving adherence to Guidelines for Hypertension Drug Prescribing: Cluster-randomized Controlled Trials of General versus Patient-specific Recommendation. *The American Journal of Managed Care*, 11(11): 677-685.
36. Graham, S.M., English, M., Hazir, T., Ernerson, P. & Duke, T. 2008. Challenges to improving case management of childhood pneumonia at health facilities in resource-limited setting. *Bulletin of the World Health Organization*, 86(5): 349-355.
37. Gray, A. 2011. WHO Essential Medicines List for Children: Impact on patient outcomes. *Pediatr drugs*, 13(4): 209-211.
38. Gray, A. 2010. Prescribing and dispensing by nurses neglected step in the legislative process. *South African HIV Clinicians Society Nursing Magazine*.
39. Haung, N., Morlock, L., Lee, C.H., Chen, L.S. & Chou, Y.J. 2005. Antibiotic Prescribing for Children With Nasopharyngitis (Common Cold), Upper Respiratory Tract Infections, and Bronchitis Who Have Health-Professional Parents. *Pediatrics*, 116 (4): 826-832.

Appendices

40. Haagen, E.C., Nelen, W.L.D.M., Hermens, R.P.M., Braat, D.D.M. & Grol, R.P.T.M. 2005. Barriers to physician adherence to subfertility. *Human Reproduction*, 20 (12): 3301 – 3306.
41. Higuchi, M., Okumura, J., Aoyama, A., Suryawati, S. & Porter, J. 2012. Application of standard treatment guidelines in rural community health centres, Timor-Lester. *Health policy plan*, 27 (5): 396-404.
42. Holloway, K. & van Dijk, L. 2011. The world medicine situation: Rational use of medicine. *World Health Organization*, Geneva.
43. Jaffray, P. & Miti, L. 2010. The Eastern Cape Basic Services Delivery and Socio Economic Trends series 7: Primary Health Care and Emergency Services. *Fort Hare Institute of social and Economic Research*, East London.
44. Kauchali, S., Rollins, N., Bland, R., Van den Broeck, J. 2004. Maternal perceptions of acute respiratory infections in children under 5 in rural South Africa. *Tropical Medicine and International Health*, 9(5): 644-650.
45. Kerry, T. 2005. A review of Integrated Management of Childhood Illness (IMCI). *SA Fam Pract*, 47(8):32-38).
46. Kroezen, M., Francke, A.L., Groenewegen, P.P. & van Dijk, L. 2012. Nurse prescribing in Western Europe and Anglo-Saxon countries: A survey on forces, conditions and jurisdiction control. *International Journal of Nursing Studies*, 49 (12).
47. Kruger, S. 2009. Position paper on the prescribing and dispensing practices of the registered nurses. *The South African society of occupational health nursing practitioners*.
48. Lehmann, U. 2008. Strengthening Human Resources for Primary Health Care In: Barron P, Roma-Reardon J, editors. South African Health Review 2008. *Health Systems Trust*, Durban.
49. Luker, K.A., Hogg, C., Austin, L., Ferguson, B. & Smith, K. 1998. Decision making: the context of nurse prescribing. *Journal of Advanced Nursing*, 27: 657-665.

Appendices

50. Makhado, M. 2009. Comparison of antimicrobial prescribing patterns with the Standard Treatment Guidelines and Essential Drug List in Primary Healthcare facilities in Vhembe District, Limpopo Province.
51. Mayers, P.M. 2010. Nurses' Experience of Guideline Implementation in Primary Health Care Setting.
52. Menendez, R., Reyes, S., Martinez, R., dela Cuadra, P., Manuel Valles, J. & Vallterra, J. 2007. Economic evaluation of adherence to treatment guidelines in nonintensive care pneumonia. *Eur Respir J*, 29: 751-756.
53. Oluwole, D. 2008. Health Policy Development in Sub-Saharan Africa: National and International Perspective. Available from www.worldpress.org. (Accessed 17 September 2012).
54. Pagaiya, N. & Garner, P. 2005. Primary care nurses using guidelines in Thailand: a randomized controlled trial. *Tropical Medicine and International Health*, 10(5): 471 – 477.
55. Perez, X., Wisnivesky, J.P., Lurslurchachai, L., Kleinman, L.C. & Kronish, I.M. 2012. Barriers to adherence to COPD guidelines among primary care providers. *Respiratory Medicine*, 106: 374 – 381.
56. Pillay, R. 2009. Perceived competencies of nurse managers: A comparative analysis of the public and private sectors in South Africa. *African Journal of Business Management*, 3(9): 495-503.
57. Quiros, D., Lin, S. & Larson, E.L. 2007. Attitudes towards practice guidelines among intensive care unit personnel: a cross-sectional anonymous survey. *Heart and Lung*, 36(4). Available from World Wide Web: www.heartandlung.org. (Accessed 05 May 2010).
58. Schaay, N., Sanders, D. & Kruger, V. 2011. Overview of health sector reforms in South Africa. *DFID human development resource centre*, London.
59. Sibiya, M.N. 2009. A model for integration of PHC services in KwaZulu-Natal, South Africa.

