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LEVEL OF ADHERENCE TO TREATMENT GUIDELINES FOR NIMART AMONG TB & HIV PATIENTS: A CONCEPTUAL MODEL

by

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DECLARATION

I, the undersigned declare that, "**LEVEL OF ADHERENCE TO TREATMENT GUIDELINES FOR NIMART AMONG TB & HIV PATIENTS: A CONCEPTUAL MODEL**" is my original work and that all the sources I have used or cited have been indicated and acknowledged by means of complete references

Signature:

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ABSTRACT

Tuberculosis (TB) is the leading cause of death among people living with human immunodeficiency virus (HIV). At least one in four deaths among people living with HIV & AIDS (PLWH) can be attributed to TB, and many of these deaths occur in resource-limited settings. Although policies, strategies and treatment guidelines are in place, the epidemic of HIV associated TB continues to grow, particularly in South Africa. HIV is a key driver of the global rise in TB cases through accelerated progression of TB and great risk of reactivation. Adherence to treatment guidelines have been shown to improve patient outcomes. Adherence to treatment guidelines in nurse-led interventions had been found to be moderate to better. The improvement of care for TB & HIV co-infected patients depends on the proper adherence to treatment guidelines.

Guidelines had been changing to meet the needs of patients and the health care system. Furthermore, South Africa's health system is pre-dominated by nurses and TB & HIV integrated interventions rely on nurses initiating and managing antiretroviral (ARV) and TB treatment. However, there is little or no evidence of adherence and compliance to TB & HIV co-infection treatment guidelines among nurses providing care, treatment and support to HIV-infected TB patients outside of research protocols. The purpose of this study was to evaluate nurses initiating and managing ART (NIMART) adherence to treatment guidelines and to explore factors

influencing adherence to treatment guidelines in order to conceptualise the finding into a conceptual model of treatment guidelines adherence.

An explanatory sequential mixed method design was used in this study and comprised two phases. Phase 1 used a descriptive cross-sectional study to describe the level of adherence to treatment guidelines among Primary Health Care/Community Health Centres (PHC/CHC) with nurses initiating and managing ART/TB treatment. Six hundred and eighty eight (688) patient medical records were randomly sampled from 16 randomly selected PHC/CHC facilities in Ugu district in Kwazulu-Natal Province (KZN) and Ngaka Modiri Molema district in North-West Province (NWP). A structured data abstraction tool was used as an instrument to collect data. The Statistical Packages for Social Sciences (SPSS, version 20) computer software was used for data analysis. Adherence to treatment by nurses was cross-tabulated against demographic characteristics to detect possible patterns and variations. The means and standard variations of all continuous variables were calculated. Result presentations include frequency tables generated by SPSS. The differences in means of scales and variables across demographic characteristics were compared through a t-test. Multiple linear regression analysis was done to establish the predictors of measures of adherence to treatment guidelines using the backward methods. Correlation was done to establish relationships between measures of adherence to treatment guidelines and patient treatment outcomes.

Phase 2 used an exploratory-descriptive study to explore and describe the anticipated facilitators and challenges for adherence to treatment guidelines among

nurses initiating and managing ART and TB treatment through focus group interviews. An interview guide was used to ensure focus during the interview. Demographic variables were analysed from the focus group demographic data sheet. The aim was to identify the themes suggested by participants. Transcripts were reviewed to identify themes, sub-themes and categories. Axial coding was then performed. By this process, the emerging themes from data were further delineated along their respective properties and dimensions, and sub-categories generated. The researchers used a two-axis grid, with the focus groups comprising one axis and the key content areas comprising the second axis, and reviewed these categories and sub-categories. Statements were compared within and across sessions for consistency.

The results revealed a significant difference between the two provinces with regard to the level of adherence to treatment guidelines with NWP having about 91% moderate and 9% high adherence to evaluations done at diagnosis or before initiation of treatment as compared to about 74% moderate and 14% high in KZN. About 73% of patient records in KZN had highly adhered to the treatment guidelines with regard to evaluations done on Initiation of ART with NWP having only about 35% of high adherence to treatment guidelines, hence there was a marked statistical difference between the two provinces ($p<0.001$). There was a marked moderate to high level of adherence to treatment guidelines to evaluations done at ART initiation. A low level of adherence was revealed by this study as the majority of patients files were not monitored for CD4 cell counts and viral load in both KZN (71.2%) and NWP

(88.5%), respectively. However there was a significant difference between the two provinces at $p<0.001$.

There was no significant relationship between patient treatment outcome and adherence to treatment guidelines with regard to TB diagnosis ($r=0.035$; $p=0.867$) and TB regimen ($r=0.145$; $p=0.498$). A moderate significant negative association between patient treatment outcome and TB monitoring was found ($r=0.449$; $p=0.24$).

Two themes emerged from the focus group interviews as barriers and facilitators of adherence to treatment guidelines. Barriers were inclusive of factors related to negative attitude towards the treatment guidelines, knowledge/awareness and behaviour and facilitators comprised of the following sub-themes, namely, attitude, knowledge/awareness and behavioural change.

For adherence to treatment guidelines to improve, a number of factors should be considered and implemented thus - the guidelines recommendations, organisational and patient factors as well as support, supervision and mentorship towards the NIMART nurses. NIMART nurses should be supported and supervised in their initiation and management of ART roles in order for them to be competent and confident about quality TB & HIV service provision. Continuous professional development (CPD) in the TB & HIV area should also be promoted as NIMART need constant supervision by physicians and pharmacists and continuous updating and orientation to new drugs, practice and knowledge.

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ALT	:	Alanine Aminotransferase
ANOVA	:	Analysis of Variance
ART	:	Antiretroviral Therapy/Treatment
ARV	:	Antiretroviral
CDC	:	Centers for Disease Control and Prevention
CHC	:	Community Health Centre
CPD	:	Continuous Professional Development
CPT	:	Cotrimoxazole Preventive Therapy
DoH	:	Department of Health
DOTS	:	Directly Observed Treatment, Short-Course
DST	:	Drug Sensitivity Tests
EN	:	Enrolled Nurse
FAST	:	Faculty of Agriculture, Science and Technology
FBC	:	Full Blood Count
GTPT	:	Guidelines for Tuberculosis Preventive Therapy
HAART	:	Highly Active Antiretroviral Therapy
Hb	:	Haemoglobin
Hct	:	Haematocrit
HCT	:	HIV Counselling and Testing
HIV	:	Human Immunodeficiency Virus
IDP	:	Infectious Disease Physician
IMCI	:	Integrated Management of Child Illnesses
INH	:	Isoniazid
IPT	:	Isoniazid Preventive Therapy
KZN	:	Kwazulu-Natal Province
LSD	:	Fisher's Least Significant Difference
MDR-TB	:	Multidrug-Resistant Tuberculosis
MRR	:	Medical Record Review
NDoH	:	National Department of Health
NIMART	:	Nurses Initiating and Managing Antiretroviral Therapy/Treatment
NNRTI	:	Non-Nucleoside Reverse Transcriptase Inhibitor
NsRTI/NtRTI	:	Nucleoside/Nucleotide Reverse Transcriptase Inhibitor
NWP	:	North-West Province
PALSA Plus	:	Practical Approach to Lung Health and HIV & AIDS in South Africa
PCP	:	Pneumocystis Pneumonia
PHC	:	Primary Health Care

PHCN	:	Primary Health Care Nurses
PI	:	Protease Inhibitor
PICT	:	Provider Initiated Counselling and Testing
PLWH	:	People Living with HIV & AIDS
PN	:	Professional Nurse
QDA	:	Qualitative Data Analysis
RBC	:	Red Blood Cells/Red Blood Cell Count
RP	:	Respiratory Physician
SA	:	South Africa
SAATG	:	South African Antiretroviral Treatment Guideline
SANGTB	:	South African National Guidelines for Tuberculosis
SE	:	Standard Error
SPO	:	Structure-Process-Outcome
SPSS	:	Statistical Program for Social Sciences
TB	:	Tuberculosis
TB & HIV	:	Tuberculosis & Human Immunodeficiency Virus
TST	:	Tuberculin Skin Test
VL	:	Viral Load
WBC	:	White Blood Cells/White Blood Cell Count
WHO	:	World Health Organization
XDR-TB	:	Extensively Drug-Resistant Tuberculosis

CHAPTER 1

OVERVIEW OF THE STUDY

1.1 Introduction and Background

Tuberculosis (TB) is the leading cause of mortality among people living with human immunodeficiency virus (HIV). At least one in four deaths among people living with HIV & AIDS (PLWH) can be attributed to TB, and many of these deaths occur in resource-limited settings (World Health Organization (WHO, 2010:3). Although policies, strategies and treatment guidelines are in place, the epidemic of HIV associated TB continues to grow, particularly in South Africa (Harries, Zachariah, Corbett, Lawn, Santos-Filho, Chimzizi, Harrington, Maher, Williams & Cock, 2010:1906).

Adherence to treatment guidelines have been shown to improve patients' outcomes. According to Byrsell, Regnell and Johansson (2012:165), adherence to treatment guidelines in nurse-led interventions had been found to be moderate to better. Nurse-led care has been associated with stricter adherence to protocols, improved prescribing in concordance with treatment guidelines, more regular follow-up, and potentially lower health care costs (Clark, Smith, Taylor & Campbell, 2010:2). HIV is a key driver of the global rise in TB cases through accelerated progression of TB and greater risk of reactivation (Perrin, Breen & Lipmann, 2012:42). TB and HIV infection are inextricably linked and over the last 30 years

they have been responsible for an increasingly global burden of death and disease (Perrin, Breen & Lipmann, 2012:42).

Collaborative TB & HIV activities are essential to prevent, diagnose and treat TB among PLWH (WHO, 2010:3). In recent years, the implementation of integrated TB & HIV interventions has been rising globally. This has created the need for additional research to clarify how to deliver quality and integrated services for TB and HIV prevention, treatment and care, and thus prevention of unnecessary deaths (WHO, 2010:30).

Despite the paramount challenges TB & HIV co-infection present to health care workers and policy makers, there are now genuine rationalisations for optimism (Perrin *et al*, 2012:42). Many countries had embarked in the fight to eradicate and mitigate TB & HIV co-infection through integrated treatment guidelines. According to WHO (2010:30), the best delivery model of integrated TB & HIV interventions is unknown. However, different models for integration between TB and HIV care programmes are already in place in several countries (e.g., India and Mozambique are providing separate HIV and TB services with strengthened cross referrals; and partial integration of services is used in Rwanda and Tanzania).

Furthermore, South Africa and Malawi have been reported to be the only two countries that had a fully integrated model with one stop service for TB patients with HIV (WHO, 2010:30). This service resulted in 87% (765/881) of TB patients accepting HIV testing, 98% of HIV-infected TB patients receiving cotrimoxazole prophylaxis, and 73% of HIV-infected TB patients receiving antiretroviral therapy (ART) in South Africa (Verkuijl, Makaluza, Macharia, Jagwer & Flam, 2008:1). In contrast, while 92% of the Malawian TB patients attending the

first integrated clinic in Lilongwe had tested for HIV infection, only 36% (300/830) of the eligible co-infected patients initiated ART (Jahn, Tweya, Garieta, Zimba, Mulinde, Kalulu, Phiri, Boxshall & Gottlieb, 2008:3). Patients' reluctance about receiving dual therapy and fear of side effects explained this low uptake of ART among eligible HIV-infected TB patients (WHO, 2010:30).

From the mid-1980s, TB programmes in countries with high prevalence of HIV infection, particularly in sub-Saharan Africa, faced increasing challenges: rising TB case notifications; disproportionally more patients with smear-negative disease (Colebunders & Bastian, 2000:104) and drug-related side-effects (Nunn, Kibuga, Gatuna, Brindle, Omwega, Were, Imalingat, Wasunna, McAdam, Lucas & Gilks, 1991:628); high case fatality (Diul, Maher & Haris, 2001:149); high rates of tuberculosis recurrence (Korenromp, Scano, Williams, Dye & Nunn, 2003:99); and increased transmission of TB within congregate settings. In industrialised countries in the 1990s, outbreaks of multidrug-resistant tuberculosis (MDR-TB) occurred in HIV-infected people in health facilities (Edlin, Tokars, Grieco, Crawford, Williams, Sordillo, Ong, Kilburn, Dooley, Castro, Jarvis & Holmberg, 1992:1518), only to be re-entered in the well-publicised outbreak of extensively drug-resistant tuberculosis (XDR-TB) in HIV-infected people in Tugela Ferry, Kwazulu-Natal, South Africa, from 2005 to 2006 (Gandhi, Moll, Sturm, Pawinski, Govender, Lalloo, Zeller, Andrews & Friedland, 2006:1578).

National guidelines for strengthened referral models between TB and HIV services have been shown to improve identification of HIV status among TB patients, provision of cotrimoxazole prophylaxis treatment (CPT) to HIV-infected TB patients, and TB screening together with TB diagnosis among PLWH (Raizada, Chauhan, Babu, Thakur, Khera, Wares,

Sahu, Bachani, Rewari & Dewani, 2009:3;). As an illustration of full integration, a one stop service for HIV-infected TB patients was introduced in South Africa in 2006 (WHO, 2010:31).

Since 2004, according to Mkhwanazi (2012:1), the TB cure rate has gone up to 70% from 50% nationally. Three out of the nine provinces have shown dramatic improvement in their TB management programmes, namely, Kwa-Zulu Natal, Eastern Cape (In UKhahlamba district, a much higher HIV and TB rate is reported) and the North-West (Mkhwanazi, 2012:1). Furthermore, even if there is better testing and cure rates for TB patients, HIV and TB are still a concern, while this increase in TB cure rates has been in conjunction with increase participation by nurses in the diagnosis and management of TB ((Mkhwanazi, 2012:1).

According to the National Department of Health (NDoH, 2009:70), three approaches can help to minimise the impact of TB on those with HIV: (i) TB preventive therapy to reduce an individual client's risk of developing TB; (ii) Early, prompt diagnosis of TB through intensified case-finding; and (iii) appropriate case management of TB, including the provision of comprehensive HIV care to the co-infected. Furthermore, these strategies will prolong the lives of PLWH and help minimise the negative effects of TB on the course of HIV and interrupt the transmission of TB. In terms of priorities, the most effective way of breaking the transmission chain and preventing infection and disease in the community is to find and cure infectious cases of TB (NDoH, 2009:70; Fujiwara, Dlodlo, Nakanwagi-Makwaya, Cesari, & Boillot, 2012:33).

The goal for the South African ART guideline (NDoH, 2010:2) is to integrate HIV and TB services and to prioritise ARV for patients co-infected with TB & HIV. In addition, to implement NIMART by preparing nurses to perform those duties in primary health care (PHC) and community health centre (CHC) facilities (NDoH, 2010:2). The majority of studies regarding adherence to implementing treatment guidelines have been done with physicians and fewer studies have been conducted about adherence to treatment guidelines for nurse-led initiation and management of HIV & TB collaborative intervention.

1.2 Problem Statement

The improvement of care for HIV & TB co-infected patients depends on the proper adherence to treatment guidelines. Guidelines had been changing to meet the needs of patients and the health care system. Furthermore, South Africa's health system is pre-dominated by nurses and TB & HIV integrated interventions rely on nurses initiating and managing ART and TB treatment. However, there is little or no evidence of adherence and compliance to HIV & TB co-infection treatment guidelines among nurses providing care, treatment and support to HIV-infected TB patients outside of research protocols. This study sought to describe the level of adherence and explore factors that influence the adherence to treatment guidelines among nurses initiating and managing ART and TB to HIV-infected TB patients.

1.3 Purpose and Objectives of the Study

This study comprised three phases:

1.3.1 Phase 1 (Quantitative Phase)

Aim:

To conduct a cross-section evaluation of HIV & TB co-infected patients receiving care at CHC and PHC clinics to determine the extent to which nurses initiating and managing ART and anti-tuberculosis treatment adhere to treatment guidelines in North-West (NW) and Kwazulu-Natal (KZN) provinces.

Objectives:

1. To determine level of adherence to the delivery of guidelines of integrated TB & HIV co-infection interventions by nurses providing care, treatment and support to HIV-infected TB patients;

2. To describe factors predicting the level of nurse adherence to treatment guidelines; and

3. To establish the relationship between level of adherence to treatment guidelines and patient outcome measures.

1.3.2 Phase 2 (Qualitative Phase)

Aim:

To conduct an exploratory-descriptive qualitative study utilising focus group interviews to explore and describe factors influencing treatment guidelines adherence among NIMART/anti-TB treatment in KZN and NWP

Objectives:

4. To explore and describe factors influencing treatment guidelines adherence among NIMART/anti-TB treatment in KZN and NWP

Research question:

What are the factors influencing treatment guidelines adherence among NIMART/anti-TB treatment in KZN and NWP?

1.3.3 Phase 3 (Meta- Inference

Aim:

To draw conclusions based on the findings of both quantitative and qualitative designs

Objective:

To interpret and make meta-inferences of both quantitative and qualitative findings.

1.3.4 Phase 4 (Conceptual Model of Adherence to Treatment Guidelines)

Aim:

To develop a conceptual model for the study

Objectives:

To conceptualise the findings into an adapted conceptual model of adherence to treatment guidelines.

1.4 Significance of the Study

The potential findings of this study will inform policy makers and the developers of guidelines about the factors affecting nurse adherence to treatment guidelines. Furthermore, the findings from this study can be used to inform future intervention research to improve HIV & TB co-infection treatment and management guidelines to decrease the incidence of active TB among HIV-infected patients in South Africa and elsewhere. The findings of this study will also provide additional evidence for the effectiveness of nurse-initiated and managed integrated HIV & TB interventions.

1.5 Definitions of Concepts

Adherence	The process in which a person follows rules, guidelines, or standards of care (Mosby's Medical Dictionary, 2009). However, in this study, it means to follow correctly the HIV & TB treatment guidelines to facilitate and implement integrated interventions.
Treatment guidelines	Recommendations on the appropriate treatment and care of people with specific diseases and conditions within the National Health System and are based on the best available evidence (National Institute for Health and Care Excellence, 2003:np). Hence, herein means recommendations used to assist health care providers and patient decisions about appropriate health care for HIV & TB circumstances.
TB & HIV co-infection	The Centers for Disease Control and Prevention (CDC, 2012:np) defines TB & HIV co-infection as a condition in which a person has both HIV infection and active TB disease - thus, simultaneous infection with both HIV and TB pathogens.
Antiretroviral treatment	Treatment with drugs that inhibit the ability of HIV to multiply in the body (National Cancer Institute Dictionary, nd).

NIMART trained PHC nurse	A primary health care professional nurse trained to initiate and manage antiretroviral therapy.
NIMART trained professional nurse	Any professional nurse trained to initiate and manage antiretroviral therapy.

1.6 Study Outline

Given the aims and objectives, this study was divided into Phase 1 and Phase 2 which were conducted sequentially. Phase 1 was a quantitative, descriptive and predictive chart review and Phase 2 an exploratory-descriptive study. The thesis has been arranged into the following chapters:

Chapter 1: Contains the introduction, problem statements, objectives, significance and outcome.

Chapter 2: Is the literature review focusing on key components of the study.

Chapter 3: Outlines the research methodology used in the study.

Chapter 4: Presents the findings and discussion of Phase 1 of the study.

Chapter 5: Details the findings and discussion of Phase 2 of the study.

Chapter 6: Provides the conclusions and recommendations of the study.

Chapter 7: Entails the conceptualisation of both the qualitative and quantitative findings of this study.

Chapter 8: Provides the limitations, strengths, recommendations and the conclusion of the study.

1.7 Summary

This chapter outlined the overview of the study, including the background and rationale for the study, the problem statement, research purpose in respect of the different phases and their objectives. The significance of the study, definition of terms as well as the sequential arrangement of chapters was also described.

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 Introduction

The HIV has a dramatic impact on TB control in countries with a high burden of TB & HIV (WHO, 2004:4). At the same time, tuberculosis is not only the leading cause of death among people living with HIV (PLWH), but also the most common curable infectious disease among PLWH (WHO, 2004:4). This has led to the realization that additional interventions are urgently needed to augment the WHO's recommended Directly Observed Treatment, Short-Course (DOTS) strategy for TB control (WHO, 2006:5). Tackling TB should include tackling HIV as the most potent force driving the TB epidemic; tackling HIV should include tackling TB as a leading killer of PLWH (WHO, 2006:4; WHO, 2004:8). The WHO's global response has been the development of the global framework for TB & HIV with the aim to reduce TB transmission, morbidity and mortality (while minimising the risk of anti-tuberculosis drug resistance), as part of overall efforts to reduce HIV-related morbidity and mortality in high HIV prevalence settings. The global framework largely focuses on sub-Saharan Africa.

The global TB and HIV epidemics in sub-Saharan Africa are closely intertwined. TB is the leading cause of mortality among PLWH worldwide, with South Africa having the greatest number of HIV-infected individuals and among the highest TB incidence rates worldwide (WHO, 2007:376). TB changes the clinical presentation of HIV from a slowly progressing

disease with reasonable prognosis to one with a high mortality rate (Haileyesus, Mark, Rick & Paul, 2007:2046). Hence, this study sought to review the level of integration of services among these two co-epidemics.

In many countries with limited resources, the TB case rate has increased 5- to 10-fold since the identification of HIV, and the prevalence of HIV infection among individuals with newly diagnosed TB exceeds 80% (Corbett, Marston, Churchyard & De Cock, 2006:934). The greatest burden of the TB and HIV infection interface is seen in sub-Saharan Africa, where the enormous size of the problem is tragically, inversely proportionate to the paucity of resources available for its control (Gandhi, Moll & Sturm, 2006:1577).

According to Mayer & Dukes Hamilton (2010:68), in 2007 about1.37 million people infected with HIV were estimated to be co-infected with TB and 1 of 4 deaths from TB is now HIV related. In regions with a high prevalence of HIV infection, the AIDS epidemic has stoked an increase in the number of cases of TB, including those caused by drug-resistant strains of *M. tuberculosis* (Mayer & Dukes Hamilton, 2010:68). Health care systems in most developing countries have been under-resourced and poorly managed for decades (Mayer & Dukes Hamilton, 2010:68). Individuals co-infected with TB and HIV or AIDS personify the difficulties that such weak health systems pose (Mayer & Dukes Hamilton, 2010:69)

This chapter provides the literature review on adherence to treatment guidelines and a conceptual framework

2.2 Literature Review

2.2.1 Introduction

Treatment guidelines are commonly regarded as a useful tool for quality patient care improvement (Grimshaw, Thomas, Maclennan, Fraser, Ramsay, Vale, Whitty, Eccles, Matowe, Shirran, Wensing, Dijkstra & Donaldson, 2004:609). Hence, their impact in clinical practice is optimal. Several studies or reviews had shown that guidelines have only been moderately effective in changing the process of care and that there is little room for improvement. Therefore, this review focuses on developing and implementing clinical guidelines for TB-HIV services, TB-HIV collaborative activities, impact of the TB-HIV collaborative activities, adherence to treatment guidelines, factors influencing adherence to guidelines.

2.2.2 Developing and Implementing Treatment Guidelines

Clinical practice/treatment guidelines are defined as a systematically developed statement to assist health care providers and patients decisions about appropriate health for specific clinical circumstances (Field & Lohr, 1990:7). The intent for treatment guidelines are said to:

1. Improve the quality of patient care and health care outcomes,
2. Summarise research findings and make clinical decisions more transparent,
3. Reduce inappropriate variation in practice,
4. Promote efficient use of resources,
5. Identify gaps in knowledge and prioritise research activities,
6. Provide guidance for consumers and inform and empower patients,

7. Inform public policy and support quality control, including audits of clinician and hospital practices (Davis, Joanne & Palda, 2007:3).

For this reason, implementation should be in line with reaching the above mentioned purposes.

Grimshaw, Freemantle, Wallace, Russels, Hurwits, Watt, Long & Sheldon (1995: 60) stated that although guidelines can be used to help change clinical practice, their adoption and use is not automatic and will depend to a great extent to which they are developed and implemented. It is often assumed that guidelines developed by the health care providers who will ultimately use them improve their implementation, owing partly to a perception of increased ownership. Guidelines produced by locally professional end users may at times be seen as less credible than those produced by respected practitioners (opinion leaders) or national experts in the subject matter (Grimshaw *et al*, 1995:60).

However, of importance in this review are TB & HIV guidelines recommended for South Africa with regard to targeted collaborative activities for TB & HIV. The collaborative activities were recommended by WHO in a document originally published in 2004 as interim policy on collaborative TB & HIV activities and was updated in 2012 (Fujiwara *et al*, 2012:vii).

2.2.3 TB & HIV Collaborative Activities

The risk of developing TB is estimated to be between 12-20 times greater in PLWH than among those without HIV infection. In 2011, there were 8.7 million new cases of TB, of which 1.1 million were among PLWH (WHO, 2013:np). These TB and HIV co-epidemics require urgent and effective attention and demand a collaborative effort between TB & HIV

programmes employing different, but complementary strategies (Kassa, Jerene, Assefa, Teka, Aseffa & Deribew, 2012: 1). Both programmes should be able to identify and manage both diseases. However, the two programmes are often separate at the level of patient care, contributing to delayed diagnosis and linkage to care (Kassa *et al*, 2012:1). TB & HIV programs must establish linkages to better utilise resources, avoid missed opportunities, and accelerate universal access to comprehensive TB & HIV prevention, treatment and care services (Mukherjee, 2006:24). This shows that the two epidemics complement each other and had led the health care system to employ collaborative measures to curb their burden.