Appendices

60. Sica, G.T. 2006. Bias in Research Studies. *Radiology*, 238(3):780-789, Available from World Wide Web: <http://radiology.rsna.com/content/238/3/780.full>. (Accessed 28 January 2011).
61. Stein, J., Lewin, S., Fairall, L., Mayers, P., English, R., Bheekie, A., Bateman, E. & Zwarenstein, M. 2008. Building capacity for antiretroviral delivery in South Africa: A qualitative evaluation of the PALSA PLUS nurse training program. *BMC Health Services Research*, 8: 240.
62. Steinman, M.A., Fischer, M.A., Shlipak, M.G., Bosworth, H.B., Oddone, E.Z., Hoffman, B.B. & Goldstein, M.K. 2004. Clinician awareness of adherence to hypertension guidelines. *The American Journal of Medicine*, 117.
63. Strengthening Pharmaceutical System/Management Sciences for Health. 2008. Report on the State of Availability and Delivery of Pharmaceuticals in Northern Cape Province. *SPS/MSH*, Pretoria.
64. Trap, B, Todd, C.H., Moore, H. & Laing, R. 2001. The impact of supervision on stock management and adherence to treatment guidelines. *Health Policy and Planning*, 16(3):273-280. Available from World Wide Web: <http://www.ncbi.nlm.nih.gov/pubmed/11527868>. (Accessed 29 April 2010).
65. Tredoux, C. & Smith, M. 2006. Evaluating research design. In Terre Blanche, M; Durrheim, K. and Painter, D., Editors. *Research in Practice*. 2nd Ed. *University of Cape Town Press*, Pg. 160-186.
66. United Nations High Commissioner for Refugees. 2006. UNHCR drug management manual: Policies Guidelines UNHCR list of Essential Drugs. *UNHCR*, Geneva Switzerland.
67. Wentzel, S.W. 2008. The role of a clinic manager in a Primary health Care setting
68. World Health Organization. 1993. How to investigate drug use in health facilities, selected drug use indicators. *World Health Organization*, Geneva.
69. World Health Organization. 2012. Evolving threat of antimicrobial resistance options for action. *World Health Organization*, Geneva.

Appendices

70. Woods, D.L. 2010. IMCI revisited. *SAJCH*, 4(2).
71. Worku, Z. 2011. A survival analysis of South African children under the age of five years. *Health SA Gesondheid*, 16(1):472.
72. Zoutman, D.E., Ford, B.D., Bassili, A.R., Cosby, J.L. & Nakatsu, K. 2008. Factors affecting antibiotic decisions for upper respiratory tract infections I: A survey of family physicians. *Int J Infect Contr*, 4(1).

APPENDICES

Appendix A: Detailed approved regimens for respiratory conditions studied

Conditions	with	Treatment regimen
<p>predominant wheeze Bronchospasm, acute associated with asthma and chronic obstructive bronchitis</p>	<p>with chronic</p>	<p>Oxygen, 40% or higher Salbutamol 0.5%, solution, nebulised over 3 minutes preferable driven by oxygen: 0.5 – 1ml in 3ml of sodium chloride 0.9%</p> <p>If reversal of bronchospasm is incomplete after the first nebulisation for children with Asthma: Prednisone, oral, 1-2mg/kg immediately then once daily for 7 days If oral prednisone cannot be taken: Hydrocortisone, IV, 4-6mg/kg immediately maximum dose: 100mg</p> <p>And Ipratropium bromide 0.5 – 1ml (0.125 – 0.25mg) solution added to Salbutamol solution if no nebuliser available: Salbutamol, inhalation, 4-8 puffs, using a spacer, every 4 hours if there is no immediate response add: Ipratropium bromide, inhalation, 4 puffs, using a spacer, every 4 hours if no relief: Repeat Salbutamol every 20 – 30 min in the first hour, thereafter repeat every 2-4 hours if needed</p> <p>B₂ agonist e.g. Salbutamol, inhalation, 100-200mcg (2puffs), as required 4-6 hourly until relief is obtained Inhaled corticosteroids, e.g. budesonide and beclomethasone 100mcg twice daily Refer to doctor if no improvement</p>
<p>Asthma, chronic</p>		<p>Oxygen, humidified, using nasal canula at 1-2 L per minute Salbutamol 0.5%, solution, 0.5 – 1ml diluted to 2-4ml with sodium chloride 0.9%, nebulised over 3 minute (single dose) Salbutamol spray 2 puffs when necessary</p>
<p>Bronchiolitis, acute in children</p>		<p>Oxygen, humidified, using nasal canula at 1-2 L per minute Salbutamol 0.5%, solution, 0.5 – 1ml diluted to 2-4ml with sodium chloride 0.9%, nebulised over 3 minute (single dose) Salbutamol spray 2 puffs when necessary</p>
<p>Upper airway disease Croup in Children (Laryngotracheobronchitis)</p>		<p>Treatment regimen Grade 1: Inspiratory stridor only Prednisone, oral, 1-2mg/kg, single dose Grade 2: Inspiratory and expiratory stridor Adrenaline, 1:1 000 diluted in sodium chloride 0.9%, nebulised, immediately Prednisone, oral, 1-2mg/kg as a stat dose Grade 3: Inspiratory and expiratory stridor with active expiration using abdominal muscles Treat as above, if no improvement within an hour refer urgently (intubate before referral) Grade 4: Cyanosis, apathy, marked retractions, impending apnoea Intubate (if no response give treatment as above) then refer urgently</p> <p>Paracetamol, oral, 15mg/kg/dose 4-6 hourly when required to a maximum of 4 doses per 24 hours. Dose calculated per weight if children under 6 months</p> <p>If epiglottitis suspected Ceftriaxone, im, 50-80mg/kg/dose immediately as a single dose</p>

Appendix A: Detailed approved regimens for respiratory conditions studied

Respiratory infections	Treatment regimen
Common cold and influenza	<p>Pain and fever: Paracetamol, oral, 15mg/kg/dose 4-6 hourly to a maximum of 4 doses per 24 hours. If children under 6 months calculate dose by weight</p> <p>Infants: Sodium chloride 0.9%, instilled into each nostril</p>
Pneumonia in children	<p>Pneumonia: Amoxicillin, oral, 25-30mg/kg/dose 8 hourly for 5 days Penicillin-allergic patients: Erythromycin, oral, 10-15mg/kg/dose 6 hourly for 5 days Paracetamol, oral, 15mg/kg/dose 4-6 hourly to a maximum of 4 doses per 24 hours. If children under 6 months calculate dose by weight</p> <p>Severe Pneumonia Oxygen, using nasal canula at 1-2 L per minute before and during transfer Ceftriaxone, im, 50-80mg/kg/dose immediately as a single dose Co-trimoxazole, oral before referral</p>

Appendix B: An overview of the study site

UMKHANYAKUDE CLINICS PER HOSPITAL AND NUMBER OF PRESCRIBERS

	Manguzi	Prescribers	Mosvold	Prescribers	Mseleni	Prescribers	Bethesda	Prescribers	Hlabisa	Prescribers
1	Bhekabantu	2	Ekuhlehlani	3	Ezimpondweni	3	Bethesda Gateway	2	Esiyembeni	2
2	KwaNdaba	3	Gwalliwani	3	Mabibi	3	Bethesda Mobile	2	Ezwenelisha	3
3	KwaZibi	3	Khwambuzi	3	Manaba	3	Gedleza	3	Gunjaneni	3
4	Mahlungulu	3	Manyiseni	3	Mbazwana	5	Jozini	8	Hlab Gateway	2
5	Manguzi Mob	7	Mbadleni	3	Mduku	4	Madonela	2	Hlabisa Mobile	4
6	Maputa	5	Mosvold Mobile	6	Mngobokazi	3	Makhathini	3	Inhlwathi	4
7	Mboza	2	Ndumo	6	Mseleni Mobile	4	Mhlekezi	2	Khula	3
8	Mshudu	3	Nkungwini	3	Ntshongwe	2	Mkuze	3	KwaMsane	18
9	Phelandaba	4	Nondabuya	3	Oqondweni	2	Ophansi	3	Macabuzela	4
10	Thengani	3	Ophondweni	3					Machibini	2
11	Velabusha	1	Shemula	3					Madwaleni	4
12	Zamazama	3							Makhowe	2
13									Mpembeni	2
14									Mpukunyoni	3
15									Mtubatuba	5
16									Mtubatuba Mobile	5
17									Nkundusi	5
18									Nfondweni	3
19									Somkhele	4
	12	39	11	39	9	29	9	28	19	78
	Total number of clinics									
	60									
	Total number of prescribers									
	208									