As a result, WHO recommends three TB & HIV collaborative activities, thus: (i) to establish and strengthen the mechanism for delivering integrated TB & HIV services; (ii) reducing the burden of TB in PLWH and initiate ART; and (iii) to reduce the burden of HIV in patients with presumptive and diagnosed TB (WHO, 2012:9). The three *I*s incorporated intensify TB case findings and ensure high quality anti-tuberculosis treatment, initiate TB prevention with Isoniazid Preventive Therapy (IPT) and early ART, and ensure control of TB infection in health care facilities and congregate settings (WHO, 2012:22-25). The WHO HIV & TB departments and their partners, including community groups, work collaboratively on joint TB & HIV advocacy, policy development and implementation in countries (WHO, 2013:np). The collaborative activities are discussed as follows:

1. **ESTABLISH AND STRENGTHEN THE MECHANISM FOR DELIVERING INTEGRATED TB & HIV SERVICES**

In order to reach this recommendation a subset of aspects needs to be maintained that is:

1. Setting up and strengthening a coordinating body for collaborative TB & HIV activities functional at all levels;

2. Determining HIV prevalence among TB patients and TB prevalence among PLHA;
3. Carrying out joint TB & HIV planning to integrate the delivery of TB & HIV services which includes models of TB & HIV services integration;
4. Monitoring and evaluating collaborative TB & HIV activities (WHO, 2012:14; Fujiwara *et al*, 2012:32).

For these recommendations to be achieved, there should be an involvement of broad based implementers from all levels of the health fraternity.

. **REDUCE THE BURDEN OF TB IN PLWH AND INITIATE ART**

This recommendation provides the importance of preventing and managing TB among PLWH. The burden of TB among PLHW can be reduced by:

1. Intensifying TB case-finding and ensuring high quality anti-TB treatment,
2. Initiating TB prevention with IPT and early ART, and
3. Ensuring control of TB infection in health care facilities and congregate settings (Fujiwara *et al.*, 2012:33, WHO, 2012:14).
4. Reducing the burden of HIV in patients with presumptive and diagnosed TB.

HIV also has an impact on TB, hence the importance of reducing its burden through:

1. Provision of HIV testing and counselling;
2. HIV prevention interventions to patients with presumptive and diagnosed TB;
3. Provision of Cotrimoxazole Preventive Therapy (CPT) for TB patients living with HIV;
4. Ensuring HIV prevention interventions, treatment and care for TB patients living with HIV; and

5. Provision of antiretroviral therapy for TB patients living with HIV (Fujiwara, 2012:33, WHO, 2012:14).

These provisions would be of great importance in meeting the recommendation.

2.2.4 Impact of TB & HIV Collaborative Activities

It is of paramount interest to understand the impact of TB-HIV collaborative activities within the health care setting as well as evaluating its recommendations. Over the past few decades, TB and HIV services were disconnected, which meant an increase in the cost of care for patients, as well as other added inconveniences, as numerous visits were required to access the required care. There were higher losses to follow-up and case fatalities, as well as delays in ART initiation (Choun, Pe, Thai, Lorent, Lynen & van Griensven, 2013:197). Although TB programme indicators like case notification, default rates and case evaluation had been progressively improving under the existing TB control interventions, death rates were high and treatment success remained below the global target of 85% (WHO, 2010:45).

The integration of TB & HIV services provides a unified strategy to address the burden of TB & HIV (WHO, 2003:3). The aim of integrated health services is to organise and manage the services so that people can get the health care they need (WHO, 2003:3). In TB & HIV control, integration of services has emerged as an essential component in any country's response to the TB & HIV dual epidemic with the aim to create coherence and synergy between the two programmes, not only to address problems with access and fragmentation, but also to enhance efficiency, quality of care and consumer satisfaction (Kodner, 2009:13).

Multiple recommendations and guidelines (WHO, 2012:8; Fujiwara *et al*, 2012:vii) are in place to support health care providers to deal with TB & HIV. Hence this review looked at the adherence thereof to treatment guidelines with regard to TB & HIV

2.2.5 Adherence to TB & HIV Guidelines

Adherence by health care providers is commonly evaluated in terms of process, subjective and outcome measures (Peterson, Roe, Mulgund, DeLong, Lytle, Brindis, Smith, Pollack, Newby, Harrington, Gibler, & Ohman, 2006:1917; Mosca, Linfante, Benjamin, Berra, Hayes, Walsh, Fabunnmi, Kwan, Mills & Simpson, 2005:506; Krane, Anderson, Lazarus, Termini, Bowdish, Chauvin, Fonseca, 2009:55). Adherence is herein defined as the response of the health care provider according to the guidelines within a designated timeframe, where the timeframe is the usual 'window of opportunity' to practice diagnostic and therapeutic actions.

The adherence to treatment guidelines comprise the following aspects, thus adherence to:

1. HIV testing,
2. IPT and CPT provision,
3. Evaluations done at diagnosis and before initiation of treatment,
4. ART regimens and patient monitoring, as well as
5. Overall adherence to *Treatment Guidelines*.

There is lack of evidence with regard to nurses' adherence to TB-HIV treatment guidelines and more with regard to physicians adherence to TB-HIV treatment guidelines, hence the focus of this review was based on available literature with regard to TB & HIV services.

2.2.6 Adherence to HIV Testing Among TB Patients

There is insufficient evidence with regard to the adherence of to HIV testing, however, Low and Eng (2009:480) reported that there is still poor adherence to clinical guidelines. Furthermore, this trend of poor compliance to HIV testing in TB patients had been evident since the 1980s until 2009 (Katz, Hall, Keon & Crane, 1993:1285; Asch, London, Barnes & Gelberg, 1997:380; Geduld, Brassard, Culman & Tannenbaum, 1999:117; Alrajhi, Nematallah, Abdulwahab & Bukhary, 2002:752; Dart, Alder, Mamdani, Solamalai, Evans, Johnson, Cropley & Lipman, 2006:272; Low & Eng, 2009:480), and this may be because of lack of adequate published literature. According to Low *et al* (2009:481), failure to test for HIV had been linked to low risk for HIV infection as perceived by physicians, however, collaborative activities for TB & HIV are fully promoting HIV Counselling and Testing (HCT) among TB patients (Fujiwara *et al*, 2012:25), due to the significant relationship of HIV and TB infection globally.

Respiratory physicians were less likely to test for HIV as compared to infectious disease physicians who tested the majority of their patients (Low & Eng, 2009: 480). Hence, they all did not meet the recommendations set out in the guideline, which indicates that there is poor adherence. The study revealed that most failures to test for HIV were independently associated with the outpatient setting considering its awkwardness, public perceptions and social stigma (Low & Eng, 2009:480). However, early screening can also be a good source for determining patient knowledge about HIV, the link of HIV & TB and provides detailed information and ability to identify risk factors that are associated with greater chances of getting HIV infection (Low & Eng, 2009:480; Fujiwara *et al*, 2012:26). This calls for studies to

address provider adherence as well as the involvement of other health care providers in providing HCT.

2.2.7 Adherence to IPT and CPT Provisions

IPT and CPT are the most regarded preventive therapies among TB & HIV patients in this era. Although its dependence on provider discretion and assessment as well as eligibility issues, major differences among providers still exists and continually affects the wellness of TB & HIV patients. Earlier studies reported that adherence to the provision of IPT was relatively poor among physicians (Saraceni, Pacheco, Golub, Vellozo, King, Cavalcante, Eldred, Chaisson & Durovni, 2011:250; Hiransuthikul, Hiransuthikul, Nelson, Jirawisit, Paewplot & Kasak, 2005:1214). Both studies indicated that ruling out active TB is a requirement before provision of IPT and include screening for symptoms, Tuberculin Skin Test (TST), sputum smear microscopy and chest X-ray.

However, some of the physicians do not do the TST and this can be explained on the bases that a positive TST does not differentiate between infection and active disease, and a false-positive could result from previous BCG vaccination exposure to environmental mycobacteria (Aït-Khaled, Alarcon, Bissell, Boillot, Caminero, Chiang, Clevenbergh, Dlodlo, Enarson, Enarson, Ferroussier, Fujiwara, Harries, Helda, Hinderaker, Kim, Lienhardt, Rieder, Rusen, Trébucq, Van Deun & Wilson, 2009:934). Furthermore, a negative TST does not exclude TB disease since a person with severe immune suppression from HIV may not react to a TST, even if they do have TB (Ait-Khaled *et al*, 2009:934); others did not do chest X-ray for screening for active TB prior to administrating IPT, hence, according to WHO (2010:30), it was not required as an investigation before starting IPT; others were concerned about

patients adherence to IPT and introducing INH-resistance to TB cases, whereas providing IPT to PLWH does not increase the risk of developing INH-resistant TB and this was stated as it should not be the barrier to providing IPT (WHO, 2010:30); and few physicians felt IPT is not beneficial to these patients and, according to Lawn, Myer, Bekker and Wood (2006:1609), the risk of developing TB is reduced by 70-90% and recurrent TB by 50% (Golub, Duroni, King, Cavalacante, Pacheco, Moulton, More, Chaisson & Saraceni, 2008:2529), hence not providing IPT place PLWH at higher risk.

The physicians adherence to Pneumocystis Pneumonia (PCP) provision was high (Saraceni *et al*, 2011:250) and on the other hand there were variations in the usage of PCP, that is, they used it either in single therapy regimens, dual therapy regimens, triple therapy regimens or only as a prophylaxis. PCP is recommended for all symptomatic PLHA and should be continued until the person's immune defence mechanisms have improved and a critical CD4 cell count had been reached for a minimum period of six months (Fujiwara *et al*, 2012:29).

2.2.8 Adherence to Evaluations Done at Diagnosis and Before Initiation of Treatment

The majority of physicians adhered to the recommendations published in the guidelines with regard to the evaluations done at diagnosis and at the pre-treatment stage (Naidoo, Esterhuizen, Jinabhai & Taylor, 2010:457). The use of CD4 cell count and viral load (VL) varied with regard to eligibility to start treatment and changing therapy, as physicians tended to use CD4 counts more than VL at diagnosis and before initiating ART; on the other hand they used VL more than CD4 counts in changing therapy, and also for monitoring effectiveness (Naidoo *et al*, 2010:457). The criteria used by physicians to initiate therapy

with respect to CD4 were found to be compliant to the national and international guidelines (Naidoo *et al*, 2010:457). The majority of patients initiated into ART met the criteria even though other physicians opted for non-recommended or discreet measures (Saraceni *et al*, 2011:250; Naidoo *et al*, 2010:457). Consequently, there confusion still abounds which guidelines to follow as different national guidelines are in place and only one international guideline exists.

Furthermore, it was evident that clinical assessment of the patients was also taken as an important measure wherein TB screening and clinical staging was adhered to by most physicians (Saraceni *et al*, 2011:250; Naidoo *et al*, 2010:457). Most physicians were highly compliant to clinical staging compared to TB screening which had a moderate adherence by physicians (Saraceni *et al*, 2011:250; Naidoo *et al*, 2010:457). However, TB is the most frequent opportunistic infection and a leading cause of death among PLWH, so screening for TB should be offered to those patients at every contact with the health care services (Fujiwara *et al*, 2012:457). Peterson *et al* (2011:67) indicated that majority of patients started ART a year after meeting the eligibility criteria. Both Naidoo *et al* (2010:457) and Peterson *et al* (2011:67) concluded that adherence to treatment guidelines was high.

2.2.9 Adherence to ART Regimen and Patient Monitoring

The triple drug combination patient monitoring was mainly prescribed by physicians, consisting either Nucleoside/Nucleotide Reverse Transcriptase Inhibitor (NRTI/NtRTI) with NNRTI or Protease Inhibitor (PI) (Naidoo *et al*, 2010:457). The most common regimen prescribed by physicians was the triple therapy consisting of 2NRTI + 1NNRTI, followed by 3NRTI, and 2NRTI + boosted PI (Naidoo *et al*, 2010:457). Most physicians adhered to the

recommendations set in the guidelines for first line that is 2NRTI + 1NNRTI as preferred classes of drug. Patients were reported to be evaluated clinically on a monthly basis from the initiation of treatment for 3 months by the majority of physicians and only few physicians evaluated them every three months when they were stable (Naidoo *et al*, 2010:457). Most physicians adhered to national and international recommendations of evaluating CD4 counts every 3-6 months, while just below average adhered to evaluating VL every 6 months (Naidoo *et al*, 2010:457).

2.2.10 Adherence to Clinical Guidelines

This review of recent studies found that adherence to current clinical guidelines by health care providers were dependent on different types and stages of care provided. The adherence to clinical guidelines among physicians providing TB & HIV services to TB & HIV patients seemed to vary with services provided as well as with individual perspectives around the recommendations stipulated by the clinical guidelines, both national and international. HIV testing and provision of IPT had the lowest level of adherence, even though they carried a very important aspect in reduction of HIV & TB burden in the health care systems. Therefore, it's imperative that a strategy to ensure awareness of the importance of HIV testing among newly diagnosed TB patients and provision of IPT among HIV patents be implemented among health care providers.

The studies done by (Saraceni *et al*, 2010:251; Naidoo *et al*, 2010:457; Peterson *et al*, 2011:67; Low & Eng, 2009:480; Hiransuthikul *et al*, 2005:1214) have seen moderate to high adherence to clinical guidelines with regard to evaluations done during diagnosis and before initiation of ART, initiation of ART, ART regimen and monitoring of effectiveness of ART. This

may be due to the paradigm shift of ART for prevention (Wilson, 2012:1). However, provision of ART together with IPT as well as PCP reduces the risk of TB and other opportunistic infections (Fujiwara *et al*, 2012:22).

2.2.11 Factors Affecting Adherence to Treatment Guidelines

The rate of adherence to treatment guidelines is said to be likely influenced by several factors. Health care providers may not be familiar with or may not agree with the guidelines (Crocker, Alweis, Scheirer, Schamel, Wasser & Levingood, 2013:6). Furthermore, the time-pressured environment of primary care does not lend itself to the application of complex multi-step guidelines, which might lead to over-estimation of risk of bacterial/viral infection or benefits of antibiotic/antiretroviral therapy (Crocker *et al*, 2013:6). The current focus on patient satisfaction may increase the pressure on providers to meet perceived patient expectations for any therapy for their symptoms (Crocker *et al*, 2013:6). It is possible that provider desire to reduce the perceived risk of patient coming back if a therapy was not prescribed was a factor in their decision (Crocker *et al*, 2013:6).

Cabana *et al* (1999:1460-1463) had identified six factors associated with adherence to treatment guidelines that were also identified as pertinent factors for this study and had been reported by many other studies (Vashitz, Meyer, Parmet, Henkin, Peleg, Libermann & Gilutz, 2011:660; Satman, Imamoglu, Yilmaz & ADMIRE study group, 2010:156). These factors are said to be familiarity, awareness, outcome expectancy, self-efficacy, motivation and agreement (Cabana *et al*, 1999:1460-3; Vashitz *et al*, 2011:660; Satman *et al*, 2010:156). However, the influence of each of these factors differed by profession (Physicians vs Nurses vs Dieticians), educational background, care experience and personality (Satman *et al*,

2010:156; Vashits *et al*, 2011:660). Lack of agreement to treatment guidelines, poor outcome expectancy, and paucity of evidence supporting the recommendations had been found to be stronger barriers to physicians, while practical concerns were deemed to be more important for nurses, such as expertise, workload, and patient comfort (Cabana *et al*, 1999:1460-3; Vashitz *et al*, 2011:660; Satman *et al*, 2010:156). This shows that the familiarity and confidence gained through experience of working in a TB-HIV services setting may enhance the provider's ability to apply treatment guidelines appropriately and on the other sider provider's personality type may seem to shape one's attitudes to guidelines.

In conclusion, avenues should be created to bridge these gaps in adherence to clinical guidelines. It is also of paramount importance to investigate the relationship between provider adherence to clinical guidelines and patient outcome, as well as its influence towards quality care provision. Furthermore, it is also implied that the process of ruling out TB should be seen as an important opportunity to detect active new cases for early treatment, reduction of mortality and transmission of TB, especially among HIV-infected patients (WHO, 2013:59). The simplicity of the clinical guidelines, centralisation of treatment and involvement of local health care providers in the development of guidelines can improve the level of adherence. Adherence to treatment guidelines should be reinforced to the health care providers. Thus, concrete literature to explain its association with patients' outcome and quality of care, factors associated influencing provider adherence to guidelines is needed and should be done amongst all health care providers providing TB-HIV services.

2.3 Conceptual Framework

The conceptual framework of this study was based on Donabedian's structure-process-outcome (SPO) model (Donabedian, 1966:178) and the conceptual model of health care delivery performance (Cowing, Davino-Ramaya, Ramaya & Szmerekovsky, 2009:74) as a foundational work to guide this study in measuring adherence to treatment guidelines. Donabedian's (1996:178) SPO model (Figure 2.1) is a useful framework for quality assessment and illustrates the link between process and outcome. Furthermore, structural measures were defined as the professional and organisational resources associated with the provision of care, such as staff credentials and facility operating capacities (Donabadien, 1988:1745). Process measures refer to the tasks done to and for the patient by practitioners in the course of treatment (Gustafson & Hundt, 1995:567). Outcome measures are the desired states resulting from care processes, which may include reduction in morbidity and mortality, and improvement in the quality of life (Kane & Kane, 1988:np). This model suggests that the structure leads the process to produce outcome. Donabedian (1996:178) believed strongly in the importance of health care structure, seeing it as a driving force for later care processes and ultimately for health outcomes.

2.3.1 Donabedian SPO model

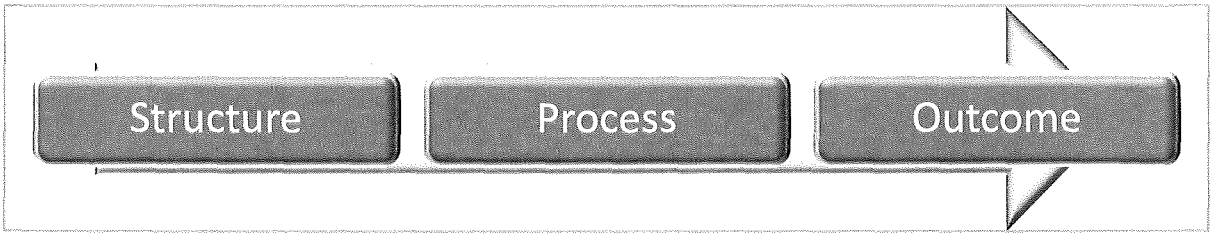


Figure 2.1: Donabedian's structure-process-model

Donabedian's (1996:178) interpretation on structure focused on the following aspects: physical structure, facilities and provider qualifications. Most modern accreditation and quality organisations, such as the Joint Commission on Accreditation of Health-care Organisations (2003:40) have historically viewed the structure largely from the 'nuts and bolts' perspective. Nurses' adherence to treatment is a factor in the process of the SPO model while patient treatment outcome and improved laboratory parameters (CD4 cell count and viral load levels) are factors of outcome. This is exemplified as follows for each item.

2.3.1.1 Structure

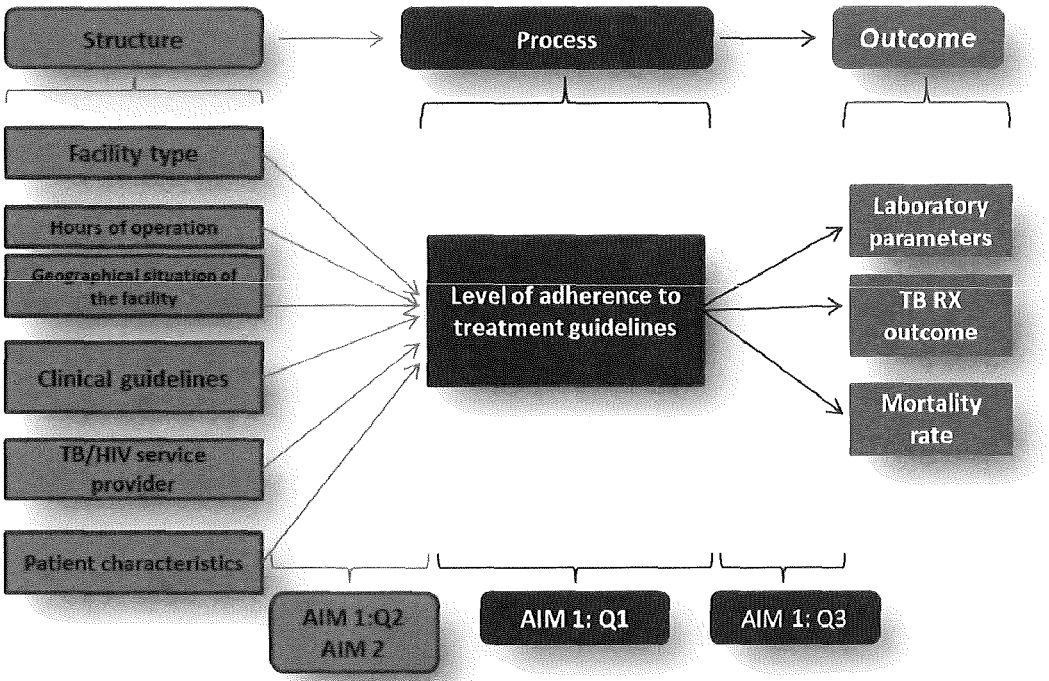
The structural measures were incorporated into facility type, hour of operations, nurse-patient ratio, adequate facilities and equipment, qualification of care providers and treatment guidelines. Good care settings and supporting structures contribute to good care as emphasised by Donabedian (2005:713)

2.3.1.2 Process

Process examines how care has been provided in terms of appropriateness, acceptability, completeness or competency (Donabadien, 2005:713). In this case, "were the treatment guidelines adhered to when providing care, treatment and support to HIV and TB patients?" Instruments that assess process variables are categorised under the following headings: evaluations done at diagnosis of TB & HIV, provision of preventive therapy, ART initiation, ART regimen and monitoring. These measurements typically have more grey areas and are less definite than those obtained through assessing outcomes.

2.3.1.3 Outcomes

Outcomes are usually concrete and precisely measured (Donabadien, 2005:713). The outcome in this study was determined by improvement in laboratory parameters, TB treatment outcome and recovery or survival of the patient. With the recovery or survival, mortality rate was used as a measure, hence the proposed framework of the study as indicated in Figure 2.2.

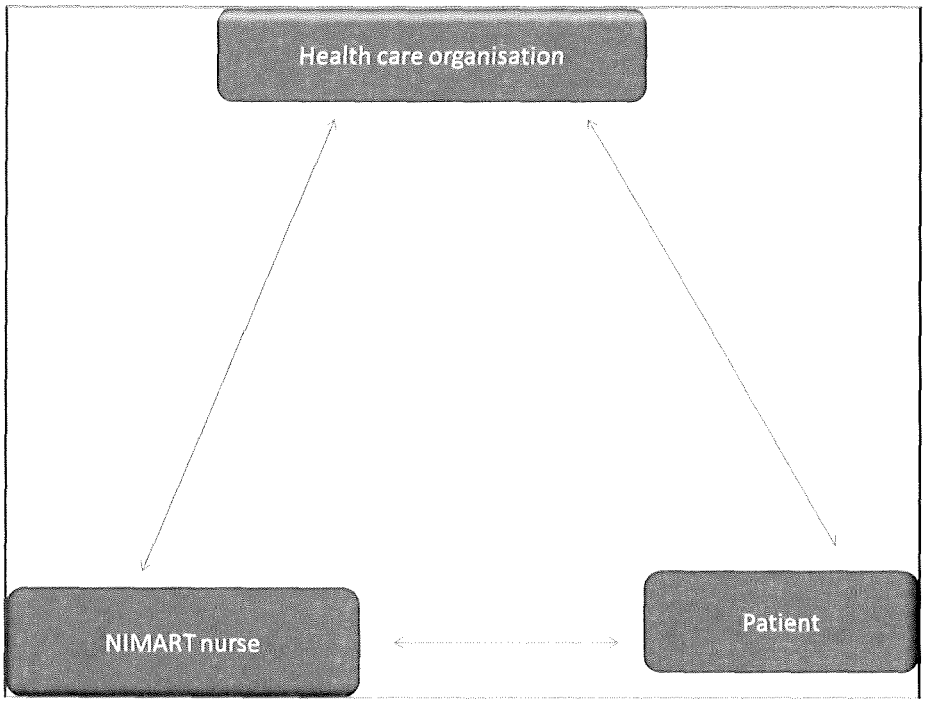


Adapted from Donabedian structure-process-outcome model (1980)

Figure 2.2: Conceptual framework: Adherence to treatment guidelines

2.3.2 Interrelationship of the Three Major Entities in the Service Triad (Conceptual Model of Health Care Delivery Performance)

The three major entities in the service triad are health care organisation, clinician and patient (Figure 2.3), wherein clinician refers to the team of physicians, nurses, medical assistants and office staff (Cowing *et al*, 2009:74). In this study, the health care organisation was operationalized as the structure (Donabadien, 2005:713) since this had been a strong foundational base in which to think about the adherence to treatment guidelines. NIMART nurses were used in this study as clinicians since they were the ones initiating and managing ART and anti-TB treatment to TB & HIV patients. However, factors facilitating adherence to treatment guidelines were determined by the use of focus group in Phase 2 of the study. This framework was used to develop a model of adherence to treatment guidelines for NIMART and anti-TB treatment.