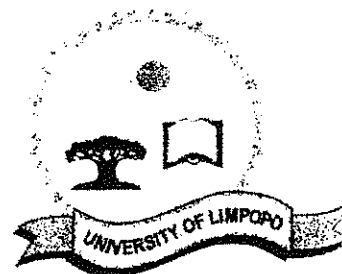
Appendix C: Sampled PHC facilities

SAMPLING OF UMKHANYAKUDE PHC FACILITIES

1	Bethesda Gateway	31	Maputa
2	Bethesda Mobile	32	Mbadleni
3	Bhekabantu	33	Mbazwana
4	Ekuhlehleni	34	Mboza
5	Esiyembeni	35	Mduku
6	Ezimpondweni	36	Mhlekezzi
7	Ezwenelisha	37	Mkuze
8	Gedleza	38	Mngqobokazi
9	Gunjaneni	39	Mosvold Mobile
10	Gwaliweni	40	Mpembeni
11	Hlab Gateway	41	Mpukunyoni
12	Hlabisa Mobile	42	Mseleni Mobile
13	Inhlwathi	43	Mshudu
14	Jozini	44	Mtubatuba
15	Khula	45	Mtubatuba Mobile
16	Khwambuzi	46	Ndumo
17	KwaMsane	47	Nkundusi
18	KwaNdaba	48	Nkungwini
19	KwaZibi	49	Nondabuya
20	Mabibi	50	Ntondweni
21	Macabuzela	51	Ntshongwe
22	Machibini	52	Ophansi
23	Madonela	53	Ophondweni
24	Madwaleni	54	Oqondweni
25	Mahlungulu	55	Phelandaba
26	Makhathini	56	Shemula
27	Makhowe	57	Somkhele
28	Manaba	58	Thengani
29	Manguzi Mob	59	Velabusha
30	Manyiseni	60	Zamazama

UNIVERSITY OF LIMPOPO

Medunsa Campus



MEDUNSA RESEARCH & ETHICS COMMITTEE

CLEARANCE CERTIFICATE

P O Medunsa

Medunsa

0204

SOUTH AFRICA

MEETING: 03/2011

Tel: 012 - 521 4000

PROJECT NUMBER: MREC/H/36/2011: PG

Fax: 012 - 560 0086

PROJECT :

Title: Adherence of authorized prescribers to standard treatment guidelines / essential drug list when treating children presenting with respiratory conditions at Primary Health Care level in Umkhanyakude health district, KwaZulu Natal

Researcher: Mrs S Hlongwana
Supervisor: Ms Elvera Helberg
Co-supervisor: Dr S Bezuidenhout
Hospital Superintendent: Dr CHV Williams (Umkhanyakude Health District Office)
Department: Pharmacy
School: Health Care Sciences
Degree: MSc (Med) in Pharmacy

DECISION OF THE COMMITTEE:

MREC approved the project.

DATE: 13 April 2011


PROF. G. A. OGUNBANJO
CHAIRPERSON MREC

Note:

- i) Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.
- ii) The budget for the research will be considered separately from the protocol. PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.



health

Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x9051
Pietermaritzburg, 3200
Tel.: 033 – 395 2895
Fax.: 033 – 394 3782
Email: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM 65/11
Enquiries : Mrs X. Xaba
Telephone : 033 – 395 2805

Dear Mrs SI Hlongwana

Subject: Approval of a Research Proposal

1. The research proposal titled 'Investigating adherence of authorized prescribers to standard treatment guidelines/Essential Drug List (STGs/ EDL) when treating children presenting with respiratory conditions at Primary Health Care in Umkhanyakude Health District, KwaZulu Natal' was reviewed by the KwaZulu-Natal Department of Health.