Adapted from the conceptual model of health care delivery performance.

Figure 2.3: Interrelationships of the three major entities in the service triad.

2.4 Summary

This chapter was subdivided into two sections thus literature review and the conceptual framework. It elaborated on the development and implementation of treatment guidelines, TB & HIV collaborative activities and their impact. Adherence to TB & HIV guidelines with regard to HIV testing among TB patients, IPT and CPT provision, evaluations done at diagnosis and before initiation of ART, adherence to ART regimen and HIV patient monitoring were reviewed. The appraisal revealed that adherence to treatment guidelines was dependent on different types, stages of care and services provided, not forgetting the individual attitudes and behaviours. Numerous factors that affect adherence to treatment guidelines were identified. A conceptual framework was also elaborated that will guide the study.

CHAPTER 3

RESEARCH DESIGN AND METHOD

3.1 Introduction

This chapter was divided into two phases to allow for clarity given that the study employed a mixed methods approach using quantitative research approach (Phase 1) and qualitative research approach (Phase 2). The two phases have different objectives and use different methods and designs in collecting information to answer the overall purpose of the study, hence the reason for dividing the study into two phases. Phase 1 involves a quantitative descriptive chart review to determine the extent to which nurses initiating and managing ART and anti-tuberculosis treatment adhere to treatment guidelines. Phase 2 uses a qualitative exploration and description of factors influencing adherence to treatment guidelines among nurses initiating and managing ART and anti-TB treatment.

3.2 Research Strategy

An explanatory sequential design was used for this study. Mixed methods research is defined by Onwuegbuize & Turner (2007:123) as a type of research in which a researcher combines elements of qualitative and quantitative approaches for the purpose of breadth and depth of understanding and corroboration. According to Grove, Burns & Gray (2012:695), the researcher collects and analyses quantitative data and then collects and analyses qualitative data. This design starts with the collection and analysis of quantitative data, which has the priority for addressing the study's questions (Creswell, 2009:71). This

first phase is followed by the subsequent collection and analysis of qualitative data. The second, qualitative phase of the study is designed so that it follows from the results of the first, quantitative phase (Creswell, 2009:71). The researcher interprets how the qualitative results help to explain the initial quantitative results (Creswell, 2009:71). Furthermore, Grove *et al* (2012:695) explained that qualitative examination of the phenomenon facilitates a fuller understanding and is well suited to explaining and interpreting relationships. Phase I focused on a descriptive cross-sectional design and Phase II on an exploratory-descriptive design. Methods are implemented sequentially [(QUANTITATIVE: Phase 1) → (QUALITATIVE: Phase 2)], to use qualitative findings to help interpret and contextualise quantitative results. The purpose for choosing this method is to use qualitative results to assist in explaining and interpreting the results of a quantitative study (Figure 3.1).

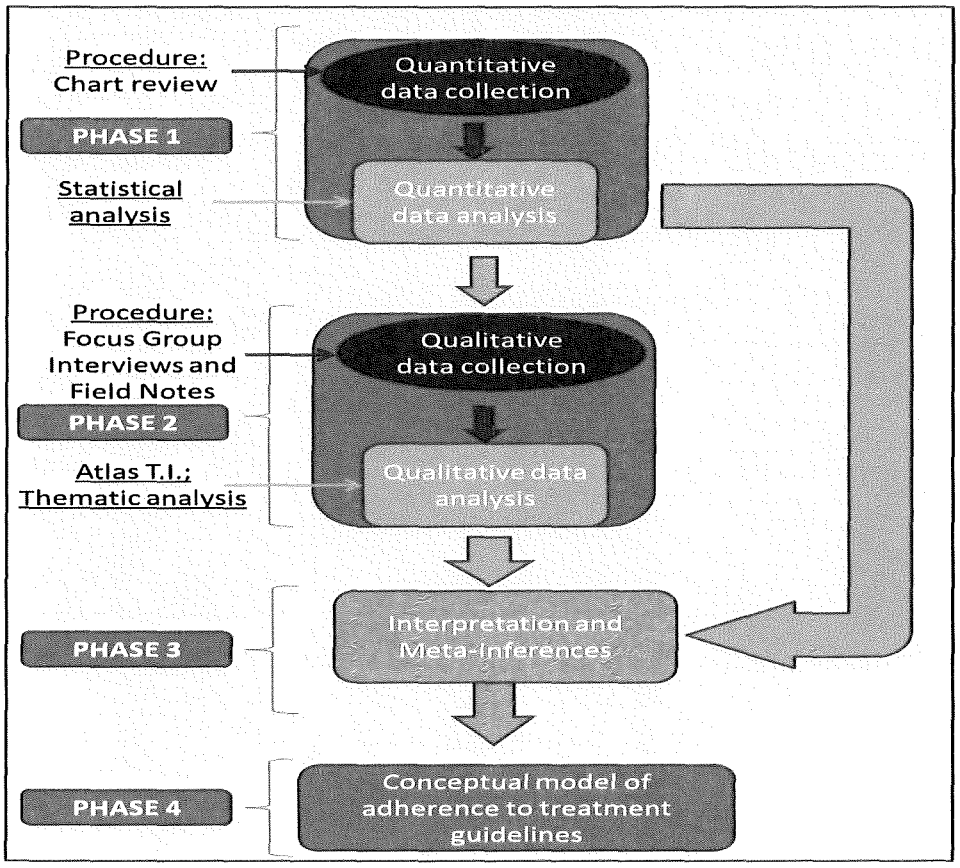


Figure 3.1: Mixed methods explanatory sequential design

Phase 3 of this study interpreted and made meta-inferences of both quantitative and qualitative findings. Furthermore, Phase 4 would follow to conceptualize the findings of Phase 1 and Phase 2 into an adapted model of adherence to treatment guidelines.

3.2.1 Phase 1 (Descriptive Cross-Sectional Study)

3.2.1.1 Study Design

In this phase, a descriptive cross sectional study (Sullivan, 2012:8) was conducted to describe the level adherence to treatment guidelines among PHC/CHC clinics with nurses initiating and managing ART/TB treatment. A cross-sectional descriptive study is a descriptive study of a situation at one particular time, which provides a current condition, but does not explain the cause or effect linkages among their components (Sullivan, 2012:8, Business Dictionary, nd,np; Grove *et al*, 2012:691). A cross-sectional medical record review and patient interview was completed for each participant. Demographics of facility and treatment provider were described.

3.2.1.2 Study Setting and Sampling

Study setting is regarded as the location where the study took place or conducted (Grove *et al*, 2012:709). This study was conducted in two provinces, namely, Kwazulu-Natal Province (KZN) and North-West Province (NWP).

KZN

This province is situated in the South Eastern coastal part of South Africa, consisting of 11 districts. The overall health facilities are 863 and 50% (429) of those are initiating ART. There are 2858 nurses trained in NIMART (the highest number compared to other provinces) and

only 232 (8%) are initiating and managing ART. Ugu district consist of 77 facilities of which 56 are initiating ART with 509 trained nurses, hence only 56 (11%) is initiating ART. This suggests that there is one NIMART-trained nurse in each facility (Stender, 2011:15).

NWP

This province is situated in the North-Western part of South Africa, consisting of 4 districts. The overall health facilities are 390 and 23% (90) of those are initiating ART. There are 597 nurses trained in NIMART and only 152 (25%) are initiating and managing ART. Ngaka Modiri Molema district consist of 128 facilities of which 30 are initiating ART with 189 trained nurses, hence only 81 (43%) are initiating ART (Stender, 2011:18).

3.2.1.3 Sample Selection

Systematic random sampling (Grove *et al*, 2012:711) was used to select 16 CHC/PHC facilities meeting the inclusion criteria. Systematic random sampling involves selecting every k^{th} element of the population, after obtaining a list of the total population (Grove *et al*, 2012:711). The listing of the population/facilities was random with respect to the variable of interest. Every third CHC/PHC formed part of the sample size from the overall CHC/PHC facilities.

Inclusion and Exclusion Criteria

1. Inclusion Criteria

1. Accredited ART facility
2. Professional nurse trained in NIMART or PHC nurse trained in NIMART
3. Initiating and managing ART services for at least 12 months

4. Located in Ugu and Ngaka Modiri Molema districts of KZN and NWP, respectively.

5. Exclusion criteria

1. CHC/PHC facilities unwilling to participate
2. Non-accredited clinics and clinics not initiating ART

The study recruited sixteen (16) sites from two districts, one district per province, that is, Ugu District- KZN (8 facilities) and Ngaka Modiri Molema District- NWP (8 facilities) which were randomly selected using systematic random sampling. Furthermore, 688 patient records were randomly selected using systematic random sampling and in each site 43 charts or records per facility were evaluated.

3.2.1.4 Data Collection Instrument

There were no standardised data collection instruments for adherence to HIV & TB treatment guidelines in South Africa (SA). To develop a four sectioned adherence to treatment guidelines data abstraction tool, recommendations from:

1. The South African ART guideline (NDoH, 2010),
2. South African National TB management guidelines (NDoH, 2009),
3. Recommendations by WHO (WHO, 2010:30),
4. Centers for Disease Control and Prevention (CDC), and
5. Cited TB & HIV integrated interventions literature (Fujiwara *et al*, 2012: 43-44), were reviewed.

It comprised a 14-item facility characteristics, 8-item NIMART nurse characteristics, 12-item patient demographics and 10-item medical record review (MRR).

The MRR instrument was used for data abstraction. The data was abstracted reliably and according to Gilbert, Lowenstein, Kozoil-McLain, Barta & Steiner (1996:307). The following data abstraction strategies were observed to avoid bias and increase inter- and intra-observer reliability: (a) train the abstractors (Horowitz & Yu, 1984:828; Allison, Wall, Spettell, Calhoun, Fargason, Kobylinski, Farmer & Kiefe, 2000:123); (b) establish unambiguous variable definitions and inclusion and exclusion criteria a priority (Horowitz RI & Yu, 1984:828); (c) establish unambiguous rules regarding the management of missing or conflicting data (Wu & Ashton, 1997:154); (d) advise the abstractors at the beginning that their work will be checked for accuracy (Reid, 1970:1146); and (e) check the reliability of the abstracted data in random samples (Beard, Yunginer, Reed, O'Connell & Silverstein, 1992:1015). All records were thoroughly evaluated based on the MRR instrument developed to evaluate adherence to treatment guidelines (Annexure F).

3.2.2 Data Analysis

This study's planning involved an extensive sample size analysis supporting the review of 676 patient records to achieve 90% power (alpha= 0.05, two-sided). Hence, this was adjusted to 688 patient records to provide for equal proportion of 43 patient records per facility. The Statistical Packages for Social Sciences (SPSS, version 20) computer software was used for data analysis. Adherence to treatment by nurses was cross-tabulated against demographic characteristics to detect possible patterns and variations. The means and standard errors of all continuous variables were calculated. Presentations of results include frequency tables generated by SPSS. The differences in means of scales and variables across demographic characteristics were compared through a t-test. Multiple linear regression analysis was done to establish the predictors of measures of adherence to treatment

guidelines using the backward methods. Correlation was done to establish the relationship between measure of adherence to treatment guidelines and patient treatment outcome.

3.2.3 Phase 2: Exploratory Study (Qualitative)

3.2.3.1 Study Design

In this phase, an exploratory-descriptive study was conducted to explore and describe the anticipated factors that influence treatment guidelines adherence among nurses initiating and managing ART and anti-TB treatment in KZN and NWP. An exploratory-descriptive study design refers to the research conducted to address an issue or problem in need of solution and/or understanding using qualitative methodology (Grove *et al*, 2012:694). Focus groups were used to acquire data from the participants. Focus groups are groups that are intended to attain NIMART nurses' perceptions in a specific area in a setting that is accommodating and non-threatening (Grove *et al*, 2012:695).

The study was guided by a central question:

> *What are the factors influencing treatment guidelines adherence among NIMART/anti-TB treatment in KZN and NWP?"*

The following broad and guiding questions were used to stimulate the discussion:

1. What are your barriers regarding adherence to treatment guidelines while initiating and managing ART/anti-TB treatment?
2. What can motivate you to adhere to treatment guidelines while initiating and managing ART/anti-TB treatment?

3. What do you think can be done to improve your adherence to treatment guidelines?

The researcher probed further to get the deeper meaning and understanding of factors influencing treatment guidelines. Probing is a technique researchers use to obtain more information in a specific area of interview (Grove *et al*, 2012:705).

Since phase one of this study sought to determine the level of adherence, this phase was used to explore and describe the anticipated NIMART nurses' perspectives on factors influencing treatment guidelines adherence.

3.2.3.2 Focus Groups

A focus group encompasses individuals selected and assembled by researchers to discuss and comment on, from personal experience (Powell & Single, 1996:499). However, the process relies on interaction within the group based on topics that are supplied by the researcher (Morgan 1997:12). Hence, the key characteristic that distinguishes focus groups is the insight and data produced by the interaction between participants. The main purpose of focus group research is to draw upon respondents' attitudes, feelings, beliefs, experiences and reactions in a way which would not be feasible using other methods, for example, observation, one-to-one interviewing and questionnaire surveys (Gibbs, 1997:np). These attitudes, feelings and beliefs may be partially independent of a group or its social setting, but are more likely to be revealed via the social gathering and the interaction which being in a focus group entails (Gipps, 1997:np). Focus group interactions elicit a multiplicity of views and emotional processes within a group context, and enable the researcher to gain a larger amount of information in a shorter period (Gipps 1997:np). Focus groups are not

natural, but organised events (Gipps, 1997:np). Morgan and Krueger (1993:32) emphasised that focus groups are predominantly useful when there are power differences between the participants and decision-makers or professionals, when the everyday use of language and culture of particular groups is of interest, and when one wants to explore the degree of consensus on a given topic.

3.2.3.3 Study Setting

The focus groups meeting were carried out in NWP and KZN. The district DoH boardroom was used as a convenient setting for all participants as they often meet there for HIV & TB services monthly progress meetings. According to Grove *et al* (2012:275), the location for focus group session needs to be carefully selected to ensure privacy, comfort and safety. The setting had enough space for participants to sit comfortably in a circle or U-shape and maintain eye contact with one another.

3.2.3.4 Focus Group Sample Selection

Recruiting appropriate participants for each focus group is critical, because recruitment is the most common source of failure (Grove *et al*, 2012:275). Each focus group consisted of 6-8 NIMART-trained nurses to promote adequate participation. A purposive sample of NIMART who have been initiating and managing ART for at least 12 months in a CHC or PHC within a selected district in KZN and NWP were recruited to this study. Nurses were consciously selected based on the inclusion criteria to select NIMART-trained nurses. Focus group members were selected to ensure that focus group participants represent the diversity of the larger group about whom the researcher wants to learn.

3.2.3.5 Focus Group Procedures

Four (4) to six (6) participants were asked to be part of a focus group (Marshall & Rossman, 2011:149; Grove *et al*, 2012:275; Krueger, 1994:21). It was anticipated that four (4) focus groups in each province (n=16-24) will be needed to achieve the study aim (2). The total number of Participants was 6 in each focus group amounting to a total of 24 NIMART nurses. The researcher led each focus group. Research assistants were trained as the focus group discussion recorder or a note taker who would be an observer and not a participant. All focus group discussions were recorded using a digital recorder and were transcribed verbatim for later analysis. The note taker made hand-written notes and observations during the discussion, which served as a "backup" in case something happened with the recording equipment or participants wished not to have their discussion tape-recorded. Focus groups lasted for about 90-120 minutes. The time of day that was convenient for the participants was established prior to the focus group session.

3.2.3.6 Data Collection - Interview Guide

A discussion guide was created to provide an outline and prepared in advance to cover the topics and issues to be explored. The guide was designed with the overall research questions in mind and was constructed to ensure that topics covered in the focus groups related to the research objectives. The interview guide included a welcoming, introduction, and description of the purpose of the focus group, discussion of the specific questions, ice-breakers, future planning and closure.

3.2.3.7 Focus Group Data Analysis

Demographic statistics were analysed from the focus group demographic data sheet. The focus of data analysis for this qualitative aim was to identify themes emanating from data analysis. Specifically, audiotapes were transcribed verbatim following each session. This study used ATLAS T.I. and followed the basic steps of notice-collect-think (NCT) analysis (Friese, 2012:228). These basic steps enabled researcher to work in a systematic manner instead of declaring the software to be the method itself (Friese, 2012:228). The researcher started by noticing aspects of the data that led to an idea for a label and began to collect what was noticed in the form of codes (Friese, 2012:228). This coding was divided into descriptive-level and conceptual-level analysis.

Descriptive-Level Analysis

This level of analysis comprised two stages, thus first stage coding and second stage coding.

First-Stage Coding

The researcher began by reading the transcripts and field notes then noticed patterns of the data; then wrote notes, marked segments and attached first preliminary codes which could either be descriptive or already conceptual (Friese, 2012:229). This first phase of coding ended when the researcher no longer noticed anything new, when no codes were added and the researcher could only apply already existing ones (Friese, 2012:230). The researcher then looked for code labels that have been used only a few times as these codes were more likely to be descriptive, referring to specific data segment, but without the ability to be connected. According to Friese (2012:232), such codes are candidates for a closer examination, either to merge them with similar codes under a higher order conceptual label

or to evaluate whether they can be collected under a common category level. The aim of this process is to develop sub-categories and categories and develop them conceptually into themes (Friese, 2012:233).

Second-Stage Coding

According to Friese (2012:233), the second phase of coding serves as a way to validate the code list and if the code list was developed usefully, then not many new codes are added at this stage. Therefore the data was ready for the next level analysis.

Conceptual-Level Analysis

According to Friese (2012:238), at this stage the researcher link data using network views function, exploring developed ideas further and integrating all findings in writing and graphical representations. Thus, categories and themes were developed.

3.2.3.8 Measures to Ensure Trustworthiness

In order to provide trustworthiness of the qualitative analysis, the researcher followed Guba's (1981:86-87) criteria of ensuring credibility, transferability, dependability, and confirmability. Credibility (internal validity) was addressed by having two researchers independently reading and coding the transcribed focus group sessions. Transferability (external validity/generalisability) was enforced by providing rich-thick description (Lincoln & Guba, 1985:214) and sharing the results with content experts and conducting further literature review. Confirmability (objectivity) was assessed by comparing the transcribed focus group sessions with the extensive notes taken by the non-participating note-taker from the focus group. Dependability (reliability) was achieved by triangulation of methods

(Guba, 1985:214). For this study, medical records abstraction and focus group data were used.

3.3 Ethical Considerations

Ethics implies preferences that influence behaviour in human relations, conforming to a code of principles, the rule of conduct, the responsibility of the researcher and the standards of conduct of a given profession (Babbie, 2007:62). The proposal was presented at the departmental level (Department of Nursing Sciences); Faculty of Agriculture, Science and Technology (FAST); and North-West University Ethics Committee for ethical clearance, which was granted (Annexure A). Permission was sought and granted from the NWP and KZN Department of Health (Annexure C). The researcher also completed an online course on ethical issues. The following modules were undertaken: Social and Behavioural Responsible Conduct of Research and Human Research - Social & Behavioural Researchers & Staff (See Annexure D).

3.3.1 Confidentiality and Privacy

Privacy implies the element of personal privacy, while the confidentiality indicates the handling of information in a confidential manner (De vos *et al.*, 2011:119). According to Morris (2006:246) participants should be informed of all possible limits to this principle as well as the steps to be taken to ensure that no breach of this principle would take place. The researcher ensured that all collected data were stored in locked in a safe place. Electronic data was saved in a password protected environment to which only the researcher had access. No names of the participants and clinics were divulged or recorded on the data collection forms; however, ID codes were used.

3.3.2 Participant Informed Consent

Obtaining informed consent implies that all possible or adequate information on the goal of the study, the expected duration of participant's involvement, the procedures to be followed, possible advantages and disadvantages be rendered to potential participants (De vos *et al.*, 2011:117). According to Babbie (2007:64) voluntary participation and the right to withdraw from the study had become formalised in the concept of informed consent. Voluntary participation and written consent of all participants was sought and detailed information about the research was provided (Annexure E).

3.3.3 Benefits and Freedom from Harm (Beneficence)

The term beneficence is an obligation to maximise the potential benefits and to minimise potential harm (De vos *et al.*, 2011:116). The facility managers were informed that the research was of no harm to them. The study protected the rights and dignity of the facilities. The researcher adhered to the rules and standards of planning, implementing, evaluating and reporting of research to ensure the quality of research. The results of the research will be disseminated to the facilities involved.

3.3.4 Steps to Minimise Risks

The fundamental ethical rule of research is that it must bring no harm to participants (De vos *et al.*, 2011:115). This is a minimal risk study. This study will minimise risk while maximising the benefit for the participants. Focus group names will be coded. Audio and transcribed data have been stored safely and only the researcher has access to the data. Moreover, data backups are stored in a secured data room, which is environmentally controlled and access limited.

3.3.5 Respect for People's Rights, Dignity, and Diversity

Researchers conducting any research have an ethical responsibility to determine whether the right of participants are protected at all times (Grove, Gray & Burns, 2014:99). Throughout the study, the researcher respected the rights, dignity and worth of all participants. During the survey and focus group sessions, the researchers were respectful of the rights of others to hold values, attitudes, and opinions that differ from their own.

3.4. Phase 3: Interpretation and Meta-Inference

Phase 3 of this study provided the interpretation and meta-inference of Phase 1 results with the aid of phase 2. This is to combine both sets of inferences from quantitative and qualitative findings into a coherent whole and allow the appropriate emphasis to be placed.

3.5 Phase 4: Conceptual Model of Adherence to Treatment Guidelines

This phase entails the conceptualisation of both quantitative and qualitative findings of this study. This study adapted Donabadien Structure Process Outcome Model (SPO) (1966:178) and Cowing et al's (2009:74) Conceptual Model of Health Care Delivery Performance. Given the deductive nature of this study, the researcher used the two models to develop a conceptual model for adherence to treatment guidelines for NIMART nurses. This had been elaborated well in details within Chapter 2's conceptual framework.

3.6 Summary

A mixed methods approach was used and a sequential explanatory design had been employed in this study. The study comprised two phases, that is quantitative and qualitative. A sample of 16 facilities and 688 patient files were selected randomly using

systematic sampling. The MRR instrument was used to abstract data from the patient files. Focus group interviews were used for the qualitative phase with the use of focus group interview guide. Ethical considerations were taken into account and the procedures for data collection and analysis were explained.

CHAPTER 4

QUANTITATIVE RESULTS

4.1 Introduction

The results presented in this chapter are structured according to the aims and objectives of the study. The aims of the study were divided into Phase 1 and Phase 2. This chapter projects the results for Phase 1 which is the quantitative phase aimed to conduct a cross-sectional evaluation of TB & HIV co-infected patients receiving care at CHC and PHC clinics and to determine the extent to which nurses initiating and managing ART and anti-tuberculosis treatment adhere to treatment guidelines in NWP and KZN.

The objectives included describing the level of adherence to the treatment guidelines of integrated TB & HIV co-infection interventions by nurses providing care, treatment and support to HIV-infected TB patients, determining factors predicting the level of nurse adherence to treatment guidelines and establishing the relationship between level of adherence to treatment guidelines and patient outcome measures.

This chapter is divided into demographic characteristics, level of adherence to treatment guidelines, factors predicting adherence to treatment guidelines and the relationship between adherence to treatment guidelines and patient outcome.

4.2 Facility and Patient Demographic Characteristics

4.2.1 Facility Demographics

The facilities were categorised into PHC and CHC, four in both KZN and NW provinces (Table 4.1). Most facilities were located in the rural area in KZN (62.5%) while both rural and urban were represented equally (50%) in NWP. About 63% of facilities were found to be operating 24 hours in NWP compared to KZN with 50% operating 8 and 24 hours, respectively. The mode of integration was mainly full in KZN and NWP (75% and 87.5%, respectively). HIV services were mainly provided by NIMART primary health care nurses (PHCN) in KZN (62.5%) and NWP (100%), while TB services were mainly provided by professional nurses (PN) and enrolled nurses (EN) (75% and 87.5%, respectively) in both provinces. NWP reported to have all the necessary guidelines compared to KZN facilities that lacked some guidelines. North West province had all the guidelines in the facility thus GTPT, SANGTB, SAATG, IMCI and PALSA plus guidelines.

4.2.2 Patient Data

Patients were dominated by females in both provinces that are KZN (63.8%) and NW (62.4%). The majority of patients were African (<98%) in both provinces. The findings showed that most patients from NWP were unemployed (61.0%) and for the majority in KZN employment status was unknown (55.6%). Table 4.2 shows the breakdown of the frequency and percentage distribution of patients' socio-demographic characteristics as well as the mean comparisons of age, number in households, and visits by patients to facility for TB & HIV services. It was evident from the findings that about 49% and 69% of patients from KZN and NWP, respectively, were living with more than one family member, suggesting that

about 26% of patients from both provinces were living with either one family member or relatives.

Table 4.1: Facility demographics

		Province		Total
		Kwazulu-Natal (n=8)	North-West (n=8)	
Facility type	PHC	4 (50.0)	4(50.0)	8 (50.0)
	CHC	4 (50.0)	4 (50.0)	8 (50.0)
Geographical location of the facility	Rural	5 (62.5)	4 (50.0)	9 (56.3)
	Urban	3 (37.5)	4 (50.0)	7 (43.8)
Hours of operation	8 hours	4 (50.0)	3 (37.5)	7 (43.8)
	24 hours	4 (50.0)	5 (62.5)	9 (56.3)
Method of TB & HIV integration	Partial	2 (25.0)	1 (12.5)	3 (18.8)
	Full	6 (75.0)	7 (87.5)	13 (81.3)
HIV service provider	NIMART PHCN	5 (62.5)	8 (100.0)	13 (81.3)
	NIMART PN	2 (25.0)	0 (0.0)	2 (12.5)
	Both	1(12.5)	0 (0.0)	1 (6.3)
TB service provider	NIMART-PHCN/PN	1 (12.5)	0 (0.0)	1 (6.3)
	PN/EN	6 (75.0)	7 (87.5)	13 (81.3)
	Both	1 (12.5)	1 (12.5)	2 (12.5)
GTPT guidelines present in the clinic	Yes	4 (50.0)	8 (100.0)	12 (75.0)
	No	4 (50.0)	0 (0.0)	4 (25.0)
SANGTB guideline present in the clinic	Yes	4 (50.0)	8 (100.0)	12 (75.0)
	No	4 (50.0)	0 (0.0)	4 (25.0)
SAATG guideline present in the clinic	Yes	4 (50.0)	8 (100.0)	12 (75.0)
	No	4 (50.0)	0 (0.0)	4 (25.0)
IMCI guideline present in the clinic	Yes	5 (62.5)	8 (100.0)	13 (81.3)
	No	3 (37.5)	0 (0.0)	3 (18.8)
PALSA Plus guideline present in the clinic	Yes	2 (25.0)	8 (100.0)	10 (62.5)
	No	6 (75.0)	0 (0.0)	6 (37.5)

Key: SANGTB - South African National Guidelines for TB, SAATG - South African antiretroviral Treatment Guideline, IMCI - Integrated Management of Child Illnesses, PALSA Plus- Practical Approach to Lung Health and HIV & AIDS in South Africa

Table 4.2: Patient demographics

		Province		χ^2 (p-value)
		Kwazulu-Natal [Frequency (%)]	North-West [Frequency (%)]	
Gender	Male	127 (36.4%)	126 (37.6%)	0.150 (0.698)
	Female	224 (63.8%)	209 (62.4%)	
Race	African	349 (99.4%)	331 (98.8%)	2.905 (0.234)
	Coloured	1 (0.3%)	4 (1.2%)	
	Asian	1 (0.3%)	-	
Employment	Employed	83 (23.6%)	53 (15.9%)	118.432 (0.000)
	Unemployed	73 (20.8%)	203 (61.0%)	
	Status unknown/not recorded	195 (55.6%)	77 (23.1%)	
Living arrangements	More than one family member	172 (49.0%)	230 (68.7%)	57.432 (0.000)
	More than one family relative	17 (4.8%)	0 (0.0%)	
	One family member or relative	91 (25.9%)	86 (25.7%)	
	Homeless	27 (7.7%)	3 (0.9%)	
	No record	44 (12.5%)	16 (4.8%)	
Patient caregiver	Community/Home based caregiver	25 (7.1 %)	18 (5.4%)	65.277 (0.000)
	Family member	231 (65.8 %)	288 (86.0%)	
	Family relative	12 (3.4 %)	6 (1.8%)	
	Friend	75 (21.4 %)	8 (2.4%)	
	No record	8 (2.3 %)	15 (4.5%)	
		Mean (SD)	**Mean (SD)**	**t (sig)**
Age		34.79 (9.46)	39.11 (10.44)	68.871 (0.000)
Number in a household		3.38 (2.14)	2.60 (1.36)	27.653 (0.000)
Total number of visits attended		10.71 (3.91)	10.37 (1.21)	50.894 (0.000)
Total number of HIV clinic visits scheduled		10.61 (3.89)	6.34 (1.67)	50.637 (0.000)

χ^2 – Chi-Squared, p-value - significance level, SD - standard deviation, t - t-test, sig - significance level (two-tailed)

There was a significant difference with regard to living arrangements between KZN and NWP ($p<0.001$). The majority of patients were being taken care of by their family members (65.8% and 86%, respectively, for KZN and NWP. A significant difference was observed between the provinces with regard to patient caregiver ($p<0.001$).

The mean age of patients was 34.79 (SD=9.46) for KZN and 39.11 (SD=10.44) for NWP with significance difference of mean age at $p<0.001$. The mean number of family members in a household was found to be 3.38 (SD=2.14) for KZN and 2.60 (SD=1.36) for NWP with a marked significant difference at $p<0.001$. Total number of visits attended mean was found to be 10.71 (SD=3.91) for KZN and 10.37 (SD=1.21) for NWP with a statistical difference that was significant at $p<0.001$. A mean of 10.61 (3.89) for KZN and 6.34 (SD=1.67) for NWP with regard to total number of HIV visits scheduled were marked together with a significant statistical difference at $p<0.001$.

4.3 Adherence to Treatment Guidelines

The adherence to treatment guidelines was measured on two entries, namely, the HIV entry point and the TB entry point, according to the following aspects: evaluations done at diagnosis or before initiation of ART; evaluations done on initiation of ART; ART regimen; TB & HIV outcome; and monitoring of patients.

4.3.1 HIV Entry Point

4.3.1.1 Evaluations Done at Diagnosis or Before Initiation of ART

Table 4.3 provides the evaluations done at diagnosis or before initiation of ART. Among the females, about 11% and 12% had their pregnancy tested in both KZN and NWP, respectively, and there was no significant statistical difference between the two provinces. Thus, the majority of patients (87.6% & 88.8%, respectively for Kwazulu-Natal and NWP) were not tested for pregnancy or there was no record in either province. It was evident that about 88% and 91.9% of patients were staged clinically in KZN and NWP respectively with no significant statistical difference (p=0.089).

Table 4.3: Evaluations done at diagnosis or before initiation of ART

		Province		χ^2 (P-value)
		Kwazulu-Natal	North-West	
Pregnancy (n=433)	Done	25 (11.2)	26 (12.4)	2.018 (0.365)
	Not done	199 (88.8)	183 (87.6)	
Clinical staging (n=686)	Done	309 (88.0)	308 (91.9)	2.891 (0.089)
	Not done	42 (12.0)	27 (8.1)	
Clinical stages (n=686)	Stage 1	133 (37.9)	237 (70.7)	77.619 (0.000)
	Stage 2	78 (22.2)	39 (11.6)	
	Stage 3	81 (23.1)	38 (11.3)	
	Stage 4	16 (4.6)	2 (0.6)	
	Not done/recorded	43 (12.3)	19 (5.7)	
TB screening (n=686)	Done	219 (62.4)	324 (96.7)	122.382 (0.000)
	Not done	132 (37.6)	11 (3.3)	
Clinical findings (TB) (n=543)	Only one clinical sign	34 (15.5)	9 (2.8)	37.133 (0.000)
	Two clinical signs	17 (7.8)	10 (3.1)	
	Above 2 clinical signs	11 (5.0)	21 (6.3)	
	None	157 (82.1)	284 (87.7)	
TB suspects identified (n=543)	TB suspects	54 (24.7)	48 (14.8)	8.298 (0.004)
	Not suspects	165 (75.3)	275 (85.2)	
Sputum smear collected among TB suspects (n=102)	Yes	50 (92.6)	37 (77.1)	4.873 (0.027)
	No	4 (7.4)	11 (22.9)	
Sputum smear collected in non-suspects (n=584)	Yes	65 (21.9)	1 (0.3)	67.539 (0.000)
	No	232 (78.1)	286 (99.7)	
Smear results (n=153)	Negative	101 (87.8)	26 (68.4)	12.836 (0.002)
	Positive	8 (7.0)	11 (28.9)	
	Results not recorded	6 (5.2)	1 (2.7)	
Smear culture and DST (n=686)	Done	59 (16.8)	8 (2.4)	40.449 (0.000)
	Not done	292 (83.2)	327 (97.6)	

Continued/...

Table 4.3: Evaluations done at diagnosis or before initiation of ART (Continued)

		Province		χ^2 (P-value)
		Kwazulu-Natal	North-West	
Culture results (n=67)	Negative	54 (91.5)	3 (37.5)	24.882 (0.000)
	Positive	5 (8.5)	5 (62.5)	
DST results (n=67)	No record	351 (100)	335 (100)	
TST (n=2)	Done	0 (0.0)	2 (0.6)	2.109 (0.348)
	Not done	351 (100)	333 (99.4)	
TST results (n=2)	No record	0 (0.0)	2 (100)	
Chest X-ray (n=686)	Done	1 (0.3)	6 (1.8)	3.850 (0.050)
	Not done	310 (99.7)	329 (98.2)	
Chest X-ray results (n=7)	No record	1 (100)	6 (100)	
CD4 cell count (n=686)	Done	344 (98.0)	328 (97.8)	0.008 (0.930)
	Not done	7 (2.0)	7 (2.2)	
CD4 cell count results (n=672)	Less than 200	160 (46.5)	147 (44.8)	7.944 (0.019)
	200 and more	183 (53.2)	171 (52.1)	
	No results	1 (0.3)	10 (3.0)	
CPT given for CD4 less than 200 (n=307)	Yes	1 (0.6)	138 (93.9)	268.889 (0.000)
	No	159 (99.4)	9 (6.1)	
Viral load (n=686)	Done	86 (24.5)	26 (7.8)	35.162 (0.000)
	Not done	265 (75.5)	309 (92.2)	
Pre-ART counselling	Done	326 (92.9)	302 (99.0)	18.375 (0.000)
	Not done	25 (7.1)	3 (1.0)	
General HIV education (n=672)	Done	324 (92.3)	303 (99.3)	19.123 (0.000)
	Not done	27 (7.7)	2 (0.7)	
Antiretroviral therapy information	Done	323 (92.0)	300 (98.4)	16.706 (0.000)
	Not done	28 (8.0)	5 (1.6)	
Adherence planning (n=686)	Done	316 (90.0)	302 (99.0)	24.158 (0.000)
	Not done	35 (10.0)	3 (1.0)	

χ^2 – Chi-Squared, p-value - significance level, CPT - Cotrimoxazole Preventive Therapy, TST - Tuberculin Skin Test

Among the clinically staged patients, the majority for NWP was stage 1 (70.7%) and in KZN (37.9%) with a significant statistical difference at $p<0.001$.

The majority of patients had been screened for TB, that, is 62.4% for KZN and 96.7% for NWP with a significant difference at $p<0.001$. Of the patients screened for TB, the majority in both provinces did not have any clinical sign of TB (KZN 82.1% and NWP 87.7%), hence about 5% and 6.3% had more than two clinical signs of TB and there was a significant difference at $p<0.001$. About 24.7% of patients for KZN and 14.8% for NWP were identified as TB suspects (significant difference of $p=0.004$). Approximately 93% and 77% of TB suspects identified from KZN and NWP, respectively, had their sputum smear results collected with a significant difference of $p=0.027$. Furthermore, about 22% for KZN and 0.3% for NWP had collected their sputum smear results collected, even though they were non-suspects for TB with an evident significant statistical difference at $p<0.001$.

The majority of patients whose sputum smears were collected tested negative, thus about 89% in KZN and 68% NWP, and about 7% for KZN and 28.9% for NWP tested positive. About 5.2% and 2.7% of patients' results were not recorded for KZN and NWP, respectively with a marked significant difference between the sputum smear results at $p=0.002$. About 17% of patients of KZN and 2% of NWP had smear cultures and drug sensitivity tests (DST) performed, and there was a significant statistical difference between the provinces at $p<0.001$. The results revealed that 91.5% of the 59 patients in KZN had negative cultures and 8.5% positive cultures, while among the 8 patients in NWP 37.5% had negative cultures and 62.5% positive cultures. There was a significant difference between the two provinces with regard to culture results ($p<0.001$). In both provinces there was no record for DST results.

The tuberculin skin test (TST) was only done for 0.6% of the patients in NWP and not done completely/no record among patients in Kwazulu-Natal. However there was no statistical difference between the two provinces (p=0.348). Chest X-ray was also seldom performed in KZN (0.3%) and NWP (1.8%) with a significant statistical difference at p=0.05. All chest X-ray results were recorded in the patient files for both provinces. The majority of patients had their CD4 cell counts estimated (98% for KZN and 97.8% for NWP) with no significant difference (p=0.930). The majority of patients had 200 or more CD4 cell counts performed - KZN (53.2) and NWP (52.1), and about 46.5% for KZN and 44.8% for NWP had CD4 cell count below 200. There were just about 0.3% of patients in KZN and 3.0% in NWP who did not have CD4 cell count results recorded anywhere in their patient files. A significant statistical difference in CD4 cell count was observed for the provinces (p=0.019).

The provision of CPT for patients having CD4 cell count less than 200 was 0.6% for KZN and 93.9% for NWP, indicating the percentage of those who received CPT. Hence a high percentage of patients (99.4%) with CD4 less than 200 in KZN have no record of CPT provision and only about 6% of patients in NWP had no record of CPT provision ($p<0.001$ for the differences between Kwazulu-Natal and NWP). Viral load (VL) had been done for 24.5% of patients in KZN and 7.8% in NWP. The majority of patients did not have their viral load estimated (75.5% and 92.2% for Kwazulu-Natal and NWP, respectively) during diagnosis or before initiation of ART with a statistical significant difference at $p<0.001$.

The majority of patients had been given pre-ART counselling in both KZN (92.9%) and NWP (99.0%) with a significant difference at $p<0.001$. General HIV education was evident to have been given to 92.3% and 99.3% of patients in KZN and NWP, respectively, and when

compared there was a significant statistical difference at p<0.001. ART information was given to about 92% of patients in KZN and about 98% in NWP and the statistical difference was significant at p<0.001. About 90% and 99% of patients in KZN and NWP, respectively, were taken through adherence planning for ART.

4.3.1.2 Clinical Laboratory Investigations Done on Initiation

Clinical laboratory investigations done on initiation (Table 4.4) were inclusive of patient CD4 cell counts, viral load (VL), creatinine, full/complete blood count (FBC), haematocrit (Hct), haemoglobin (Hb) and alanine aminotransferase (ALT). The majority of patients were initiated on ART using CD4 cell count in both provinces, that is, KZN (98.3%) and NWP (98.7%) with no statistical difference between the two provinces (p=0.678). The mean initiation CD4 cell count was 217.72 (SD=128.96) for KZN and 229.86 (SD=134.25) for NWP, however there was no significant mean difference between the two provinces (p=0.246). Some of the patients were initiated using both CD4 cell count and VL, that is, about 25% of patients in KZN and 9% of patients in NWP were initiated using both parameters with a significant statistical difference at p<0.001.

Among other tests, creatinine was done in about 88% and 60% of patients in KZN and NWP, respectively, with a significant statistical difference at p<0.001. The mean creatinine results was found to be 66.49 (SD=40.44) and 67.08 (SD=20.89) for KZN and NWP, respectively, hence there was no significant mean difference between the two provinces (p=0.857). Full blood count (FBC) or Hb were done in about 77% of patients in KZN and only about 51% of patients in NWP with a marked significant difference between the provinces (p<0.001).

Table 4.4: Clinical laboratory investigations done on initiation

		Province		χ^2 (P-value)
		Kwazulu-Natal	North-West	
Patient CD4 cell count	Yes	345 (98.3)	301 (98.7)	0.172 (0.678)
	No	6 (1.7)	4 (1.3)	
CD4 cell count results	Mean (SD)	217.72 (128.96)	229.86 (134.25)	1.162 (0.246)
Patient viral load	Yes	89 (25.4)	26 (8.5)	31.979 (0.000)
	No	262 (74.6)	279 (91.5)	31.979 (0.000)
Creatinine	Yes	309 (88.0)	183 (60.0)	70.642 (0.000)
	No	41 (11.7)	122 (40.0)	
Creatinine results	Mean (SD)	66.49 (40.44)	67.08 (20.89)	-0.180 (0.857)
FBC or Hb	Yes	270 (76.9)	156 (51.1)	51.822 (0.000)
	No	80 (23.1)	144 (48.9)	
WBC results	Mean (SD)	5.85 (2.43)	5.23 (2.11)	2.393 (0.017)
RBC results	Mean (SD)	5.15 (21.86)	4.03 (0.56)	0.539 (0.590)
Hb results	Mean (SD)	11.59 (1.88)	11.89 (2.19)	-1.454 (0.147)
HCT results	Mean (SD)	0.35 (0.064)	0.36 (0.06)	-1.468 (0.143)
Platelet results	Mean (SD)	273.59 (99.50)	260.65 (114.71)	1.094 (0.275)
ALT	Yes	306 (87.2)	306 (87.2)	94.336(0.000)
	No	43 (12.3)	141 (46.2)	
ALT results	Mean (SD)	28.19 (40.02)	23.48 (21.23)	1.404 (0.161)

χ2 – Chi-Squared, t - t-test value, p-value - significance level, SD - standard deviation, WBC - white blood count, RBC - red blood cell count, Hb – haemoglobin, Hct - results, haematocrit or packed cell volume, ALT - alanine aminotransferase test.

The FBC included white blood cell (WBC) results, red blood cell (RBC) results, haemoglobin (Hb) results, haematocrit or packed cell volume (Hct) and platelets results. The mean WBC was found to be 5.85 (SD=2.43) and 5.23 (SD=2.11) for KZN and NWP, respectively, projecting a significant mean difference at p=0.017 between the provinces. There was no significant mean difference between KZN (mean=5.15; SD=21.86) and NWP (mean=4.03; SD=0.56) with regard to RBC results (p=0.590). The mean Hb results for KZN (mean=11.59; SD=1.88) was not significantly different (p=0.147) from NWP (mean=11.89; SD=2.19). There was no significant mean difference (p=0.143) between KZN (mean=0.35; SD=0.064) and

NWP (mean=0.36; SD=0.06) with regard to Hct results. Mean platelets counts for KZN (mean=273.59; SD=99.50) and NWP (mean=260.65; SD=114.71) were not significantly different (p=0.275) between the provinces. Alanine aminotransferase test (ALT) was evidently done in about 87% and 54 % of patients in KZN and NWP respectively with a significant statistical difference (p<0.001). The mean ALT results for Kwazulu-Natal and NWP, respectively, was found to be 28.19 (SD=40.02) and 23.48 (SD=21.23), however there was no significant mean difference (p=0.161).

4.3.1.3 ART Regimen

The ART regimen used for patients in this study were all found to be first-line for adults and adolescents, infants and children as well as maternal regimens for HIV-infected pregnant mothers, according to the ART guidelines. All facilities in each province had adopted the use of two (2) Nucleoside/Nucleotide Reverse Transcriptase Inhibitors (NsRTI/NtRTI) and one (1) Non-Nucleoside Reverse Transcriptase Inhibitor (NNRTI) combinations across all types of patients (Table 4.5). The most commonly used combination was Lamivudine plus Tenofovir plus Efavirenz (3TC/TDF/EFV) in KZN (80.1%) and NWP (63.8%) for adults and adolescents followed by the combination of Lamivudine, Tenofovir and Nevirapine (3TC/TDF/NVP) was prescribed in about 16.5% and 22.9% of patients in KZN and NWP, respectively. The combination of Zidovudine, Lamivudine and Efaviranz (AZT/3TC/EFV) (1.2%; 10.3%), Zidovudine, Lamivudine and Nevirapine (AZT/3TC/NVP) (0.3%; 2.7%) and Emtricitabine, Tenofovir and Efavirenz (TDF/FTC/EFV) (0.6%; 0.3%) were also prescribed mainly as maternal regimens for pregnant mothers in KZN and NWP, respectively. Abacavir, Lamivudine and Efavirenz (ABC/3TC/EFV) combination was also evident for infants and children regimens for KZN (1.4%) and NWP (0.0%). There was a statistically significant difference between the two provinces with regard to the regimen combinations prescribed (p<0.001).

Table 4.5: ART regimen combination

	Province		Total Frequency (%)	χ^2 (p-value)
	Kwazulu-Natal Frequency (%)	North-West Frequency (%)		
AZT+3TC+NVP	1 (0.3)	8 (2.7)	9 (1.4)	45.243 (0.000)
AZT+3TC+EFV	4 (1.2)	31 (10.3)	35 (5.4)	
3TC+TDF+NVP	57 (16.5)	69 (22.9)	126 (19.5)	
3TC+TDF+EFV	277 (80.1)	192 (63.8)	469 (72.5)	
ABC+3TC+EFV	5 (1.4)	0 (0.0)	5 (0.8)	
TDF+FTC+EFV	2 (0.6)	1 (0.3)	3 (0.5)	

χ^2 – Chi-Squared, p-value - significance level, AZT - Zidovudine, 3TC - Lamivudine, NVP - Nevirapine, EFV - Efavirenz, TDF - Tenofovir, ABC - Abacavir, FTC - Emtricitabine

4.3.1.4 Monitoring of HIV Management

Monitoring of patients progress and ART effectiveness was mainly based on the laboratory parameters, that is, the frequency of combined use of CD4 cell count and VL markers by NIMART (Table 4.6). Hence, the findings of this study reveal that not all patients were monitored using both markers. The CD4 cell count was used to monitor the effectiveness of ART at six (6) months after initiation of ART in most patients in KZN (90.6%) and was seldom done in NWP (37.7%) with a statistical significant difference between the two provinces ($p<0.001$). The findings revealed that CD4 cell count was seldom done at 12 months after initiation of ART with 71.2% and 79% of patients not monitored in KZN and NWP, however, there was a significant statistical difference between this two provinces ($p=0.034$). In totality, CD4 cell count monitoring was done in about 66% and 25% of all patients who

participated in this study at six months and 12 months after initiation of ART, in KZN and NWP, respectively.

Viral load monitoring was mainly done at six months after initiation of ART in KZN (86%) as compared to NW (25.6%) and the two provinces differed significantly (p<0.001). Twelve months after initiation of ART, VL was only monitored in about 30% of patients in KZN and about 18% of patients in NWP with a significant statistical difference of p=0.001. The overall VL monitoring done was about 58% (KZN) and 24% (NWP) of all patients that participated in this study at six months and 12 months after initiation of ART.

Table 4.6: Monitoring practices to assess the effectiveness of ART

		Province		Total	χ^2 (P-value)
		Kwazulu-Natal Frequency (%)	North-West Frequency (%)		
CD4 monitoring 6 months after initiation of ART	Yes	318 (90.6)	115 (37.7)	433 (66.0)	203.479 (0.000)
	No	33 (9.4)	190 (62.3)	223 (34.0)	
CD4 monitoring 12 months after initiation of ART	Yes	101 (28.8)	63 (20.7)	164 (25.0)	6.778 (0.034)
	No	250 (71.2)	241 (79.0)	491 (74.8)	
Viral load monitoring 6 months after initiation of ART	Yes	302 (86.0)	78 (25.6)	380 (57.9)	244.817 (0.000)
	No	49 (14.0)	227 (74.4)	276 (42.1)	
Viral load monitoring 12 months after initiation of ART	Yes	104 (29.6)	56 (18.4)	160 (24.4)	11.238 (0.001)
	No	247 (70.4)	249 (81.6)	496 (75.6)	

χ^2 – Chi-Squared, p-value - significance level

There was no monitoring done with regard to monthly creatinine, ALT, HB or FBC except during initiation of ART.

4.3.2 TB Entry Point

4.3.2.1 Evaluations Done at Diagnosis/Before Anti-TB Treatment Initiation

Almost all patients in KZN (92.9%) had reported one or more signs of TB and all patients in NW (100%) had complained of one or more signs of TB, however, no statistical difference was evidenced (p=0.366). The majority of patients in KZN had no record (78.6%) of being offered TB counselling while in NWP all patients had received TB counselling (100%), hence a significant statistical difference was marked (p<0.001). About 93% and 100% of patients in KZN and NWP, respectively, had provided sputum smears for microscopy on spot with only about 7% in KZN whose sputum was collected on spot and the following day in the morning (Table 4.7). There was no statistical difference marked with regard to sputum smear microscopy done (p=0.366)

The sputum smear microscopy results were found to be all positive among all patients within the two provinces. Most of the patients have never had TB or treated for TB before this episode for KZN (71.4%) and NW (100%). Only about 28.6% had had TB before this episode in KZN however there was a very weak statistical difference marked between the two provinces (p=0.053). Sputum for culture and DST was collected among the 28.6% of retreatment cases from KZN of which all tested positive (100%) for culture and for DST about 75% was sensitive to all anti-TB regimen drugs and 25% were resistant to rifampicin in KZN.

HIV testing among newly diagnosed TB at entry was conducted in about 78.6% and 100% of patients KZN and NWP, respectively. In KZN, about 21.4% had their HIV status known, hence there was no need to be tested for HIV. The HIV test results for all the TB patients were positive.