The proposal is hereby approved for research to be undertaken at identified Primary Health Care Facilities.

2. You are requested to take note of the following:
 - a. Make the necessary arrangement with the identified facility before commencing with your research project (please always attach the list provided to this letter).
 - 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 Mr X. Xaba.

Yours Sincerely


Mrs E. Snyman
Acting Chairperson: Provincial Health Research Committee
KZN Department of Health
Date: 25/05/2011

uMnyango Wezempilo . Departement van Gesondheid

Fighting Disease, Fighting Poverty, Giving Hope

Appendix F: Adapted WHO data collection form for prescription audits

FORM A: ASSESSING COMPLIANCE WITH APPROVED STANDARD TREATMENT GUIDELINES AD ESSENTIAL DRUG LIST						
FACILITY NAME:				DATE:		
Prescription No.	Prescription date	Patient age	Diagnosis or symptom (exactly as stated on the prescription)	Qty and duration	Regimen indicated on 2008 STG/EDL	Treatment complies with approved STGs? (Yes/No)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						

Appendix G

INVESTIGATING FACTORS IMPACTING ON ADHERENCE OF AUTHORIZED PRESCRIBERS WHEN TREATING RESPIRATORY CONDITIONS IN CHILDREN UP TO 12 YEARS AT PHC FACILITIES AT UMKHANYAKUDE HEALTH DISTRICT

Name of interviewer _____ / _____ / 2011
 Date of interview _____ / _____ / 2011
 (signature)

SECTION 1: BIOGRAPHIC INFORMATION

1	2	3	4	5	6	7	8
Age in years in the last birthday	Sex 1 = Male 2 = Female	Highest training qualification holding	Job designation/level	Length of existence in PHC (in years)	Length of experience in prescribing (years)	As an authorized prescriber, which of the following trainings do you have? 1 = PHC training 2 = Dispensing course training 3 = Training in both PHC and dispensing 4. No training obtained 5 = Other (specify)	Name of the PHC facility you work for

SECTION 2: PRESCRIBER'S PERCEPTION ON ADHERENCE

9. As an authorized prescriber, how often do you think you comply with the 2008 PHC STG/sIEDL when treating respiratory condition in children presenting in your facility in the last six months?
 1 always 2 most of the time 3 sometimes 4 never 5 uncertain

10. In your opinion, what do you think affects your compliance to the 2008 PHC STG/sIEDL when treating respiratory condition in children?

SECTION 3: DRUGS AVAILABILITY AND PRESCRIBERS' KNOWLEDGE OF THEIR USE

11. How can you describe drug availability for respiratory conditions in children as per 2008 PHC STG's/EDL for the past six months?
 1 always available 2 mostly available 3 few times available 4 never available 5 unsure

12. If respiratory drug prescribed is not available what do you normally do with the patient?
 1 nothing 2 prescribe another drug 3 refer the patient to another health facility

13. Which respiratory conditions do you usually experience drug shortage for?
 1 conditions with predominant wheeze 3 respiratory infections
 2 upper airway disease 4 not applicable

14. If you prescribe another drug, please list the drug that you normally run short of and the replacement drug thereof?
 Drug prescribed Replacement drug
 14.1
 14.2

15. Kindly state why do you normally choose the above-mentioned as a replacement drug?

16. Do you think drug availability impacts on your compliance to the 2008 PHC STG's/EDL?
 1 yes 2 no 3 sometimes 4 unsure

17. Using the following scale, how would you describe your knowledge of drugs, in terms of which drug is used for which respiratory condition?
 1 very good (...-100%) 2 good (... - ...%) 3 average 4 poor (<50%) 5 unsure

SECTION 4: PRESCRIBERS' UNDERSTANDING AND AVAILABILITY OF THE 2008 PHC STG's/EDL

18. Using the following scale, how would you describe your content understanding of the 2008 PHC STG's/EDL?
 1 very good (...-100%) 2 good (... - ...%) 3 average 4 poor (<50%) 5 unsure

19. Do you have copies of the 2008 PHC STG's/EDL book in your facility?
 1 yes 2 no

20. If yes, are they enough to meet the prescribing needs of your health facility?
 1 yes 2 no 3 unsure

21. Do you always have a copy of the 2008 PHC STG's/EDL Book in your consulting room when consulting patients?

1 yes 2 no 3 sometimes 4 unsure

22. Do you think that availability of the 2008 PHC STG's/EDL book affect your compliance to the STGs for the treatment of respiratory conditions in children?