Table 4.7: Evaluations done at TB diagnosis or before treatment initiation

		Province		Total Frequency (%)	X^2 (P-value)
		Kwazulu-Natal Frequency (%)	North-West Frequency (%)		
Patient complained of any TB signs (n=25)	Yes	13 (92.9)	11 (100)	24 (96.0)	0.818 (0.366)
	No	1 (7.1)	0 (0)	1 (4.0)	
If yes, was counselling for TB done (n=25)	Yes	1 (7.1)	11 (100)	12 (48.0)	21.280 (0.000)
	No	2 (14.3)	0 (0)	2 (8.0)	
	No record	11 (78.6)	0 (0)	11 (44.0)	
Sputum smear microscopy done (n=25)	On spot	13 (92.9)	11 (100)	24 (96.0)	0.818 (0.366)
	On spot and morning	1 (7.1)	0 (0)	1 (4)	
Sputum smear microscopy results (n=25)	Both positive	14 (100)	11 (100)	25 (100)	a
Has the client been treated for TB before (n=25)	Yes	4 (28.6)	0 (0)	4 (16.0)	3.741 (0.053)
	No	10 (71.4)	11 (100)	21 (84.0)	
Smear culture and drug susceptibility (n=25)	Yes	4 (28.6)	0 (0)	4 (16.0)	3.741 (0.053)
	No	10 (71.4)	11 (100)	21 (84.0)	
Culture results (n=5)	Positive	4 (100)	0 (0.0)	4 (0.0)	a
Drug susceptibility results (n=5)	Sensitive	3 (75.0)	0 (0.0)	4 (0.0)	a
	Resistant	1 (25.0)	0 (0.0)	1 (0.0)	
HIV test done (n=25)	Yes	11 (78.6)	11 (100)	22 (88.0)	2.679 (0.102)
	No	3 (21.4)		3 (12.0)	
If yes, results (n=25)	Positive	11 (78.6)	11 (100)	22 (88.0)	2.679 (0.102)
	Status known	3 (21.4)		3 (12.0)	
CD4 collected for HIV-positive clients (n=25)	Yes	12 (85.7)	11 (100)	23 (92.0)	1.708 (0.191)
	No	2 (14.3)		2 (8.0)	
Adherence counselling done (n=25)	Yes	11 (78.6)	10 (90.9)	22 (84.0)	0.580 (0.446)
	No	3 (21.4)	1 (9.1)	4 (16.0)	
Family planning reviewed (n=15)	Yes	7 (87.5)	7 (100)	14 (93.3)	0.938 (0.333)
	No	1 (12.1)	0 (0.0)	1 (6.7)	
CD4 cell count results	Mean (SD)	190.11 (149.96)	200.64 (127.88)		-0.180 (0.859)
Height	Mean (SD)	1.57(0.15)	1.66 (0.09)		-1.525 (0.145)
Weight	Mean (SD)	57.95 (15.99)	54.63(8.74)		0.590 (0.561)
BMI	Mean (SD)	26.51(17.01)	20.03 (3.79)		1.174 (0.256)

a- No statistics are computed because sputum smear microscopy results, culture results, drug susceptibility test results and Province are constants.

There was no significant statistical difference between the two provinces with regard to HIV testing and HIV results (p=0.102). The findings revealed that about 85.7% and 100% of patients in KZN and NWP, respectively, had their CD4 cell counts collected after testing with only about 14.3% of patients in KZN who did not have their CD4 cell count collected. There was no significant statistical difference between the two provinces (p=0.191).

Adherence counselling with regard to anti-TB treatment was offered to the majority of patients before the start of treatment in about 79% and 91% of patients in KZN and NWP, respectively. Approximately 21% (KZN) and 9% (NWP) of patients were not offered treatment adherence counselling, and there was no statistical difference noted (p=0.446). Among the TB female patients (n=15) about 87.5% and 100% of female patients had their family planning reviewed before the start of anti-TB treatment in KZN and NWP, respectively. Only 12.1% of patients did not have their family panning reviewed in KZN, however, there was no statistical difference between the two provinces (p=0.333).

There was no significant mean difference between the two provinces (p=0.859) with the mean CD4 cell count of 190.11 (SD=149.96) for KZN and 200.64 (SD=127.88) for NWP. The mean height of patients was found to be 1.57 (SD=0.15) and 1.66 (SD=0.09) for KZN and NWP, respectively. There was no significant mean difference between the two provinces (p=0.145). Mean weight of patients was found to be 57.95 (SD=15.99) for KZN and 54.63 (SD=8.79) for NWP, however there was no significant mean difference (p=0.561). The mean body mass index (BMI) among newly diagnosed TB patients was 26.51 (SD=17.1) for KZN and 20.03 (SD=3.79) for NWP, with no significant mean difference (p=0.230)

4.3.2.2 Anti-TB Regimen

There was a statistically significant difference (p=0.035) in anti-TB regimen between KZN and NWP (Table 4.8). Most patients (66.7%) were started on regimen 1 in KZN and all patients (100%) in NWP were also started on regimen 1. About 33% of patients in KZN were started on regimen 2 since they had been treated for TB before this present episode. The regimens were well coordinated with the patient's weight, that is, 30-37 kg (0.0%, 9.1%), 38-54 kg (41.7%, 54.5%), 55-70 kg (33.3%, 36.4%) and above 70 kg (25%, 0%) for KZN and NWP, respectively. There was no significant statistical difference between the two provinces (p=0.256).

Table 4.8: Anti-TB treatment and preventive practices on TB & HIV patients

		Province		Total	χ^2 (P-value)
		Kwazulu-Natal Frequency (%)	North-West Frequency (%)	Frequency (%)	
Regimen	Regimen 1	8 (66.7)	11 (100.0)	19 (82.6)	4.439 (0.035)
	Regimen 2	4 (33.3)	0 (0.0)	4 (17.4)	
Dosage according to weight	30-37 kg	0 (0.0)	1 (9.1)	1 (4.3)	4.055 (0.256)
	38-54 kg	5 (41.7)	6 (54.5)	11 (47.8)	
	55-70 kg	4 (33.3)	4 (36.4)	8 (34.8)	
	Above 70 kg	3 (25.0)	0 (0.0)	3 (13.0)	
If HIV & TB client, cotrimoxazole and pyridoxine given	Yes	11 (84.6)	11 (100.0)	22 (91.7)	1.846 (0.174)
	No	2 (15.4)	0 (0.0)	2 (8.3)	
TB contacts screened	Yes	2 (16.7)	7 (63.6)	9 (39.1)	5.316 (0.021)
	No	10 (83.3)	4 (36.4)	14 (60.9)	

χ^2 – Chi-Squared, p-value - significance level

All patients were TB & HIV co-infected and only about 84.6% in KZN and 100% in NWP were given cotrimoxazole preventive therapy (CPT) and pyridoxine; however, 15.4% were not

given the CPT plus pyridoxine in KZN. There was no significant difference between the two provinces with regard to the provision of CPT and pyridoxine (p=0.174). In the event of preventing the spread of TB among contacts, about 16.7% of patients in KZN had their contacts screened as compared to about 63.6% of patients in NWP. The majority of patients (83.3%) in KZN had their contacts not screened for TB as compared to just about 36.6% in NWP. There was a significant difference between the two provinces at p=0.021.

4.3.2.3 TB Monitoring

Table 4.9 illustrates the monitoring practices used to assess the effectiveness of anti-TB treatment and patient outcome. Three indicators were used to measure treatment adherence, that is, TB card which was only employed by KZN (9.1%), treatment supporters which was employed by NWP (18.2%) and patient self-report that had been used by the majority of patients (90.9% & 81.8% in KZN and NWP, respectively). There was no statistical difference between the two provinces (p=0.217). The majority of patients were assessed clinically (85.7% & 90.9%), that is, using weight, clinical signs and symptoms, respectively for KZN and NWP, and there was no significant difference when the two provinces were compared (p=0.692).

Sputa microscopy collection must be done at 7/11th weeks and 5/6th month as monitoring for sputum smear conversion from positive to negative and for treatment outcome. Sputa collection at 7/11 weeks was done by about 7.1% of patients in KZN as compared to 54.5% of patients in NWP. This implied a high number of patients (92.9%) in KZN did not have sputa collected for smear conversion as compared to about 45.5% in NWP. There was a significant statistical difference with regard to sputa collection at 7/11th weeks (p=0.009).

Table 4.9: Monitoring practices to assess the effectiveness of anti-TB treatment

	Province			
	Kwazulu-Natal Frequency (%)	North-West Frequency (%)	Total Frequency (%)	χ^2 (P-value)
Measures used to determine treatment adherence				
TB card	1 (9.1)	0 (0.0)	1 (4.5)	
Treatment supporter	0 (0.0)	2 (18.2)	2 (9.1)	3.053 (0.217)
Patient self-report	10 (90.9)	9 (81.8)	19 (86.4)	
Assessed clinically				
Yes	12 (85.7)	10 (90.9)	22 (88.0)	0.157 (0.692)
No	2 (14.3)	1 (9.1)	3 (12.0)	
Sputa collected at 7/11 weeks				
Yes	1 (7.1)	6 (54.5)	7 (28.0)	6.866 (0.009)
No	13 (92.9)	5 (45.5)	18 (72.0)	
Sputa results at 7/11 weeks				
Negative	1 (100.0)	3 (50.0)	4 (57.1)	
Positive	0 (0.0)	1 (16.7)	1 (14.3)	0.875 (0.646)
No results/record	0 (0.0)	2 (33.3)	2 (28.6)	
Sputa collected at 5/6 months				
Yes	2 (14.3)	4 (36.4)	6 (24.0)	1.646 (0.199)
No	12 (85.7)	7 (63.6)	19 (76.0)	
Sputa results at 5/6 months				
Negative	2 (100.0)	3 (75.0)	5 (83.3)	0.600 (0.439)
No results/record	0 (0.0)	1 (25.0)	1 (16.7)	
Patient treatment outcome				
Cured	3 (21.4)	3 (27.3)	6 (24.0)	
Treatment completed	8 (57.1)	7 (63.6)	15 (60.0)	3.761 (0.288)
Treatment failure	0 (0.0)	1 (9.1)	1 (4.0)	
Defaulted/lost for follow up	3 (21.4)	0 (0.0)	3 (12.0)	

χ^2 – Chi-Squared, p-value - significance level

Of the patients whose sputa were collected, 100% had a negative results in KZN compared to NWP where about 50% had negative results, 16.5% had a positive results and 33.3% with no results found in the patient medical records, with no statistical difference (p=0.646). About 14.3% of patients in KZN had their sputum smear collected for treatment outcome determination as compared to 36.4% of patients in NWP, revealing that a high percentage of patients (85.7% & 63.6%, respectively for KZN and NWP) had their sputum smear not collected for determination of treatment outcome. There was no difference statistically between the provinces (p=0.199). All patients from KZN who had their sputa collected tested negative compared to 75% of NWP whose sputum results was negative and 25% with no results/record found in their medical records, with no statistical difference (p=0.439).

Patient outcome was categorised into cured, treatment completed, treatment failure and lost for follow-up or defaulted treatment. It was evident that in KZN, 21.4% of patients were considered cured, 57.1% had completed treatment, with no treatment failure marked and 21.4% had defaulted or were lost for follow-up compared to NWP with 27.3% cured, 63.6% treatment completed, 9.1% treatment failure and no defaulter or lost to follow-up. However, there was no statistically significant difference between KZN and NWP with regard to TB treatment outcome (p=0.288)

There was a significant difference between the two provinces with regard to the overall level of adherence to treatment guidelines with NWP having about 91% moderate and 9% high adherence to evaluations done at diagnosis or before initiation of treatment compared to about 74% moderate and 14% high adherence levels in KZN. About 73% of files in KZN had highly adhered to the treatment guidelines with regard to evaluations done on initiation

of ART while NWP had only about 35% of high adherence to treatment guidelines, hence there was a marked statistical difference between the two provinces ($p<0.001$). There was a marked moderate to high level of adherence to treatment guidelines to evaluations done at ART initiation.

A low level of adherence was revealed by this study as the majority of patient files were not monitored in both KZN (71.2%) and NWP (88.5%). However, there was a significant difference between the two provinces at $p<0.001$. NWP (81.8%) adhered highly to the treatment guidelines in terms of evaluations done at TB diagnosis compared to KZN with just 50%. There was no statistical difference ($p=0.231$) between the provinces. A high adherence was marked in NWP with 60% of patient records with regard to TB regimen. The majority of patient files in KZN revealed moderate adherence to treatment guidelines with significant difference at $p=0.019$. Poor adherence was also marked with regard to TB monitoring in both provinces with no statistical difference ($p=0.112$).

4.4 Factors Predicting Adherence to Treatment Guidelines

Multiple regression analysis was conducted to assess whether facility type, geographical situation of the facility, hours of operation, guidelines availability, TB & HIV service provider, method of integration of TB & HIV services (facility characteristics) and patient characteristics (age, gender, race, employment status, patient caregiver, living arrangements, number of family members in a household, total number of clinic visits attended) contributed to the prediction of the level of adherence to treatment guidelines with respect to evaluations done at HIV diagnosis or before initiation of ART, evaluations done on initiation of TB monitoring and TB treatment outcome.

Table 4.10 presents a regression of facility type, geographical situation of the facility, hours of operation, guidelines availability, TB & HIV service provider, method of TB & HIV integration and socio-demographic characteristics of the patients on adherence to treatment guidelines with respect to evaluations done at HIV diagnosis or before initiation of ART

In model 9 of Table 4.10, total number of visits attended, geographical situation of the facility, gender, hours of operation, patient caregiver, TB service provider, Method of TB & HIV integration, facility type contributed to the prediction of adherence to treatment guidelines in terms of evaluations done at HIV diagnosis or before initiation of ART with an adjusted regression coefficient (R^2) of 0.037 and they were significant contributors ($p<0.001$).

Table 4.11 presents the regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to evaluations done at HIV diagnosis or before ART initiation. Using the Beta (β) values in Table 4.11 as a measure of relative importance, geographical situation of the facility contributed more to the prediction of the adherence to treatment guidelines in terms of evaluations done at HIV diagnosis or before initiation of ART, followed by the TB service provider, method of TB & HIV service integration and facility type.

Table 4.12 presents regression of facility characteristics and patients' socio-demographic characteristics on adherence to evaluations done during ART initiation. In model 1 of Table 4.12, total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, hours of operation, patient caregiver, PALSA

Table 4.10: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to evaluations done at HIV diagnosis or before ART initiation

Model	R	R^2	Adjusted R^2	SE of the Estimate	F	P
1	0.243[a]	0.059	0.032	0.39016	2.214	0.004[b]
2	0.243[b]	0.059	0.034	0.38981	2.366	0.003[c]
3	0.243[c]	0.059	0.036	0.38950	2.531	0.002[d]
4	0.242[d]	0.059	0.037	0.38923	2.713	0.001[e]
5	0.240[e]	0.058	0.038	0.38908	2.895	0.001[f]
6	0.238[f]	0.056	0.038	0.38899	3.094	0.000[g]
7	0.235[g]	0.055	0.038	0.38894	3.317	0.000[h]
8	0.230[h]	0.053	0.038	0.38907	3.533	0.000[i]
9	0.224[i]	0.050	0.037	0.38924	3.781	0.000[i]

a	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, TB service provider, Method of TB & HIV integration, facility type
b	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, TB service provider, Method of TB & HIV integration, facility type
c	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, SANGTB guideline present in the clinic, TB service provider, Method of TB & HIV integration, facility type
d	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, gender, race, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, SANGTB guideline present in the clinic, TB service provider, Method of TB & HIV integration, facility type
e	Predictors: (constant), total number of visits attended, geographical situation of the facility, gender, race, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, SANGTB guideline present in the clinic, TB service provider, Method of TB & HIV integration, facility type
f	Predictors: (constant), total number of visits attended, geographical situation of the facility, gender, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, SANGTB guideline present in the clinic, TB service provider, Method of TB & HIV integration, facility type
g	Predictors: (constant), total number of visits attended, geographical situation of the facility, gender, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, SANGTB guideline present in the clinic, TB service provider, Method of TB & HIV integration, facility type
h	Predictors: (constant), total number of visits attended, geographical situation of the facility, gender, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, TB service provider, Method of TB & HIV integration, facility type
i	Predictors: (constant), total number of visits attended, geographical situation of the facility, gender, hours of operation, patient caregiver, TB service provider, Method of TB & HIV integration, facility type
Key	r- correlation coefficient; R^2 – R-squared, SE of estimates- Standard Error of estimates, F- F-value, P- Significant level

Table 4.11: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to evaluations done at HIV diagnosis or before ART initiation

Model		Unstandardised Coefficients		Standardised Coefficients	t	P
		b	SE	Beta (β)		
9	Constant	1.600	0.192		8.344	0.000
	Facility type	0.162	0.080	0.205	2.041	0.042
	Geographical situation of the facility	0.194	0.051	0.241	3.805	0.000
	Hours of operation	-0.164	0.090	-0.207	-1.819	0.069
	Method of TB & HIV integration	0.145	0.070	0.147	2.070	0.039
	TB service provider	0.110	0.038	0.124	2.918	0.004
	Gender	-0.057	0.034	-0.068	-1.660	0.097
	Patient caregiver	-0.040	0.023	-0.073	-1.725	0.085
	Total number of visits attended	-0.009	0.006	-0.070	-1.676	0.094

*Dependent variable: HIV diagnosis, b – regression coefficient, SE – standard error, β – standardised regression coefficient (beta weight), t – t-statistic, P – significance level

plus guideline present in the clinic, HIV service provider, number of family members in a household, SANGTB guideline present in the clinic, TB service provider, method of TB & HIV integration, facility type contributed to the prediction of adherence to evaluations done during ART initiation with an adjusted R^2 of 0.134 and had reached significance ($p<0.001$).

According to model 7 of Table 4.12, total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, hours of operation, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, facility type contributed to the prediction of adherence to evaluations done during initiation of ART with an adjusted R^2 of 0.138 and had also reached significance ($p<0.001$).

Table 4.12: Regression of facility characteristics and patients' socio-demographic characteristics on adherence to evaluations done during ART initiation.

Model	R	R^2	Adjusted R^2	SE of the Estimate	F	Sig.
1	0.397[a]	0.158	0.134	0.77022	6.614	0.000[b]
2	0.397[b]	0.158	0.135	0.76960	7.060	0.000[c]
3	0.397[c]	0.158	0.137	0.76904	7.562	0.000[d]
4	0.396[d]	0.157	0.138	0.76854	8.135	0.000[e]
5	0.395[e]	0.156	0.139	0.76824	8.772	0.000[f]
6	0.394[f]	0.156	0.139	0.76795	9.525	0.000[g]
7	0.392[g]	0.153	0.138	0.76827	10.321	0.000[h]
8	0.388[h]	0.151	0.137	0.76878	11.259	0.000[i]

a	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, TB service provider, method of TB & HIV integration, facility type
b	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, TB service provider, facility type
c	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, hours of operation, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, Tb service provider, facility type
d	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, hours of operation, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, facility type
e	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, age, hours of operation, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, facility type
f	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, hours of operation, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, facility type
g	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, hours of operation, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, facility type
h	Predictors: (constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, hours of operation, PALSA plus guideline present in the clinic, hiv service provider, number of family member in a household, facility type
Key	r- correlation coefficient; R^2 – R-squared, SE of estimates- Standard Error of estimates, F- F-value, P- Significant level

In model 8, only total number of visits attended, living arrangements, geographical situation of the facility, employment status, hours of operation, PALSA plus guideline present in the

clinic, HIV service provider, number of family member in a household, facility type contributed to the prediction of adherence evaluations done during initiation of ART with an adjusted R^2 of 0.137 ($p<0.001$).

Table 4.13 presents the regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to evaluations done during initiation of ART. The beta values in Table 4.13 indicate that facility type had more contribution to the adherence to treatment guidelines in terms of evaluations done during initiation of ART. This is followed by hours of operation, PALSA plus availability in the facility and the geographical situation of the facility with low beta values compared to the facility type.

Table 4.13: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on Adherence to evaluations done during initiation of ART

	Model	Unstandardised Coefficients		Standardised Coefficients	t	P
		b	SE	Beta (β)		
8	(Constant)	0.595	0.251		2.375	0.018
	PALSA plus guideline present in the clinic	0.386	0.071	0.227	5.420	0.000
	Facility type	0.528	0.152	0.319	3.483	0.001
	Geographical situation of the facility	0.275	0.070	0.163	3.930	0.000
	Hours of operation	-0.442	0.153	-0.267	-2.885	0.004
	HIV service provider	0.144	0.047	0.135	3.080	0.002
	Employment status	-0.037	0.022	-0.067	-1.702	0.089
	Living arrangements	0.117	0.042	0.143	2.794	0.005
	Number of family members in a household	0.042	0.023	0.095	1.838	0.067
	Total number of visits attended	0.025	0.011	0.087	2.180	0.030

*Dependent variable: Initiation of ART, b – regression coefficient, SE – standard error, β – standardised regression coefficient (beta weight), t – t-statistic, P – significance level

Table 4.14 shows regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to HIV monitoring.

Table 4.14: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to HIV monitoring

Model	R	R^2	Adjusted R^2	SE of the Estimate	F	Sig.
1	0.468[a]	0.219	0.197	0.70811	9.865	0.000[b]
2	0.467[b]	0.218	0.197	0.70784	10.494	0.000[c]
3	0.466[c]	0.217	0.198	0.70763	11.202	0.000[d]
4	0.465[d]	0.216	0.198	0.70747	12.012	0.000[e]
5	0.463[e]	0.215	0.198	0.70738	12.945	0.000[f]
6	0.460[f]	0.212	0.197	0.70808	13.901	0.000[g]
7	0.458[g]	0.210	0.196	0.70849	15.107	0.000[h]
8	0.454[h]	0.206	0.194	0.70938	16.474	0.000[i]

a	Predictors: (Constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, TB service provider, method of TB & HIV integration, facility type
b	Predictors: (Constant), Total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, TB service provider, method of TB & HIV integration, facility type
c	Predictors: (Constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, TB service provider, facility type
d	Predictors: (Constant), total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, TB service provider, facility type
e	Predictors: (Constant), Total number of visits attended, living arrangements, geographical situation of the facility, employment status, race, age, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, TB service provider, facility type
f	Predictors: (Constant), Total number of visits attended, living arrangements, employment status, race, age, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, TB service provider, facility type
g	Predictors: (Constant), total number of visits attended, living arrangements, employment status, race, age, patient caregiver, PALSA plus guideline present in the clinic, number of family member in a household, TB service provider, facility type
h	Predictors: (Constant), total number of visits attended, living arrangements, employment status, age, patient caregiver, PALSA plus guideline present in the clinic, number of family member in a household, TB service provider, facility type
Key	r- correlation coefficient; R^2 – R-squared, SE of estimates- Standard Error of estimates, F- F-value, P- Significant level

In model 1 of Table 4.14, total number of visits attended, living arrangements, geographical situation of the facility, employment status, gender, race, age, hours of operation, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, SANGTB guideline present in the clinic, TB service provider, method of TB & HIV integration, facility type contributed to the prediction of adherence to HIV monitoring with an adjusted R^2 of 0.197.

In model 6, total number of visits attended, living arrangements, employment status, race, age, patient caregiver, PALSA plus guideline present in the clinic, HIV service provider, number of family member in a household, TB service provider, facility type contributed to the prediction of adherence to HIV monitoring with an adjusted R^2 of 0.197 and had reached significance ($p<0.001$).

According to model 8, total number of visits attended, living arrangements, employment status, age, patient caregiver, PALSA plus guideline present in the clinic, number of family member in a household, TB service provider, facility type had significantly contributed to the prediction of adherence to HIV monitoring with an adjusted R^2 of 1.94 ($p<0.001$).

Table 4.15 presents the regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to HIV monitoring. Availability of PALSA plus guideline weighed more in the contribution to the prediction of adherence to HIV monitoring as suggested by the beta values, followed by the number of visits attended, TB service provider and living arrangements.

Table 4.15: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to evaluations done on adherence to HIV monitoring

Model		Unstandardised Coefficients		Standardised Coefficients	t	P
		b	SE	Beta (β)		
8	(Constant)	-1.435	0.303		-4.729	0.000
	PALSA plus guideline present in the clinic	0.524	0.074	0.323	7.118	0.000
	Facility type	0.133	0.061	0.084	2.166	0.031
	TB service provider	0.349	0.079	0.197	4.434	0.000
	Age	0.007	0.003	0.082	2.106	0.036
	Employment status	0.034	0.020	0.063	1.667	0.096
	Living arrangements	0.123	0.037	0.158	3.282	0.001
	number of family members in a household	0.042	0.021	0.098	1.975	0.049
	Patient caregiver	-0.072	0.043	-0.065	-1.688	0.092
	Total number of visits attended	0.067	0.010	0.247	6.497	0.000

*Dependent variable: HIV monitoring, b – regression coefficient, SE – standard error, β – standardised regression coefficient (beta weight), t – t-statistic, P – significance level

Table 4.16 presents the regression of facility characteristics and patients' socio-demographic characteristics on adherence to ART regimen. As projected in model 1 of Table 4.16, total number of visits attended, living arrangements, PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, employment status, race, patient caregiver, age, facility type, TB service provider, geographical situation of the facility, number of family member in a household, HIV service provider, SANGTB guideline present in the clinic, hours of operation contributed to the prediction of adherence to treatment guidelines with regard to ART regimen with an adjusted R^2 of 0.055 and had reached significance at $p<0.001$.

Table 4.16: Regression of facility characteristics and patients' socio-demographic characteristics on adherence to ART regimen

Model	R	R^2	Adjusted R^2	SE of the Estimate	F	Sig.
1	0.285[a]	0.081	0.055	0.65612	3.087	0.000[b]
2	0.285[b]	0.081	0.057	0.65558	3.293	0.000[c]
3	0.284[c]	0.081	0.058	0.65513	3.516	0.000[d]
4	0.283[d]	0.080	0.059	0.65473	3.768	0.000[e]
5	0.282[e]	0.080	0.060	0.65440	4.049	0.000[f]
6	0.281[f]	0.079	0.061	0.65411	4.376	0.000[g]
7	0.279[g]	0.078	0.061	0.65392	4.748	0.000[h]
8	0.276[h]	0.076	0.061	0.65393	5.162	0.000[i]
9	0.272[i]	0.074	0.061	0.65397	5.674	0.000[j]
10	0.269[j]	0.073	0.061	0.65399	6.337	0.000[k]
11	0.266[k]	0.071	0.061	0.65400	7.221	0.000[l]
12	0.262[l]	0.069	0.061	0.65415	8.413	0.000[m]
13	0.256[m]	0.066	0.059	0.65466	10.026	0.000[n]

a	Predictors: (Constant), total number of visits attended, living arrangements, PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, employment status, race, patient caregiver, age, facility type, TB service provider, geographical situation of the facility, number of family member in a household, HIV service provider, SANGTB guideline present in the clinic, hours of operation
b	Predictors: (Constant), Total number of visits attended, PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, employment status, Race, patient caregiver, Age, facility type, TB service provider, geographical situation of the facility, number of family member in a household, HIV service provider, SANGTB guideline present in the clinic, hours of operation
c	Predictors: (Constant), Total number of visits attended, PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, employment status, patient caregiver, Age, facility type, TB service provider, geographical situation of the facility, number of family member in a household, HIV service provider, SANGTB guideline present in the clinic, hours of operation
d	Predictors: (Constant), Total number of visits attended, PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, employment status, patient caregiver, Age, facility type, TB service provider, geographical situation of the facility, number of family member in a household, HIV service provider, SANGTB guideline present in the clinic
e	Predictors: (Constant), Total number of visits attended, PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, employment status, patient caregiver, age, facility type, TB service provider, geographical situation of the facility, number of family member in a household, SANGTB guideline present in the clinic
f	Predictors: (Constant), Total number of visits attended, PALSA plus guideline present in the clinic, Gender, method of TB & HIV integration, patient caregiver, Age, facility type, TB service provider, geographical situation of the facility, number of family member in a household, SANGTB guideline present in the clinic
g	Predictors: (Constant), Total number of visits attended, PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, Age, facility type, TB service provider, geographical situation of the facility, number of family member in a household, SANGTB guideline present in the clinic

Continued/...

Table 4.16: Regression of facility characteristics and patients' socio-demographic characteristics on adherence to ART regimen (Continued)

h	Predictors: (Constant), Total number of visits attended, PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, age, facility type, geographical situation of the facility, number of family member in a household, SANGTB guideline present in the clinic
i	Predictors: (Constant), PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, Age, facility type, geographical situation of the facility, number of family member in a household, SANGTB guideline present in the clinic
j	Predictors: (Constant), PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, Age, facility type, geographical situation of the facility, number of family member in a household
k	Predictors: (Constant), PALSA plus guideline present in the clinic, gender, method of TB & HIV Integration, Age, facility type, number of family member in a household
l	Predictors: (Constant), PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, Age, facility type
m	Predictors: (Constant), PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, facility type
Key	r- correlation coefficient; R^2 – R-squared, SE of estimates- Standard Error of estimates, F- F-value, P- Significant level

According to model 13, only PALSA plus guideline present in the clinic, gender, method of TB & HIV integration, facility type had contributed to the prediction of adherence to treatment guidelines with regard to ART regimen with an adjusted R^2 of 0.059 and had reached a significant level of $p<0.001$.

Table 4.17 presents the regression coefficient of facility characteristics and patients' socio-demographic characteristics on Adherence to ART regimen.

Table 4.17: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to ART regimen

	Model	Unstandardised Coefficients		Standardised Coefficients	t	P
		b	SE	Beta (β)		
13	(Constant)	4.596	0.171		26.809	0.000
	PALSA plus guideline present in the clinic	0.269	0.056	0.194	4.788	0.000
	Facility type	0.185	0.063	0.137	2.955	0.003
	Method of TB & HIV integration	-0.157	0.078	-0.093	-2.006	0.045
	Gender	-0.172	0.057	-0.122	-3.008	0.003

*Dependent variable: Adherence to combination ART regimen, b – regression coefficient, SE – standard error, β – standardised regression coefficient (beta weight), t – t-statistic, P – significance level

Availability of PALSA plus in the facility contributed more to the prediction of ART regimen as indicated by the beta values in Table 4.17, followed by facility type, patient gender, and method of TB & HIV integration with less contribution to the prediction of adherence to ART regimen.

Table 4.18 presents the regression of facility characteristics and patients' socio-demographic characteristics on adherence on evaluations done during TB diagnosis.

Table 4.18: Regression of facility characteristics and patients' socio-demographic characteristics on adherence on evaluations done during TB diagnosis

Model	R	R^2	Adjusted R^2	SE of the Estimate	F	Sig.
1	0.864[a]	0.746	0.351	0.58173	1.890	0.170[b]
2	0.863[b]	0.746	0.415	0.55261	2.253	0.102[c]
3	0.862[c]	0.744	0.464	0.52873	2.660	0.058[d]
4	0.859[d]	0.739	0.499	0.51127	3.082	0.033[e]
5	0.850[e]	0.723	0.510	0.50577	3.391	0.021[f]
6	0.830[f]	0.688	0.488	0.51696	3.434	0.019[g]

a	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, age, PALSA PLUS guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic, hours of operation
b	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, Age, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, geographical situation of the facility, hours of operation
c	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, age, PALSA plus guideline present in the clinic, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, geographical situation of the facility, hours of operation
d	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, age, PALSA plus guideline present in the clinic, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, geographical situation of the facility, hours of operation
e	Predictors: (Constant), Total number of visits attended, employment status, facility type, Age, PALSA plus guideline present in the clinic, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, geographical situation of the facility, hours of operation
f	Predictors: (Constant), Total number of visits attended, employment status, facility type, PALSA plus guideline present in the clinic, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, geographical situation of the facility, hours of operation
Key	r- correlation coefficient; R^2 – R-squared, SE of estimates- Standard Error of estimates, F- F-value, P- Significant level

Model 4 of Table 4.18 revealed that total number of visits attended, employment status, gender, facility type, age, PALSA plus guideline present in the clinic, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, geographical situation of the facility, hours of operation had a significant contribution to the prediction of adherence to treatment guidelines in terms of evaluations done at TB diagnosis with an adjusted R^2 of 0.499 (p=0.033).

According to model 6, total number of visits attended, employment status, facility type, PALSA plus guideline present in the clinic, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, geographical situation of the facility, hours of operation had a significant contribution to the prediction of the adherence to treatment guidelines in terms of evaluations done at TB diagnosis with an adjusted R^2 of 0.488 (p=0.019).

Table 4.19 illustrates the regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence on evaluations done at TB diagnosis. Geographical situation of the facility weighed significantly more in the contribution to the prediction of adherence to evaluations done at TB diagnosis as suggested by the beta values, followed by the availability of PALSA plus and SANGTB in the facility as well as the patients' employment status with the low beta value.

Table 4.20 shows a regression of facility characteristics and patients' socio-demographic characteristics on adherence to TB regimen.

Table 4.19: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence on evaluations done at TB diagnosis

Model		Unstandardised Coefficients		Standardised Coefficients	t	P
		b	SE	Beta (β)		
6	(Constant)	4.806	1.485		3.236	0.006
	Facility type	-1.339	0.674	-0.933	-1.986	0.067
	Geographical situation of the facility	-2.155	0.569	-1.385	-3.785	0.002
	Hours of operation	1.409	0.749	0.993	1.881	0.081
	Method of TB & HIV integration	2.095	0.638	0.819	3.282	0.005
	SANGTB guideline present in the clinic	-1.728	0.535	-1.111	-3.233	0.006
	PALSA plus guideline present in the clinic	1.634	0.532	1.151	3.072	0.008
	Employment status	-1.074	0.279	-1.096	-3.844	0.002
	Living arrangements	0.218	0.105	0.499	2.077	0.057
	Total number of visits attended	-0.202	0.064	-0.745	-3.166	0.007

*Dependent variable: TB diagnosis, b – regression coefficient, SE – standard error, β – standardised regression coefficient (beta weight), t – t-statistic, P – significance level

In model 3 of Table 4.20, total number of visits attended, employment status, facility type, gender, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, living arrangements, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic had contributed to the prediction of adherence to treatment guidelines with regard to TB regimen with an adjusted R^2 of 0.718 (p=0.003).

According to model 6, total number of visits attended, employment status, gender, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, geographical situation of the facility, IMCI guideline present in the clinic significantly contributed to the prediction of adherence to treatment guidelines with regard to TB regimen with an adjusted R^2 of 0.664 (p=0.001).

Table 4.20: Regression of facility characteristics and patients' socio-demographic characteristics on adherence to TB regimen

Model	R	R^2	Adjusted R^2	SE of the Estimate	F	Sig.
1	0.929[a]	0.863	0.665	0.42425	4.362	0.016[b]
2	0.928[b]	0.860	0.693	0.40619	5.140	0.007[c]
3	0.927[c]	0.859	0.718	0.38954	6.085	0.003[d]
4	0.924[d]	0.853	0.731	0.38047	6.970	0.001[e]
5	0.907[e]	0.824	0.701	0.40064	6.742	0.001[f]
6	0.886[f]	0.786	0.664	0.42529	6.423	0.001[g]
a	Predictors: (Constant), Total number of visits attended, employment status, facility type, Age, PALSA plus guideline present in the clinic, gender, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, living arrangements, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic					
b	Predictors: (Constant), Total number of visits attended, employment status, facility type, age, gender, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, living arrangements, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic					
c	Predictors: (Constant), Total number of visits attended, employment status, facility type, gender, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, living arrangements, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic					
d	Predictors: (Constant), Total number of visits attended, employment status, facility type, gender, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic					
e	Predictors: (Constant), Total number of visits attended, employment status, facility type, gender, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, geographical situation of the facility, IMCI guideline present in the clinic					
f	Predictors: (Constant), Total number of visits attended, employment status, gender, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, geographical situation of the facility, IMCI guideline present in the clinic					
Key	r- correlation coefficient; R^2 – R-squared, SE of estimates- Standard Error of estimates, F- F-value, P- Significant level					

Table 4.21 presents the regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to TB regimen. The contribution to the prediction of adherence to treatment guidelines with regard to TB regimen was most significantly due to the availability of SANGTB guideline in the facility as projected by the beta values followed by the total number of visits attended by the patients, IMCI guidelines availability, patient caregiver and employment status.

Table 4.21: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to TB regimen

Model		Unstandardised Coefficients		Standardised Coefficients	t	P
		b	SE	Beta (β)		
6	(Constant)	5.548	1.040		5.332	0.000
	Geographical situation of the facility	-1.237	0.273	-0.758	-4.529	0.000
	Method of TB & HIV integration	1.458	0.512	0.573	2.847	0.013
	SANGTB guideline present in the clinic	-2.454	0.656	-1.575	-3.739	0.002
	IMCI guideline present in the clinic	1.162	0.620	0.772	1.873	0.082
	Gender	-0.455	0.229	-0.303	-1.990	0.067
	Employment status	-0.631	0.208	-0.605	-3.037	0.009
	Patient caregiver	0.500	0.126	0.677	3.960	0.001
	Total number of visits attended	-0.206	0.052	-0.764	-3.951	0.001

*Dependent variable: TB regimen, b – regression coefficient, SE – standard error, β – standardised regression coefficient (beta weight), t – t-statistic, P – significance level

Table 4.22 presents the regression of facility characteristics and patients' socio-demographic characteristics on adherence to TB monitoring. In model 10 of Table 4.22, employment status, facility type, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic were significant predictors to adherence to treatment guidelines in terms of TB monitoring with an adjusted R^2 of 0.361 (p=0.020). Model 11 revealed that employment status, facility type, PALSA plus guideline present in the clinic, patient caregiver had more significantly contributed to the prediction of adherence to TB monitoring with an adjusted R^2 of 0.359 (p=0.013).

Table 4.23 presents the regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to TB monitoring.

Table 4.22: Regression of facility characteristics and patients' socio-demographic characteristics on adherence to TB monitoring

Model	R	R^2	Adjusted R^2	SE of the Estimate	F	Sig.
1	0.782[a]	0.611	0.005	0.71908	1.009	0.512[b]
2	0.781[b]	0.610	0.103	0.68284	1.204	0.391[c]
3	0.779[c]	0.607	0.179	0.65331	1.418	0.285[d]
4	0.777[d]	0.603	0.240	0.62861	1.660	0.198[e]
5	0.774[e]	0.598	0.289	0.60779	1.937	0.131[f]
6	0.771[f]	0.595	0.334	0.58843	2.282	0.081[g]
7	0.769[g]	0.591	0.373	0.57101	2.710	0.046[h]
8	0.749[h]	0.561	0.369	0.57260	2.925	0.036[i]
9	0.741[i]	0.549	0.389	0.56352	3.443	0.021[j]
10	0.707[j]	0.500	0.361	0.57640	3.599	0.020[k]
11	0.686[k]	0.470	0.359	0.57729	4.221	0.013[l]

a	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, Age, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic, hours of operation
b	Predictors: (Constant), Total number of visits attended, employment status, Gender, facility type, Age, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, IMCI guideline present in the clinic, hours of operation
c	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, IMCI guideline present in the clinic, hours of operation
d	Predictors: (Constant), Total number of visits attended, employment status, Gender, facility type, PALSA PLUS guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, IMCI guideline present in the clinic
e	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider
f	Predictors: (Constant), Total number of visits attended, employment status, facility type, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider
g	Predictors: (Constant), Total number of visits attended, employment status, facility type, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration
h	Predictors: (Constant), employment status, facility type, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration
i	Predictors: (Constant), employment status, facility type, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration
j	Predictors: (Constant), employment status, facility type, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic
k	Predictors: (Constant), employment status, facility type, PALSA plus guideline present in the clinic, patient caregiver
Key	r- correlation coefficient; R^2 – R-squared, SE of estimates- Standard Error of estimates, F- F-value, P- Significant level

In Table 4.23, it is clear that employment status weighed significantly more in the contribution of to the prediction of adherence to TB monitoring as suggested by the beta values followed by facility type, the availability of PALSA plus in the facility and patient caregiver.

Table 4.23: Regression coefficients of facility characteristics and patients' socio-demographic characteristics on adherence to TB monitoring

	Model	Unstandardised Coefficients		Standardised Coefficients	t	P
		b	SE	Beta (β)		
	(Constant)	1.088	0.583		1.867	0.077
	Facility Type	0.554	0.250	0.387	2.215	0.039
11	PALSA plus guideline present in the clinic	-0.512	0.281	-0.361	-1.817	0.085
	Employment status	0.516	0.187	0.527	2.754	0.013
	Patient caregiver	-0.320	0.147	-0.434	-2.172	0.043

*Dependent variable: TB monitoring, b – regression coefficient, SE – standard error, β – standardised regression coefficient (beta weight), t – t-statistic, P – significance level

Table 2.24 presents the regression of regression of facility characteristics and patients' socio-demographic characteristics on adherence to patient TB treatment outcome. In model 10 of Table 4.24, total number of visits attended, facility type, patient caregiver, SANGTB guideline present in the clinic, hours of operation had significantly predicted to the adherence to treatment guidelines with regard to patient treatment outcome with an adjusted R^2 of 0.449 (p=0.006).

Table 4.25 presents regression coefficient of facility characteristics and patients' socio-demographic characteristics on adherence to patient TB treatment outcome.

Table 4.24: Regression of regression of facility characteristics and patients' socio-demographic characteristics on adherence to patient TB treatment outcome

Model	R	R^2	Adjusted R^2	SE of the Estimate	F	Sig.
1	0.879[a]	0.772	0.418	0.92517	2.181	0.121[b]
2	0.878[b]	0.772	0.475	0.87880	2.601	0.068[c]
3	0.878[c]	0.771	0.522	0.83860	3.092	0.036[d]
4	0.872[d]	0.761	0.542	0.82053	3.477	0.021[e]
5	0.867[e]	0.751	0.559	0.80503	3.921	0.012[f]
6	0.854[f]	0.730	0.557	0.80764	4.208	0.008[g]
7	0.835[g]	0.697	0.536	0.82661	4.314	0.007[h]
8	0.811[h]	0.658	0.508	0.85054	4.396	0.007[i]
9	0.780[i]	0.608	0.470	0.88303	4.398	0.007[j]
10	0.754[j]	0.569	0.449	0.89997	4.754	0.006[k]

a	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, age, PALSA plus guideline present in the clinic, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic, hours of operation
b	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, age, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, geographical situation of the facility, IMCI guideline present in the clinic, hours of operation
c	Predictors: (Constant), total number of visits attended, employment status, gender, facility type, age, patient caregiver, SANGTB guideline present in the clinic, living arrangements, method of TB & HIV integration, TB service provider, geographical situation of the facility, hours of operation
d	Predictors: (Constant), Total number of visits attended, employment status, gender, facility type, age, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, TB service provider, geographical situation of the facility, hours of operation
e	Predictors: (Constant), Total number of visits attended, employment status, facility type, age, patient caregiver, SANGTB guideline present in the clinic, method of TB & HIV integration, TB service provider, geographical situation of the facility, hours of operation
f	Predictors: (Constant), total number of visits attended, employment status, facility type, age, patient caregiver, SANGTB guideline present in the clinic, TB service provider, geographical situation of the facility, hours of operation
g	Predictors: (Constant), total number of visits attended, employment status, facility type, patient caregiver, SANGTB guideline present in the clinic, TB service provider, geographical situation of the facility, hours of operation
h	Predictors: (Constant), total number of visits attended, facility type, patient caregiver, SANGTB guideline present in the clinic, TB service provider, geographical situation of the facility, hours of operation
i	Predictors: (Constant), total number of visits attended, facility type, patient caregiver, SANGTB guideline present in the clinic, TB service provider, hours of operation
j	Predictors: (Constant), total number of visits attended, facility type, patient caregiver, SANGTB guideline present in the clinic, hours of operation
Key	r- correlation coefficient; R^2 – R-squared, SE of estimates- Standard Error of estimates, F- F-value, P- Significant level

Table 4.25: Regression coefficient of facility characteristics and patients' socio-demographic characteristics on adherence to patient TB treatment outcome

Model		Unstandardised Coefficients		Standardised Coefficients	t	P
		b	SE	Beta (β)		
10	(Constant)	7.106	1.149		6.183	0.000
	Facility type	-2.473	1.016	-1.027	-2.434	0.026
	Hours of operation	1.747	0.988	0.733	1.768	0.094
	SANGTB guideline present in the clinic	-1.343	0.469	-0.514	-2.866	0.010
	Patient caregiver	0.467	0.233	0.376	2.004	0.060
	Total number of visits attended	-0.296	0.076	-0.650	-3.913	0.001

*Dependent variable: Patient treatment outcome, b – regression coefficient, SE – standard error, β – standardised regression coefficient (beta weight), t – t-statistic, P – significance level

Facility type was found to be the most significant contributor to the prediction of patient TB treatment outcome followed by hours of operation, and total number of visits attended. There was a significant association between adherence to treatment guidelines in terms of evaluations done at HIV diagnosis/before ART initiation and at ART initiation ($r=0.123$; $p=0.002$); art initiation and HIV monitoring ($r=0.284$; $p<0.001$); TB diagnosis and TB treatment initiation ($r=0.867$; $p<0.001$); TB diagnosis and TB treatment monitoring ($r=0.528$; $p<0.001$); and TB treatment initiation and TB treatment monitoring ($r=0.531$; $p<0.001$).

Table 4.26 presents the correlation coefficients of total adherence to treatment guidelines during HIV diagnosis/before initiation of ART, ART initiation, ART regimen, HIV monitoring, TB diagnosis, TB regimen, TB monitoring and TB treatment outcome.

Table 4.26: Correlation coefficients of total adherence to treatment guidelines during HIV diagnosis/before initiation of ART, ART initiation, ART regimen, HIV monitoring, TB diagnosis, TB regimen, TB monitoring and TB treatment outcome

Adherence during:	HIV diagnosis / before initiation	ART initiation	HIV monitoring	TB diagnosis	TB treatment initiation
ART initiation	**0.123****				
	0.002				
HIV monitoring	0.034	**0.284****			
	0.385	**0.000**			
TB diagnosis	-0.072	-0.042	-0.011		
	0.066	0.288	0.776		
TB treatment initiation	-0.057	-0.033	-0.007	**0.867****	
	0.145	0.394	0.866	**0.000**	
TB treatment monitoring	-0.073	-0.042	-0.006	**0.528****	**0.531****
	0.064	0.279	0.881	**0.000**	**0.000**

**Correlation is significant at the 0.01 level (2-tailed), c. Unless otherwise noted, bootstrap results are based on 1000 stratified bootstrap samples.

4.5 Relationships between Level of Adherence to TB & HIV Services, Patient Treatment Outcome and Laboratory Parameters (CD4 Cell Count & Viral Load)

There was no significant relationship between patient treatment outcome and adherence to treatment guidelines with regard to TB diagnosis (r=0.035; p=0.867) and TB regimen (r=0.145; p=0.498). A moderate significant negative association between patient treatment outcome and TB monitoring was found with r=0.449 (p=0.24). (Table 4.27).

Table 4.27: Correlation between adherence to treatment guidelines with regard to evaluations done at TB diagnosis, TB regimen and TB monitoring

		TB diagnosis	TB regimen	TB monitoring
Patient treatment outcome	Pearson Correlation	0.035	0.145	-0.449*
	Sig. (2-tailed)	0.867	0.498	0.024

*Correlation is significant at the 0.05 level (2-tailed).

4.6 Summary

This chapter displayed the quantitative results with regard to adherence to treatment guidelines for patients who entered the TB & HIV services through TB- or/and HIV-entry point. The findings also revealed factors predicting adherence to treatment guidelines and the relationship between levels of adherence to TB & HIV services.

CHAPTER 5

RESULTS: QUALITATIVE PHASE

5.1 Introduction

Chapter 4 of this study dealt with the description of the quantitative results. This chapter focuses on the discussions of the qualitative findings. Sequential explanatory mixed methods were employed in this study. This chapter presents the analysis and discussion of the focus group interviews conducted on NIMART trained nurses in both KZN and NWP. Furthermore the findings of this study focused on aim 2, that is, to conduct an exploratory-descriptive qualitative study using focus group interviews to explore and describe factors influencing nurses' adherence to treatment guidelines.

The objective of the study was to explore and describe factors influencing adherence to treatment guidelines among NIMART/anti-TB treatment in KZN and NWP. Furthermore, this objective was derived to the qualitative data which revealed that adherence to treatment guidelines differed according to different stages of care, types of facilities and geographical situations. This strengthened the need to understand any other factors influencing adherence to treatment guidelines among NIMART nurses whether positively or negatively. Data were collected through focus group interviews at the hospitals during training of the NIMART nurses in KZN and NWP. The method of data collection was focus group semi-structured interviews which were based on a focus group interview guide with the leading questions:

1. **What are your barriers regarding adherence to treatment guidelines while initiating and managing ART/anti-TB treatment?**

2. **What can motivate you to adhere to treatment guidelines while initiating and managing ART/anti-TB treatment?**

3. **What do you think can be done to improve your adherence to treatment guidelines?**

The target population of the study was NIMART trained nurses who had been practising initiation and management of ART since 2011 (Table 5.1). These nurses had been working at the PHC/CHC accredited facilities initiating and managing ART since 2011. The study participants were selected purposively and comprised of 24 NIMART-trained nurses. Four (4) focus group interview sessions were conducted and each focus group comprised of 6 participants.

From the total sample of 24 participants, 17 were female NIMART trained nurses and 7 were males, 13 of them had about 3 years of experience in initiating and managing ART at the facility as well as 11 of NIMART nurses with about 4 years of experience in initiating and managing ART. Thirteen (13) of the participants were from the CHC facilities and eleven (11) from the PHC facilities. The ages of the nurses ranged from 26-58 years.

Table 5.1: The profile of NIMART trained nurses who participated in the study

Participant code	Nurse age	Gender	Years in TB & HIV services provision	CHC/PHC
1s1	43	Female	3	CHC
2s1	29	Male	3	PHC
3s1	26	Female	4	CHC
4s1	56	Female	3	CHC
5s1	44	Male	3	CHC
6s1	26	Male	4	CHC
7s2	32	Female	4	PHC
8s2	41	Female	3	CHC
9s2	28	Female	3	PHC
10s2	34	Male	4	CHC
11s2	32	Female	4	CHC
12s2	45	Female	4	PHC
1s3	31	Female	3	PHC
2s3	49	Female	3	CHC
3s3	53	Female	3	PHC
4s3	27	Male	4	PHC
5s3	58	Female	3	CHC
6s3	49	Female	3	PHC
7s4	46	Female	4	PHC
8s4	32	Female	4	PHC
9s4	44	Male	3	PHC
10s4	30	Female	3	CHC
11s4	33	Female	4	CHC
12s4	42	Male	4	CHC

CHC-Community Health Centre; PHC Primary Health Care

5.2 Findings, Discussion and Literature Control

The qualitative data analysis software, Atlas TI (Friese, 2012:1; http://atlasti.com/product/features/), was used in this study to support the qualitative data analysis (QDA). In this study, QDA began with the formulation of codes which were linked to the quotation. The

codes were then categorised into sub-categories and categories using code families. The themes, categories and sub-categories (Table 5.2) were based on the three main questions raised during the focus group interviews, that is, (i) What are your barriers regarding adherence to treatment guidelines while initiating and managing ART/anti-TB treatment?; (ii) What can motivate you to adhere to treatment guidelines while initiating and managing ART/anti-TB treatment?; and (iii) What do you think can be done to improve your adherence to treatment guidelines?