1 yes 2 no 3 sometimes 4 unsure

23. If yes, how?

24. Are you aware of any other guidelines used by PHC for the treatment of respiratory conditions in children other than the 2008 PHC STG/EDL book?

1 yes 2 no 4 unsure

25. If YES, do you use it in this health facility when prescribing?

1 yes 2 no 3 sometimes

26. What is the name of the guideline?

27. Is the other guideline mentioned in question 26 in line with the 2008 PHC STG's/EDL guideline for the treatment of respiratory conditions in children?

1 yes 2 no 3 sometimes

28. If no or sometimes which guideline takes precedence over another one in adhering to it when treating respiratory conditions in children and why?

SECTION 5: DIAGNOSIS

29. Do you always find it easy to accurately diagnose different respiratory conditions in children presenting at your facility?

1 yes 2 no 3 sometimes 4 unsure

30. If yes, what assists you to correctly diagnose the different respiratory conditions in children presenting in your facility?

31. If no, what makes it difficult for you to correctly diagnose the different respiratory conditions in children presenting in your facility?

32. As an authorized prescriber, how often do you think you prescribe correct treatment for the correct respiratory conditions in children presenting at your facility?

1 always 2 most of the time 3 sometimes 4 never 5 uncertain

33. If you do not ALWAYS prescribe correct treatment for the correct respiratory conditions, why?

SECTION 6: ATTITUDES TOWARDS GUIDELINES

34. Do you think the 2008 PHC STG's/EDL helps you as an authorized prescriber to best treat respiratory conditions in children under 12 years?
 1 yes 2 no 3 sometimes 4 unsure

35. Please explain your answer, irrespective of whether your answer is yes or no

36. Are you satisfied with the combination of treatment regimens in the 2008 PHC STG's/EDL for the respiratory conditions in children?
 1 fully satisfied 2 partially satisfied 3 not satisfied 5 unsure

37. If partially satisfied or not satisfied, what are the reasons for that?

38. Do you think adherence to the 2008 PHC STG's/EDL can help you achieve treatment outcomes of respiratory conditions in children?
 1 yes 2 no 3 sometimes 4 unsure

39. In the past six months, have you had experience of children not responding to treatment having correctly followed the 2008 PHC STG's/EDL for the treatment of respiratory conditions?
 1 yes 2 no 4 unsure

40. If yes, how many times has it occurred in the past 6 months?
 1 one time 3 three times 5 five times or more
 2 two times 4 four times 6 unsure

41. What do you think causes non-response to the 2008 PHC STG's/EDL respiratory treatment regimens?

42. What do you do if children do not respond to treatment having followed the 2008 PHC STG's/EDL for the treatment of respiratory conditions?
 1 nothing 2 prescribe another drug 3 refer the patient to another health facility

43. Do you feel motivated to use the 2008 PHC STG's/EDL when treating children presenting with respiratory conditions in your facility?
 1 yes 2 no 3 sometimes 4 unsure

44. What makes you feel motivated/demotivated to use the PHC STG's/EDL when treating children presenting with respiratory conditions in your facility?

45. Do you find it easy to refer to the 2008 PHC STG's/EDL during consultation? 1 yes 2 no 3 sometimes 4 unsure

46. If the answer is NO or SOMETIMES, what are the constraining factors?

47. If the answer is YES, what are the enabling factors?

SECTION 7: IMPLEMENTATION STRATEGY AND MONITORING AND EVALUATION

48. Did you get orientated on the 2008 PHC STG's/EDL when the latest version was introduced? 1 yes 2 no 3 sometimes 4 unsure

49. If the answer is YES or SOMETIMES, how is the orientation done?

50. Does your prescriptions ever get audited for the compliance with the 2008 PHC STG's/EDL? 1 yes 2 no 3 sometimes 4 unsure

51. If YES or SOMETIMES, who (write job designation and not a person's name) does prescriptions' audit for the compliance with the 2008 PHC STG's/EDL?