With the use of ATLAS TI, a list of codes was created leading to sub-categories, categories, sub-themes and themes. Two broad themes emerged from the data:

1. **Barriers of adherence to treatment guidelines among NIMART trained nurses**
2. **Identified needs to be met in order to promote adherence to treatment guidelines**

The themes are discussed in detail together with categories and sub-categories. Barriers and facilitators of adherence to treatment guidelines among nurses initiating and managing ART and anti-TB treatment in KZN and NWP provinces were discussed independently of each other.

5.2.1 Theme 1: Barriers to Adherence to Treatment Guidelines among NIMART Trained Nurses.

In the process of empowering nurses in the initiation and management of ART in South Africa, usage and adherence to treatment guidelines seem to be hindered by multifaceted factors. Nurses trained in NIMART deeply expressed barriers that were preventing them

from fully adhering to treatment guidelines in their facilities and throughout their care giving role. Barriers are herein regarded as factors that prevent or obstruct or restrain (Dictionary.com, nd) use and adherence to treatment guidelines. This includes factors related to negative attitude and behaviour towards the treatment guidelines. These sub-themes are inclusive of several categories that are discussed within each sub-theme.

5.2.1.1 Sub-Theme 1.1: Negative Attitude

In this study, "attitude" refers to the way in which nurses feel and think about using and adhering to the treatment guidelines. Among the nurses initiating and managing ART and anti-TB treatment in KZN and NWP, the following barriers were mentioned which led to their negative attitude towards the treatment guidelines, namely, lack of agreement with the guideline, poor motivation, support and supervision, resistance to change and insufficient knowledge and lack of awareness.

Table 5.2: Themes, sub-themes and categories emerging from the study

Theme	Sub-Theme	Category	Description of Category
1. Barriers of adherence to treatment guidelines among NIMART trained nurses	1.1 Negative attitude	1.1.1 Lack of agreement with the guidelines	1.1.1.1 Lack of nurses' input
			1.1.1.2 Lack of applicability
			1.1.1.3 Lack of evidence
		1.1.2 Poor motivation, support & supervision of NIMART trained nurses	1.1.2.1 Lack of support
			1.1.2.2 Poor teamwork
			1.1.2.3 Lack of supervision
		1.1.3 Resistance to change	1.1.3.1 Inertia from previous practice
			1.1.3.2 Change is difficult
		1.1.4 Insufficient knowledge and lack of awareness	1.1.4.1 Lack of orientation
			1.1.4.2 Lack of follow up training/education
			1.1.4.3 Lack of familiarity

Continued/...

Table 5.2: Themes, sub-themes and categories emerging from the study (continued)

Theme	Sub-Theme	Category	Description of Category
1. Barriers of adherence to treatment guidelines among NIMART trained nurses	1.2 Negative behaviour	1.2.1 Organisational factors	1.2.1.1 Time pressure
			1.2.1.2 Shortage of staff
			1.2.1.3 Heavy workload
			1.2.1.4 Poor communication
			1.2.1.5 Organisational constraints
			1.2.1.6 Guideline unavailability
			1.2.1.7 Poor guideline accessibility
			1.2.1.8 Provider accountability
			1.2.1.9 Overall organisational environment
		1.2.2 Guideline recommendation factors	1.2.2.1 Guideline unclear
			1.2.2.2 Not easy to use, too complex/not simplified & guidelines not up to date
		1.2.3 Patient factors	1.2.3.1 Patient preferences/demands
			1.2.3.2 Patient behaviour

Continued/...

Table 5.2: Themes, sub-themes and categories emerging from the study (continued)

Theme	Sub-Theme	Category	Description of Category
2. Identified needs to be met in order to promote adherence to treatment guidelines	2.1 Positive attitudinal needs	2.1.1 Improved accessibility to development and implementation of treatment guidelines	2.1.1.1 Nurses' input in guideline development
			2.1.1.2 Need for guideline applicability
			2.1.1.3 Improved guideline accessibility
		2.1.2 Improved motivation, support and supervision of NIMART trained nurses	2.1.2.1 Need for sufficient support
			2.1.2.2 Need for sufficient teamwork
			2.1.2.3 Need for sufficient supervision
		2.1.3 Adaptation to practice change	2.1.3.1 Ability to change from previous practice
		2.1.4 Improved knowledge and awareness	2.1.4.1 Guideline orientation
			2.1.4.2 Improved training/education
			2.1.4.3 Familiarity

Continued/...

Table 5.2: Themes, sub-themes and categories emerging from the study (continued)

Theme	Sub-Theme	Category	Description of Category
2. Identified needs to be met in order to promote adherence to treatment guidelines	2.2 Positive behavioural change	2.2.1 Organisational-structural changes	2.2.1.1 Need for sufficient time
			2.2.1.2 Sufficient human resources
			2.2.1.3 Reduced workload
			2.2.1.4 Improved communication
			2.2.1.5 Guideline availability
			2.2.1.6 Guideline accessibility
		2.2.2 User friendly guidelines	2.2.2.1 Guideline usability (clear, simplified & up to date guidelines)
		2.2.3 Patient responsiveness	2.2.3.1 Patient ability

5.2.1.2 Sub-Theme 1.2: Negative Behaviour

Behaviour was defined as the capacity of mental, physical, emotional, and social activities experienced (Business Dictionary, 2014:n.p) by nurses' initiating and managing ART with regard to their level of adherence to treatment guidelines. Behaviour was sub categorised into organisational, guideline recommendation and patient factors.

1. **Category 1.2.1: Organisational Factors**

Organisational factors comprised time pressure, shortage of staff, heavy workload, poor communication; organisational constraints, guideline availability, poor guideline accessibility, and provider accountability and overall organisational environment and these factors were presented on both facilitators and barriers to adherence to treatment guidelines.

Nurses trained in NIMART indicated that they do not have time to utilise the treatment guidelines in the facility and this is normally due to the quality assurance time frames set forth by the DoH to monitor patient stay in the facility.

Participants responded:

> *"The issue of workload and timeframe of the patients as stipulated by the quality assurance is a big challenge to guidelines adherence and usage in my clinic."*

> *"Workload is a major challenge when it comes to proper adherence to treatment guidelines, we don't have enough time."*

> *"Yes we don't have enough time to use the guidelines, hence the workload prevents us from adhering to treatment guidelines."*

The ability to use the guidelines and adhere to them is basically impeded by lack of time (Abrahamson, Fox, & Doebbeling, 2012:30; Lugtenberg, Zegers-van schaick, Westert & Burgers, 2009:58). Heavy workload had been verbalised to prevent and deprive NIMART trained nurses to use and adhere to treatment guidelines as there is much more to do than look at what the guidelines are saying. However, this was in line with a study done by Abrahamson *et al* (2012:30) that underscored the fact that guideline use is impeded by heavy workload.

The other factor that was revealed was shortage of staff. Participants said:

> *"The shortage of staff, you find that it's not everybody that is trained on that particular subject. But now, in addition to this shortage of staff, you find that the person who is not trained doesn't know how the guideline of that particular subject look like, he or she has never seen such guideline and he or she has to work in that particular area. For instance, you find that the person had never been NIMART trained and never been exposed to ART initiation but have to initiate ART because he/she is the next available nurse and there is no one to help the patient, the patient cannot be denied access to health care just because the trained nurse is not available, the patient has nothing to do with that."*

> *"Whether the NIMART trained nurse is on leave, off duty or sick, TB & HIV service needs to be provided and it is not the NIMART trained nurse alone not adhering to guidelines but also other nurses that provide the same services in the absence of the NIMART trained nurse."*

Shortage of nurses presents a major challenge on the provision of care to TB & HIV patients as this affects nurses going off duty, attending training, meetings, annual, maternity and sick leave, and these create challenges with the initiating and management of ART and anti-TB treatment as the patients will be attended to by any available nurses on duty. This affects the level of adherence in the patients' records as even the health care providers who are not trained are involved in the management of TB & HIV patient due to shortage of trained nurses.

Treatment guidelines unavailability in the facility was raised to be one of the challenges that is faced by NIMART trained nurses as this leads to poor adherence as nurse do not get the guidance needed. One participant indicated:

> *"Some of our clinics don't even have the so called treatment guidelines and this truly affects the level of adherence and guideline use."*

It was evident that some facilities have one or none of the treatment guidelines and this presents a problem when one needs to refer to a particular programme on how to go about TB & HIV services. Another aspect is that some facilities have TB & HIV treatment guidelines, but they are not accessible to the NIMART nurses for use, hence this affects the level of

adherence to treatment guidelines. There was poor or lack of communication between NIMART nurses and other health care providers as well as the administrative and managerial staff which are said to reduce the level of use and adherence to treatment guidelines. One participant expressed the following sentiment:

> *"When new things come from the government like guidelines it doesn't even go to the media to tell people that there is this change. We are the last people to hear that there is this change and it needs to be implemented and blah blah blah, we haven't heard of it yet, not ready yet so i become very, I don't know if I should say offended or what, it's more of a political aspect of the government. At the end we are the last people to hear about it and at the same time the people to implement it."*

Abrahamson *et al* (2012:30) emphasised that the quality and quantity of communication received regarding the use of treatment guidelines adversely influence such use.

Nurses reported that guidelines were not clear and not easy to use and very complex for them. Participants verbalised that a simplified and user friendly version of the guidelines can promote guidelines use and adherence thereto, for example:

> *"Guidelines are not clear and easy to use they are too complex for me. Why can't they simplify them and make them user friendly. The problem is not adherence but use. You can only adhere to something that you are using."*

> *"I agree we have to use the guidelines to adhere to it. However, majority of you will agree with me and the past speaker that we normally don't find*

guidelines user friendly."

This was also found by Lugtenberg *et al* (2009:58), revealing that guidelines recommendations were found to be unclear or confusing or too complex or not easy to use in practice.

Patients also have a role to play in the level of adherence among nurses initiating and managing ART and anti-TB treatment. One participant indicated that:

> *"Like in my clinic, the patients comes early and if you delay them they will shout, so we don't have time since we have to prioritise the patients before whatever we have to do."*

> *"Maybe the government should give the clients or patients to decide if they want to start ART voluntarily before meeting the eligibility criteria, so that it may also reduce defaulters as they take charge of their health and treatment."*

This is a valid point given their nature of expectations and their demands for unobstructed and immediate health care services together with their preferences or choices. Nurses felt that they (nurses) sometimes do not adhere to treatment guidelines because if they delayed patients, patients shout and as the reason nurse feels that it is important to prioritise and provide health care services within the timeframe given rather than exceeding it while looking for guidelines.

Figure 5.1 is a representation of the barriers of adherence to treatment guidelines among NIMART trained nurses. This graphic representation indicates the two sub-themes, namely, negative attitude and negative behaviour which are also subdivided into different categories.

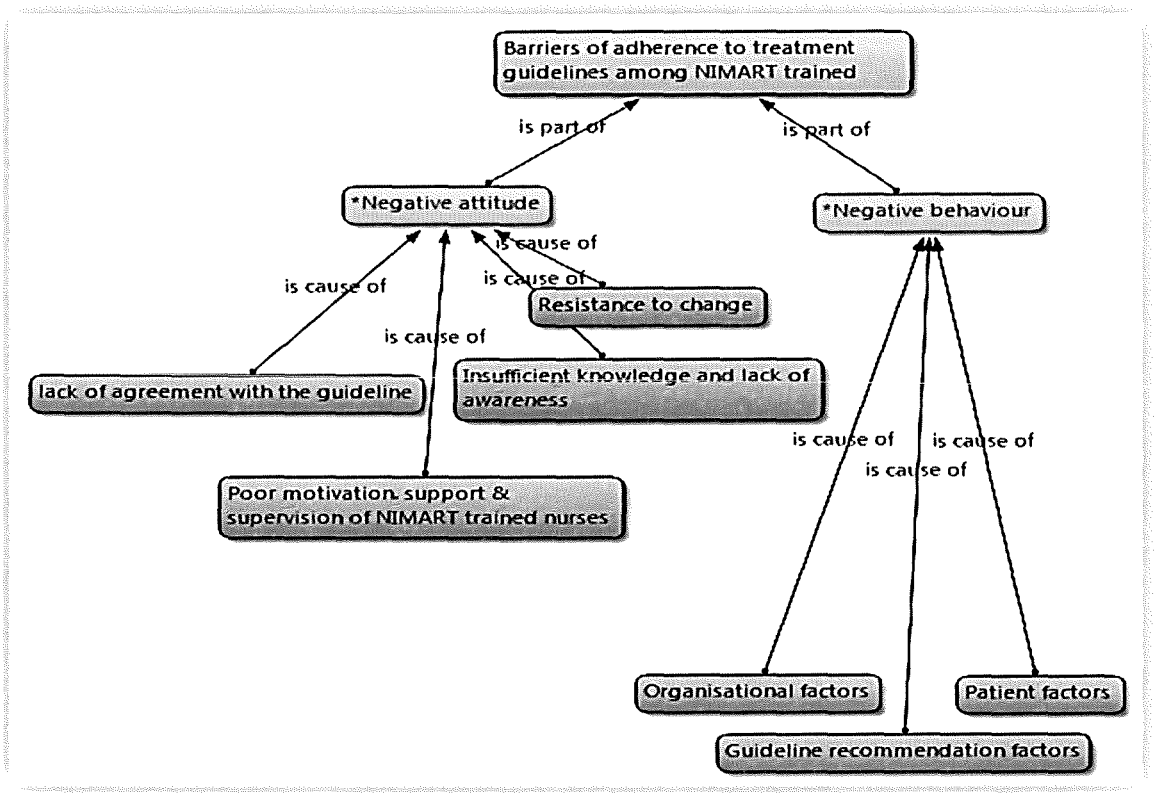


Figure 5.1: Barriers of adherence to treatment guidelines among NIMART nurses

5.2.2 Theme 2: Identified Needs to be Met in Order to Promote Adherence to Treatment Guidelines

The possibility of improved usage and adherence to treatment guidelines was raised in this study. NIMART trained nurses indicated that adherence to treatment guidelines can be

improved. This theme describes the sub-themes as follows: positive attitudinal needs and positive behavioural change. Hence, these were regarded as factors that nurses felt can promote their level of adherence to treatment guidelines.

5.2.2.1 Sub-Theme 2.1: Positive Attitudinal Needs

Among the nurses initiating and managing ART and anti-TB treatment in KZN and NWP, the following needs were identified and expressed, namely: improved accessibility to development and implementation of treatment guidelines, improved motivation, support and supervision, adaptation to practice change and improved knowledge and awareness.

2. Category 2.1.1: Improved Accessibility to Development and Implementation of Treatment Guidelines

NIMART trained nurses expressed that a simplified and easy to go through guideline (e.g., handbook, pocket book and flowcharts) which is more user friendly can improve the usage of treatment guidelines and therefore promote adherence to treatment guidelines. The participants expressed their views as follows:

> *"A portable guideline that can be accessible and owned by any health care provider can ease and promote adherence, not just one guideline for the clinic."*

> *"If they can change just a little bit of the size so that it can be like a hand book that is easy to use and quick to go through."*

Use of treatment guidelines is promoted when nurses perceive the treatment guideline is usable in daily practice (Abrahamson *et al*, 2012:29). Francke, Smit, de Veer & Mistiaen (2008:38) indicated that guidelines that are easy to understand, can easily be tried out and do not need specific resources have a better chance of being implemented correctly and adhered to.

3. Category 2.1.2: Improved Motivation, Support and Supervision of NIMART Trained Nurses

Nurses need support in their care giving role in order to follow or comply with the treatment guidelines correctly and accurately. This study's findings revealed that NIMART trained nurses can adhere better to treatment outcomes if they are given support and are being supervised in their care giving role. This was evident when a participant said:

> *"We need support and encouragement to be able to carry our nursing duties at ease and to the best of quality possible. Weekly or monthly supervision or support visits can increase the level of adherence and guidelines usage among nurses and this will promote quality provision of care to our patients."*

The literature reveals that support from physicians, programme managers, programme coordinators and facility supervisors can promote adherence to treatment guidelines among nurses initiating and managing ART and anti-TB treatment (Abrahamson *et al*, 2012:30; Mazrou, 2013:144). However, NIMART trained nurses felt that if there is a good working

relationship between health care workers, patients can be treated well and with a higher level of adherence to treatment guidelines. Participants articulated:

> *"A good working relationship can promote adherence to treatment guidelines as not only nurses provide care to TB & HIV patients."*

> *"We are supposed to work hand in glove with one another for the provision of quality care to our patients."*

These quotations are in line with the findings of a study done by Abrahamson *et al* (2012:30) that adherence to treatment guidelines is promoted when there is a lateral cooperation between health care providers. This was also emphasised by Afreen & Rahman (2014:187) that participants identified a communication gap as a reason for non-adherence

4. Category 2.1.3: Adaptation to Practice Change

Participant nurses said that they do want to change, but the system does not allow them as the pressure of task-shifting is catching up with them as the implementers. One participant verbalised:

> *"The department of health should allow us nurses to move slowly as this was not our scope of practice to be well orientated, knowledgeable and skilful. The reason we don't want to move from our past routines is because it takes time to acclimatise to the new things. I was trained for NIMART in 2011, but I still find it hard to fully understand the initiation and management of ART."*

It is clear that a gradual change of health care system may be useful to provide nurses with relevant time to become on par with the changes in health care practice and the TB & HIV service needs. Some participants feel that as they do not always keep up with the sudden growth in practice and this reduces their adherence to treatment guidelines. So, a gradual orientation to the NIMART can really improve their adherence to treatment guidelines.

5. Category 2.1.4: Improved Knowledge and Awareness

Sufficient orientation, knowledge, updates, training and follow-up training to NIMART and other nurses were revealed in this study as priorities that can increase the level of adherence to treatment guidelines. One participant responded:

> *"I think more nurses need to be trained in NIMART or all nurses in each facility need to be trained as this causes gaps in the health care provision. Patients won't be returned back because of a trained nurse not being available."*

This sentiment emphasises that provision of training and education with regard to treatment guidelines promotes adherence and use of guidelines. Other studies revealed that nurses acknowledged the importance of training orientation and education regarding treatment guidelines adherence and use (Abrahamson *et al*, 2012:29; Mazrou, 2013:144). This was further corroborated by the identified need for follow-up training to be conducted within nurse practice settings as this will reduce shortage of trained nurses. One participant emphasised:

"We know it is impossible to train everyone in time, but if there is something new coming, even if it's not a formal training but trainers can visit the facilities just to provide an insight on the available change while training are taking place."

Other studies had emphasised the importance of educational outreach visits with the use of trained person or team of health care professionals from other institutions or organisations who meet with nurses in their facilities to give information with the intent of changing the providers' practice as well as enhance their level of knowledge (Mazrou, 2013:145).

5.2.2.2 Sub-Theme 2.2: Positive Behavioural Change

It was evident from the focus group interviews that changes in behaviour can increase the level of adherence to treatment guidelines and this was with regard to the following categories, namely: organisational-structural changes, user friendly guidelines and patient responsiveness.

6. Category 2.2.1: Organisational-Structural Changes

Organisational-structural changes comprised of need for sufficient time, sufficient human resource, reduced workload, improved communication, guideline availability and guideline accessibility. If there is enough time, it would be easy for NIMART trained nurses to use and adhere correctly to the guidelines – the participants verbalised this as follows:

"We need enough time to work with patients as well as to follow the guidelines correctly. Instead of the system pushing us to do more quantity

meaning more headcount per day it should provide time for us to provide quality care to our patients. There is no use for a patient to spend the prescribed 2 hours in the clinic and you find that no quality care was provide to this patient."

"Reduced workload and reduced time pressure can increase adherence to treatment guideline and also promote the provision of quality care to our TB & HIV patients."

"We know it is impossible to train everyone in time but if there is something new coming, even if it's not a formal training but trainers can visit the facilities just to provide an insight on the available change while training are taking place."

Reduced workload was said to be promoting the adherence and use of treatment guidelines with ease. A manageable workload is assistive to the use of and adherence to treatment guidelines among nurses initiating and managing ART and anti-TB treatment (Abrahamson *et al*, 2012:29). Furthermore, nurses verbalised that a sufficiently trained nursing workforce would perk up continuation of care in the health facilities and this will further promote the adherence to treatment guidelines as there will enough or good coverage with NIMART trained nurses.

The availability of treatment guidelines was raised as another approach to promoting adherence to treatment guidelines among NIMART nurses. These guidelines need to be

available in every consulting room within each facility and need to be accessible to the NIMART trained nurses providing TB & HIV services. A participant had to say this:

> *"Guidelines need to be made available in the facilities for easy use and accessibility. However, not just one guideline, but enough for each health care provider as this will reduce time for looking for a guideline or waiting for one to be done with It so that one can use it."*

According to Abrahamson *et al* (2012:29), guideline use is promoted when the organisation makes the treatment guidelines readily available to the nurses concerned.

Nurses also verbalised that proper communication channels can promote or be favourable towards the adherence to treatment guidelines and their use thereof. A participant verbalised this aptly:

> *"A good communication between the implementers, programme managers, coordinators and supervisors can promote adherence to treatment guidelines. Any change need to be communicated to the implementers' way beforehand not just in the implementation phase."*

Other studies stated that the communication between guideline developers and implementers is necessary to promote adherence and use of the treatment guidelines (Mazrou, 2013:144; Abrahamson *et al*, 2012:29).

7. Category 2.2.2: User Friendly Guidelines

Provision of simple, clear and easy to go through treatment guidelines can improve the use and level of adherence. One participant expressed:

> *"A simple guideline that is clear and at the level of nurses can be of help to us as it will be easy to understand and go through. The chart or handbook or pocket book will be of greater help. But I like that diagram like poster ... Yes algorithm type of guidelines. It is simple and easy to follow rather than the book."*

This viewpoint was borne out by Mazrou (2013:144), Abrahamson *et al* (2012:29) and Lugtenberg *et al* (2011:105) that clear and easy to understand guidelines stand a greater chance to be used and thus improve the level of adherence.

8. Category 2.2.3: Patient Responsiveness

The ability of patients to fully participate in their ART and TB treatment was raised as an issue that can facilitate adherence to treatment guidelines. Some participants indicated:

> *"Sometimes we need patients on board; we don't monitor patients because they are not available or complying to the monthly visits that we set for them. If patients can adhere and follow all that we say to them this can ease our work and promote adherence to treatment guidelines."*

> *"I agree with you patients are our customers and their availability and engagement in the provision of ART and TB treatment can increase our adherence."*

This issue includes patients availing themselves of all necessary evaluations and adhering to their therapies. Mazrou (2013:145), Abrahamson *et al* (2012:30) and Lugtenberg *et al* (2011:103) found that some patients perceived no need for guidelines, and health care providers may think that patients need to comply with the necessary actions to increase the level of adherence to treatment guidelines.

Figure 5.2 projects the schematic representation of theme 2, that is, identified needs to be met in order to promote adherence to treatment guidelines and its sub-themes, namely, positive attitudinal needs and positive behavioural change.

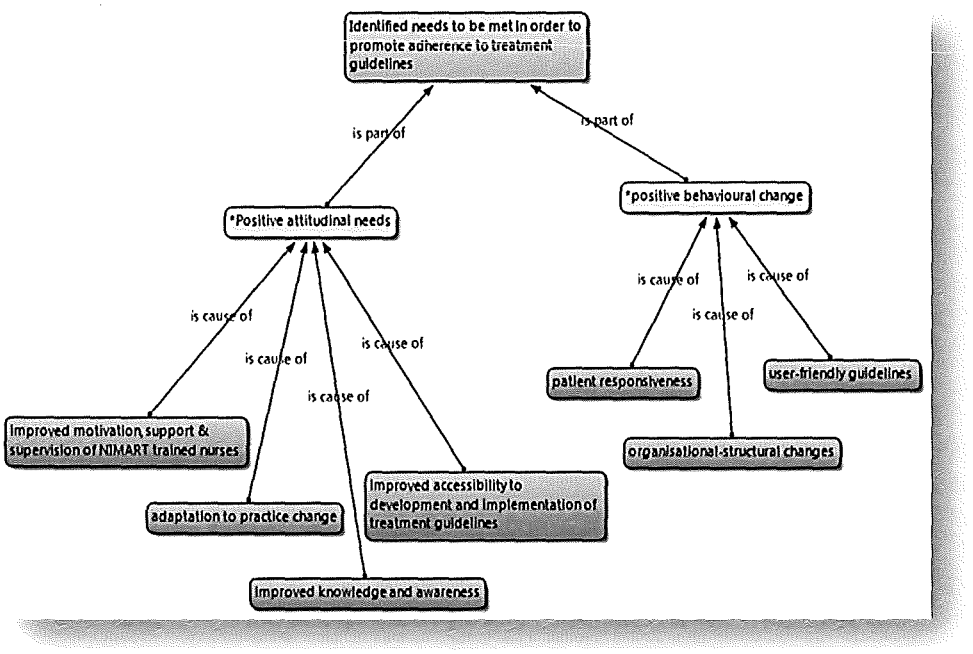


Figure 5.2: Identified needs to be met in order to promote adherence to treatment guidelines

5.3 Summary

This chapter looked at the qualitative findings and literature control that was conducted. Nurses revealed their concerns and future recommendations with regard to their level of adherence to treatment guidelines. It was evident that barriers exist that hinder nurses from fully adhering to treatment guidelines. However, they provided the possibilities of increasing their level of adherence through facilitators that would be of great help to them.