52. If YES, how often do prescriptions get audited? 1 daily 2 twice a week 3 weekly 4 bi-weekly 5 monthly 6 not applicable

53. Do you get feedbacks from your prescriptions audited for compliance with the 2008 PHC STG's/EDL? 1 yes 2 no 3 sometimes 4 unsure

54. If you get feedbacks from your prescriptions audited, in what spirit do you receive them? 1 positive spirit 2 negative spirit 3 sometimes negative, sometimes positive 4 unsure

55. Have you ever conducted self audits to check how you have been prescribing against the 2008 PHC STG's/EDL? 1 yes 2 no 3 sometimes 4 unsure

56. Do you think self audit is of any value to help you adhere to the 2008 PHC STG's/EDL, please explain your answer?

We have concluded our interview. Thank you very much for your hospitality and your valuable contribution.

58. Do you have any question for me? (list them all)

Appendix H: Letter to District Manager informing about scheduled visits



health

Department:
Health
PROVINCE OF KWAZULU-NATAL

MEMORANDUM

Tel: 033 – 846 7267

Fax: 033 – 846 7280

simangele.hlongwana@kznhealth.gov.za

www.kznhealth.gov.za

TO	: DISTRICT MANAGER – MISS MP THEMBA UMKHANYAKUDE HEALTH DISTRICT
FROM	: MRS. SI HLONGWANA (MANAGER: MONITORING, EVALUATION AND RESEARCH) PHARMACEUTICAL SYSTEM DEVELOPMENT
DATE	: 04 AUGUST 2011
RE	: VISIT TO SELECTED PHC FACILITIES FOR DATA COLLECTION

Dear Miss Themba

The letter from your office dated 01 March 2011 (attached) granted me permission to conduct research on the adherence of PHC nurses on the STGs/EDL when treating children presenting with respiratory conditions at selected PHC facilities within your district.

Please be informed that I will be commencing data collection from the **10th August 2011 to 02nd September 2011** at the following PHC facilities:

Hlabisa: Mtubatuba fixed, Somkhele, Hlabisa mobile, Gunjaneni, Nkundusi, Madwaleni and Ntondweni

Bethesda: Bethesda mobile, Madonela, Gedleza and Ophansi

Manguzi: Mahlungulu, Maputa, KwaNdaba and Zamazama

Mseleni: KwaMduku, Mqobokazi and Oqondweni

Mosvold: Nondabuya and Mbadleni

It will be appreciated if the relevant Managers from each Hospital and PHC facility selected are informed of this study before the arrangement for data collection is made. There are no fixed visit dates for each PHC facility. The PHC facility concerned will be phoned to make arrangement.

Attached is the clearance certificate from the University of Limpopo, Medunsa Campus and the approval letter from the Provincial Health Research Committee. The research proposal is available on request.

Kindly be informed that I will take all necessary precautions to minimize disruption of service delivery during the data collection period.

The copy of the results will also be made available to your office once finalised.

Thank you

MRS. SI HLONGWANA
MANAGER: MONITORING, EVALUATION AND RESEARCH
PHARMACEUTICAL SYSTEM DEVELOPMENT

• KINDLY RETURN ALL DOCUMENTATION WHEN REPLYING

Appendix I: Consent form

UNIVERSITY OF LIMPOPO (Medunsa Campus) CONSENT FORM

Statement concerning participation in Research Project.

Name of Project:

Investigating adherence of authorized prescribers to Standard Treatment Guidelines/Essential Drug List when treating children presenting with respiratory conditions at Primary Health Care level in Umkhanyakude health district, KwaZulu Natal

I have read the information on the aims and objectives of the proposed study and was provided the opportunity to ask questions and given adequate time to rethink the issue. The aim and objectives of the study are sufficiently clear to me. I have not been pressurized to participate in any way.

I understand that participation in this study is completely voluntary and that I may withdraw from it at any time and without supplying reasons.

I know that this Study has been approved by the Medunsa Campus Research and Ethics (MCREC), University of Limpopo (Medunsa Campus). I am fully aware that the results of this Study will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

I hereby give consent to participate Project.

.....
Name of participant

.....
Signature of participant.

.....
Place.

.....
Date.

.....
Witness

Statement by the Researcher

I provided verbal information regarding this study
I agree to answer any future questions concerning the Study as best as I am able.
I will adhere to the approved protocol.

.....
Name of Researcher

.....
Signature

.....
Date

.....
Place

Appendix J: Letter to the District Manager requesting authority to conduct study



HEALTH
KwaZulu-Natal

MEMORANDUM

UMKHANYAKUDE HEALTH DISTRICT OFFICE

Tel: 035-5721327

Fax: 035-5721251

E-mail: Simangele.hlongwana@kznhealth.gov.za

www.kznhealth.gov.za

TO	: THE DISTRICT MANAGER – MISS MP THEMBA
FROM	: MRS SIMANGELE HLONGWANA
DATE	: 08 NOVEMBER 2010
RE	: REQUEST FOR AUTHORITY TO CONDUCT RESEARCH FOR A MASTERS PROGRAM AT SELECTED UMKHANYAKUDE PHC FACILITIES

Dear Ms Themba

I am currently enrolled with the University of Limpopo, Medunsa campus, for a Masters Degree in Science (MSc Pharmacy). Wealth of knowledge and skills accrued through my previous studies at this University has already begun to help me gain new insights and perspectives into my work, including the shaping of my professional growth. This has motivated me to enroll for the MSc Pharmacy with this University.

In order to fulfill the requirements for this Masters Degree I am required to undertake a research project in any of the health related issues, preferably within the area of my job. It is for this reason that I request your authority to undertake a research project at the selected PHC facilities within your health district. The proposed study is titled:

“Investigating Adherence of Authorized Prescribers to Standard Treatment Guidelines/Essential Drug List when Treating Children Presenting with Respiratory Conditions at Primary Health Care Level in Umkhanyakude Health District, KwaZulu-Natal.”

The aim of this study is to determine whether authorized prescribers at PHC facilities in the Umkhanyakude health district adhere to the 2008 PHC STG's/EDL when treating respiratory conditions in children up to 12 years of age, and if not what are the possible factors impacting on their adherence to approved 2008 PHC STG's/EDL.

Data for this study will be collected from the selected PHC facilities using their clinic pink registers for prescription audits to assess adherence to the 2008 PHC STG's/EDL. Structured questionnaires will be administered by the researcher to the authorized prescribers whose pink registers were audited, to determine factors impacting on their adherence to the approved 2008 PHC STG's/EDL.

Appointments with the PHC facility managers and briefing sessions will be scheduled to explain the purpose of the study, procedure employed by the study in selecting PHC facilities, as well as the data collection strategy. All potential participants will be requested to

voluntarily sign informed consent prior to participating into the study. All efforts will be made to ensure minimum disruption of the service delivery during data collection period.

The results and recommendations of the study will also be used to improve adherence of the PHC nurses to STG/EDL at Umkhanyakude health district, thus improving treatment outcomes in a cost effective manner. They will also be made available to all relevant stakeholders including the District Management Team.

The study protocol will be approved by the University of Limpopo and the KwaZulu Natal Department of Health Ethics Committees in order to ensure that all ethical issues are adequately addressed. It is an ethical procedure that authority must be granted by relevant manager to conduct study in any facility. It is also a requirement by both University of Limpopo and the KwaZulu Natal Department of Health Ethics Committees that submission of protocols for ethical considerations must be accompanied by the written approval from relevant Health Care Manager.

For detailed information about the study, kindly find the attached protocol to be submitted to the aforementioned ethics committees. I have also attached the application form for the University of Limpopo Ethics Committee which requires your signature confirming that authority has been granted subject to ethical clearance of all relevant ethics committees.

I am looking forward to your positive response in this matter.

Mrs. SI Hlongwana
Manager-Pharmaceutical Services
Umkhanyakude Health District



HEALTH
KwaZulu-Natal

MEMORANDUM

UMKHANYAKUDE HEALTH
DISTRICT

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TO	: MRS. SI HLONGWANA
FROM	: DR. CH VAUGHAN-WILLIAMS UMKHANYAKUDE HEALTH DISTRICT
DATE	: 01 MARCH 2011
RE	: PERMISSION TO CONDUCT RESEARCH AT DISTRICT/ FACILITY

Dear Mrs. Hlongwana

I have pleasure in informing you that permission has been granted to you by the District Office to conduct research on investigating adherence of authorized prescribers to Standard Treatment Guidelines/Essential Drug List when Treating Children Presenting with Respiratory Conditions at PHC facilities in this district.

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.

Thanking you

DR. CH VAUGHAN-WILLIAMS
CHIEF TECHNICAL ADVISOR- FAMILY MEDICINE
UMKHANYAKUDE HEALTH DISTRICT