CHAPTER 6

INTERPRETATION AND META-INFERENCE

6.1 Introduction

This chapter interprets and constructs meta-inferences of the findings of this study. This is congruent with the use of sequential explanatory mixed methods design and the discussion will focus on the integrated findings rather than the individual findings from the study's separate phases. The discussion is in accordance with steps outlined in Grove *et al* (2012:209) and Creswell (2009:71) thus, the qualitative data will help explain the quantitative data. The discussion is sequenced in accordance with the study objectives and research questions. Consequently, the chapter begins with a discussion of findings related to the level of adherence to treatment guidelines among nurses initiating and managing ART and TB treatment. This is followed by a discussion of the factors predicting the level of adherence to treatment guidelines. Finally, the findings related to the relationship between the level of adherence to treatment guidelines and patients' outcome are discussed.

6.2 Level of Adherence to Treatment Guidelines among Nurses Initiating and Managing ART and TB Treatment

The level of adherence to treatment guidelines varied according to different stages of care giving. Findings revealed that NIMART nurses highly adhered to most of the recommendations provided in the TB & HIV guidelines with regard to evaluations done at

diagnosis and before initiation of ART, but failed to adhere to some of the key elements of TB & HIV services, namely, testing for pregnancy, doing TST and chest X-ray, and the provision of CPT among HIV patients. This was in agreement with observations by Naidoo *et al* (2010:455) that the majority of health care providers complied with the recommendations published in the treatment guidelines with respect to the evaluations done at diagnosis and at pre-treatment stage. These similarities would appear to reveal the ability of nurses in the provision of TB & HIV services in the same manner that physicians display. Failure to adhere to key elements of TB & HIV services was found to be aggravated by insufficient knowledge and lack of awareness of the recommendations stipulated in the guidelines.

Furthermore, organisational factors such as time pressure, heavy workload and poor guideline availability and accessibility had been reported by nurses as factors that hinder them from adhering to treatment guidelines. A moderate to high level of adherence to treatment guidelines with regard to evaluations done at TB diagnosis and before commencement of TB treatment was marked and varied with regard to the target provinces (that is, KZN and NWP). NWP showed a higher level of adherence to treatment guidelines than KZN.

Availability of more NIMART trained nurses in the facility was expressed by NIMART nurses to be promoting their adherence to treatment guidelines. This was evident with regard to NWP which had more than one NIMART nurse per facility (Stender, 2011:18) and also a higher adherence than KZN that had only one NIMART nurse per facility (Stender, 2011:15).

These discrepancies also raise multiple questions in terms of what is happening with the high number of NIMART trained nurses who are not initiating and managing ART. For example, in Ugu district out of 509 NIMART trained nurses only 56 were initiating and managing ART in 56 facilities (Stender, 2011:15).

The impact of having more than one NIMART trained nurse in the facility would be one of the effective ways of promoting adherence to treatment guidelines, especially when one NIMART trained nurse goes on leave, is off-duty or due to any other unforeseen circumstances such as being sick, other NIMART trained nurse would be in a position to carry on with the patients. Even though the presence of a NIMART trained nurses promotes the provision of TB & HIV services by nurses who are not trained, it also decreases the level of adherence to treatment guidelines. Furthermore, in some facilities guidelines are unavailable and this also impacts negatively on adherence to treatment guidelines as nurses would not have any form of guidance with regard to TB & HIV services provision. Availing guidelines that are user friendly, clear, simple and portable can improve adherence and use.

Another aspect that can increase the level of adherence to treatment guidelines is patients' preferences - where patients have a voice in their readiness to be initiated on ART regardless of their CD4 cell count level. Some nurses felt that patients need to be given a chance to decide in their own time to be initiated on ART rather than waiting to meet the criteria for ART initiation. Thus, giving them more responsibility on the decision to start ART can promote treatment adherence and improve their impact on nurses' adherence to treatment guidelines. This notion contrasts with the findings of Lugtenberg *et al* (2009:57

that patient preferences were not in line with the treatment guidelines and, therefore, a barrier to adherence to treatment guidelines. However, this is what nurses' feel as adherence involves working hand in glove with the patient in all decisions in the care giving interaction.

Nurses had moderately adhered to HIV testing among newly diagnosed TB patients; hence there were still about a quarter of patients who were not tested for HIV. This may be due to fact that nurses had not offered counselling to the majority of TB patients in KZN. Hence nurses feel and verbalise that HCT is not carried out by them, but more specifically by the counsellor which is in conflict with the guideline recommendations regarding Provider Initiated Counselling and Testing (PICT). PICT has been introduced to ensure that HCT becomes the standard of care in all consultations with health providers and promotes universal access to prevention, care and treatment services for all clients by increasing the utilisation and acceptance of HCT services (Makhunga-Ramfolo, Chidarikire, Farirai, & Matji, 2011). However, a systematic review done by Elmahdi, Gerver, Guillen, Fidler, Cooke & Ward (2013:34) indicated that adherence to 2008 National Guidelines for HIV Testing in the UK was poor and that low levels of provider offered testing seem to be a major contributor to this, particularly in patients presenting with TB.

Failure to adhere to testing guidelines is likely to contribute to late diagnosis with implications for poorer clinical outcomes and continued onwards transmission of HIV. This was further emphasised by other studies reporting poor adherence to treatment guidelines with regard to HIV testing in newly diagnosed TB patients (Low & Eng, 2009:481), and this

trend had been evident from the mid-1980s to 2009 (Katz, Hall, Keon & Crane, 1993:1285; Asch, London, Barnes & Gelberg, 1997:380; Geduld *et al*, 1999; Alrajhi, Nematallah, Abdulwahab & Bukhary *et al*, 2002; Dart, Alder, Mamdani *et al*, 2006:272 & Low & Eng, 2009:481).

Nurses highly adhered to CD4 cell count collection at diagnosis, pre-ART and initiation stages - this can be explained by their long introduction in offering HIV wellness care before. However, it was only during the introduction of NIMART when they started collecting blood for VL which seems to be a challenge to them. Resistance to practice change was revealed to be the influential factors as nurses are unable to move or deviate from their previous and routine nursing care. Furthermore, NIMART nurses were not provided with enough weaning and motivation with regard to the changes in their practice. This was supported by Lugtenberg *et al* (2009:57) and Lugtenberg *et al* (2011:100) who indicated that health care providers felt that they are not motivated enough to change and it was hard for them to overcome inertia of a previous practice.

Given the fact that NIMART trained nurses are new in the initiation and management of ART, it is imperative that nurses' ability to adhere to treatment guidelines be recognised as they had shown that they are capable. This proves that if nurses are provided with sufficient support, motivation and supervision by members of the multi-disciplinary team in health care provision regarding TB & HIV services, full level of adherence can be reached. The support, motivation and supervision included should integrate provision of adequate training, orientation, staffing and mentoring in their care giving role. Studies had revealed

that if members of a multi-disciplinary team, programme managers and coordinators, and facility supervisors provide support, motivation and supervision, the level of adherence to treatment guidelines can be improved (Abrahamson *et al*, 2012:30; Mazrou, 2013:144).

A low level of adherence to treatment guidelines with regard to monitoring for TB treatment outcome and the effectiveness of ART with the use of VL and CD4 cell count was evident in this study. The low level of adherence to monitoring was found to be closely linked to the lack of agreement with the guidelines as most NIMART trained nurses opted for CD4 cell count rather than VL. SAATG guidelines recommended that both CD4 cell count and VL must be monitored on initiation, 6 months, 1 year after ART initiation, and then every 12 months as to monitor progress of ART (NDoH, 2010:5). Hence, the majority of patients only had blood collected for VL during initiation of ART.

The study showed that even though nurses experienced some flaws in their level of adherence they were found to have a moderate to high level of adherence to treatment guidelines, except for TB monitoring and this was in line with other studies done among physicians with regard to TB & HIV services (Saraceni *et al*, 2011:251; Naidoo *et al*, 2010:457; & Peterson *et al*, 2011:4). Studies indicated a moderate to high adherence to clinical guidelines with regard to evaluations done during diagnosis and before initiation of ART, initiation of ART, ART regimen and monitoring of effectiveness of ART (Saraceni *et al*, 2011:251; Naidoo *et al* , 2010:457; & Peterson *et al*, 2011:4). This can be interpreted as nurse led care that could be associated with stricter adherence to protocols, improved prescribing in concordance with treatment guidelines, more regular follow-up, and

potentially lower health care costs (Clark, Smith, Taylor & Campbell, 2010:2). However, provision of ART together with IPT as well as CPT reduces the risk of TB and other opportunistic infections (Fujiwara *et al*, 2012:23), and this must be taken seriously and given priority as these are the core aspects of disease progression. This leads to the conclusion that there are multiple factors that predict the level of adherence to treatment guidelines.

6.3 Factors Predicting Adherence to Treatment Guidelines

Both findings revealed that adherence was predicted by the following factors: (1) high contributors: facility type, geographical situation of the facility, TB & HIV service providers, hours of operation, method of TB & HIV integration, availability of PALSA plus guideline, number of visits attended by patients, and availability of SANGTB in the facility; and (2) low contributors: living arrangements, employment status and patient caregivers. The high contributors were mainly organisational related factors and low contributors were discerned to be patient related characteristics. Hence other factors like attitude, knowledge or awareness and behaviour were revealed by participants in a focus group.

Adherence to treatment guidelines had been found to be predicted highly by the type of facility that is providing TB & HIV services, thus the CHC and PHC. A CHC have more services and resources than a PHC clinic which place NIMART trained nurse working at the CHC in a better position to carry out TB & HIV services at ease and with better support from a multi-disciplinary team. This goes hand in glove with the number of hours that the facility operates, which predicts the adherence to treatment guidelines. This suggests that the

more hours of operation there is the less the time pressure experienced by the nurses and this will help and facilitate their use and adherence to treatment guidelines.

The other factor was the geographical situation of the facility, of which there would not be much of a difference, but very important nevertheless to consider when adherence is evaluated. The rural setting with regard to socio-economic related factors and cultural factors inhibit access of patients and health care providers to quality care. It is easy for treatment, blood test result and other services related to TB & HIV to reach facilities in the urban areas than in the rural areas. Rural area facilities' geographical situation reduces the provision of quality care. According to Ong'ang'o, Mwachari, Kipruto & Karanja (2014:7), though the health care providers in both rural and urban situated facilities performed similar duties, the local and cultural setting varied, possibly the socio-economic status and cultural beliefs in the rural area may have limited patients' full access to quality health care.

Evaluations done during HIV diagnosis and before initiation of ART, at TB diagnosis, ART and TB regimen were found to have been predicted by the TB & HIV service provider. This implies that TB & HIV services depended on the nurse providing such services. Thus, if the nurse is NIMART trained or TB trained the nurse will provide quality care or assessment to these patients and is most likely to adhere to what the guideline says. This was also emphasised by NIMART trained nurses that not everything recorded in the patient records was done by the NIMART trained nurses, but also by doctors and other nursing cadres, hence that affected the level of treatment guideline adherence because they may not even know what to do or how start. The integration model employed by the facility was an

important factor in the adherence to treatment guidelines. This suggests that a facility offering full integration of TB & HIV services stands a greater chance to carry out all integrated services than a facility that is engaging in partial integration, as two or more nurses will be involved and omissions may occur in the process. As emphasised in Fujiwara *et al* (2012:23), a one-stop shop is necessary for the reduction of the burden of TB in HIV-infected patients and HIV in TB-infected patients.

Evidence from this study revealed that facilities where PALSA Plus guidelines were available, there was an increased likelihood to adherence to treatment guidelines. It was more evident that nurses are more likely to rely on PALSA Plus than SAATG guidelines as this had promoted their adherence to treatment guidelines with regard to HIV services and the same was evident with SANGTB as it predicted the adherence in terms of TB services. Nurses also verbalised that availability and accessibility to treatment guidelines in all facilities' consulting rooms will promote adherence to treatment guidelines. This was also highlighted by Abrahamson *et al* (2012:29), Lugtenberg *et al* (2011:54), Mazrou (2013:145) insofar as guideline use is promoted when they are readily available and the organisation needs to provide all necessary resources, including treatment guidelines.

Findings revealed that the number of visits attended by a patient predicted adherence to treatment guidelines with regard to ART and TB regimen among nurses initiating and managing ART and anti-TB treatment. The more visits attended the more they are likely to be given the correct ART and TB regimen. Furthermore, living arrangements of a patient contributed to the prediction of adherence to treatment guidelines with regard to ART

regimen, meaning that the type of treatment or ART combination was also influenced by the type of living arrangement the patient is exposed to.

Adherence to TB monitoring was influenced by the employment status, hence the better the employment status the greater the patients' chances of being monitored. This study also revealed that there were very few employed patients and so was the monitoring. TB treatment outcome was revealed to have been influenced by the patient's care-giver. Thus, the outcome was found to be linked with the type of care giver the patients possess. The care giver highly influenced the level of adherence to treatment guidelines as some of the issues regarding patient were solemnly linked and dependant on the care giver.

Nurses revealed that negative attitude to treatment guidelines influenced the adherence level. The negative attitude was said to be categorised into lack of agreement with the guidelines; poor motivation, support and supervision; and resistance to change. Thus, nurses felt that the treatment guidelines are not user friendly, too extensive and not easy to work with. Thus the need for a simplified and easy to use guideline was emphasised as a priority and thus promotion of treatment guideline adherence. Poor support and motivation as well as supervision regarding utilisation of guidelines were also revealed as factors affecting the level of treatment guideline adherence among nurses.

Knowledge and lack of awareness with regard to treatment guidelines was said to be a huge challenge as there are still nurses not trained in TB & HIV management guidelines. This projects a challenge as patients are the ones who suffer when the trained personnel is off duty or on leave. Training and orientation with regard to treatment guidelines should be

improved and this should be conducted in their facilities as it reduces other cost and staff shortage implications. Furthermore, the inclusion of treatment guidelines in undergraduate, postgraduate and continuing nursing education can increase the level of awareness and knowledge and thus improve the level of adherence to the treatment guidelines. Lugtenberg *et al* (2009:59) stated that Dutch general practitioners (GPs) were aware of the guidelines because they are part of their postgraduate training and continuing graduate medical education.

Nurses revealed that they find it difficult to move from their previous practice and this is exacerbated by the fact that there are so many changes happening in a very short space of time. Therefore, it is important to take them along all changes available and engage them in the process so that they can be more effective in using and following the guideline compliantly. Nurses would be in a better position to follow guidelines that have been developed by other nurses than physicians and this may result in a strong sense of ownership among nurses. This was also supported by Lugtenberg *et al* (2011:102) who indicated that treatment guideline adherence was high among Dutch GPs because the guideline was developed by their fellow GPs.

Negative behaviour was categorised into three factors, that is, organisational, guideline recommendation and patient factors. Poor communication between the programme managers, coordinators and other members of the multi-disciplinary team was said to be a major challenge towards adherence to treatment guidelines. Shortage of staff and heavy workload was also revealed as factors that hinder proper adherence to treatment guidelines

and which needs to be addressed in order to promote adherence to treatment guidelines. Treatment guidelines are supposed to be easy to use, clear and the way to resolving this is by offering our nurses a simplified and user friendly treatment guideline. Lugtenberg *et al* (2009:59) indicated that a clear and simple guideline recommendation can address the complexity of the guidelines and this can be presented in multiple versions that are algorithms, one- or two-page summaries or web-based versions with hyperlinks to more detailed information.

6.4 Relationship between Adherence to Treatment Guidelines and Patient Outcome

It was evident that adherence to treatment guidelines promoted patient treatment outcome and this was seen with regard to TB monitoring which was found to negatively affect the patient TB treatment outcome. Due to failure to adhere to treatment guidelines with monitoring TB treatment's effectiveness very few patients were cured and most of them were recorded as treatment completed, failure and lost for follow-up. Recommendations were made that effectiveness of the treatment has to be monitored at 7/11 weeks and 5/7 months for both clinical and bacteriologic monitoring (NDoH, 2014:48). It is imperative that these practices be promoted and encouraged as the majority of patients are discharged from treatment with no proof of cure after they had completed their treatment.

6.5 Summary

This chapter has delivered a discussion of the crucial integrated findings of this study. The findings have been representative of the objectives and research questions outlined in Chapter 1. This was achieved with the use of interpretation and meta-inference. Thus, a synthesis of the qualitative findings assisted the elucidation of the quantitative findings. The level of adherence to treatment guidelines, factors influencing treatment guidelines adherence and the relationship between the level of adherence to treatment guidelines and patient treatment outcome were interpreted by simultaneously drawing meta-inferences.

CHAPTER 7

CONCEPTUAL MODEL OF ADHERENCE TO TREATMENT GUIDELINES

7.1 Introduction

This chapter entails the conceptualisation of both the qualitative and quantitative findings of this study. The framework for this study was adopted from the Donabedian structure process outcome model (SPO) (1966:178) as a foundational work to guide this study in projecting the state of adherence to treatment guidelines among nurses initiating and managing ART and anti-TB treatment, as well as factors predicting the level of adherence to treatment guidelines and the TB treatment outcome.

Donabedian's (1966:178) SPO model was used as constructive framework for quality assessment and illustrates the link between structure, process and outcome. Hence, this can also be attained with the addition of three health care service triads as described by Cowing *et al* (2009:74) as the health care organisation (structure in this study), health care provider (NIMART nurses in this study) and the patient.

This section provides the application of the study findings to the conceptual model with regard to Donabadien's (1966) SPO model and Cowing *et al*'s (2009) Conceptual Model of Health Care Delivery Performance.

7.2 Application of Findings to the Conceptual Framework

The application consists of three sections, namely, structure, process and outcome as suggested by Donabedian (1966:178). The structure leads the process to produce the outcome (Figure 7.1). Donabedian believed strongly in the importance of health care structure, seeing it as a driving force for later care processes and, ultimately, health outcomes.

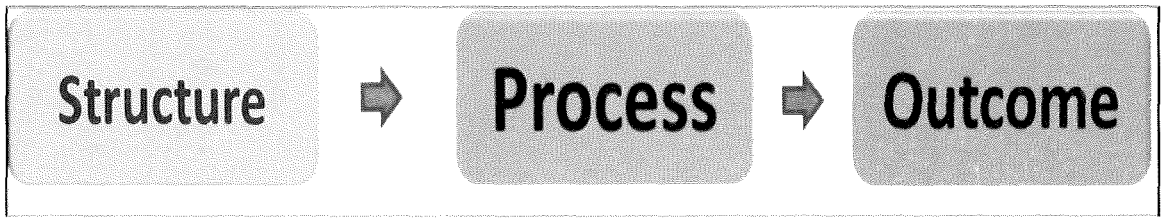


Figure 7.1: Donabadien SPO model

7.2.1 Structure: Health Care Organisation

Structural measures were defined as the professional and organisational resources associated with the provision of care, such as staff credentials and facility operating capacities and establishment (Figure 7.2). This study revealed that facility type, hour of operations, and geographical situation of the facility, adequate resources, TB & HIV service providers, availability of treatment guidelines, patient characteristics (employment status, living arrangements, number of visits attended and patient care giver) were significant contributors to the prediction of the level of adherence to treatment guidelines among nurses initiating and managing ART and anti-TB treatment. This was in accordance with

Donabedian's (2005:689) SPO model that good care settings and supporting structures contribute to quality care.

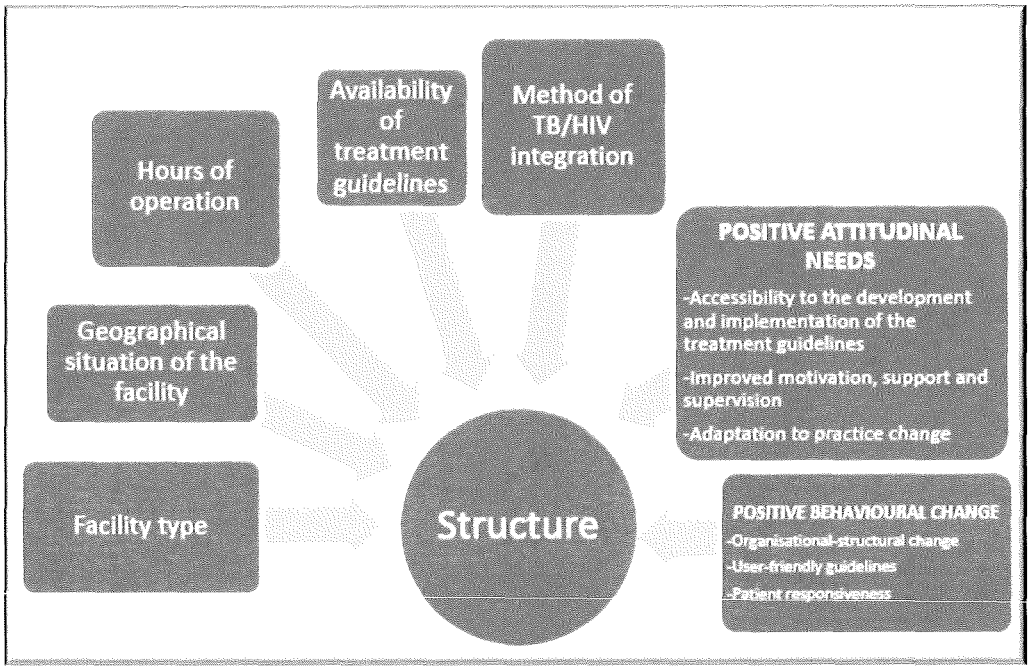


Figure 7.2: Structural factors predicting and facilitating adherence to treatment guidelines

Positive attitude towards treatment guidelines was also revealed through focus group interviews as a motivator and promoter of adherence to treatment guidelines, together with sufficient awareness/knowledge towards the guidelines and positive behavioural change. The combination of all these factors can positively promote the level of adherence to treatment guidelines of nurses initiating and managing ART and TB treatment.

7.2.2 Process

The process was described as the manner in which care has been provided in terms of appropriateness, acceptability, completeness or competency. In this case, were the

treatment guidelines adhered to when providing care, treatment and support to HIV and TB patients? This was achieved by evaluating the assessment and diagnosis of TB & HIV, provision of preventive therapy, ART initiation, ART regimen and monitoring following recommendations provided in the guidelines (Figure 7.3). It was revealed in this study that a moderate to high adherence to treatment guidelines was marked even though variations existed in different levels of patient evaluations.

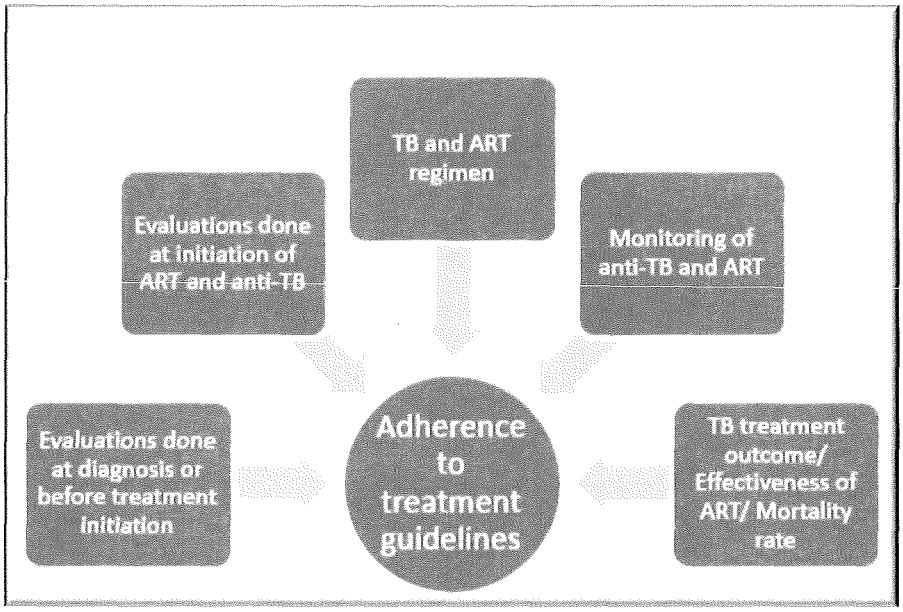


Figure 7.3: Process: adherence to treatment guidelines

This was found to be enhanced by the supporting and well-resourced structure. It was evident that providing the necessary structure can potentially increase the level of adherence to treatment guidelines. However, nurses pointed out that it is also due to instilling a positive attitude in them towards the guidelines and ensuring that sufficient knowledge/awareness as well as follow-up training and other training programmes are in place that can promote adherence to TB and HIV treatment guidelines. Positive behavioural

change both from the organisational-structural change, user friendly guidelines and patient responsiveness can improve the level of adherence among NIMART nurses and this will lead to an improved patient treatment or care outcome.

7.2.3 Outcome

Outcomes are usually concrete and precisely measured. The outcomes in this study were determined by improvement in laboratory parameters, TB treatment outcome and recovery or survival of the patient (Figure 7.4). With the recovery or survival, mortality rate was used as a measure of survival. Based on the findings of this study, there was a great improvement with respect to patient outcome as most patients completed their treatment and some were cured with no defaulter rate reported or lost for follow-up and death marked in the patient records evaluated.

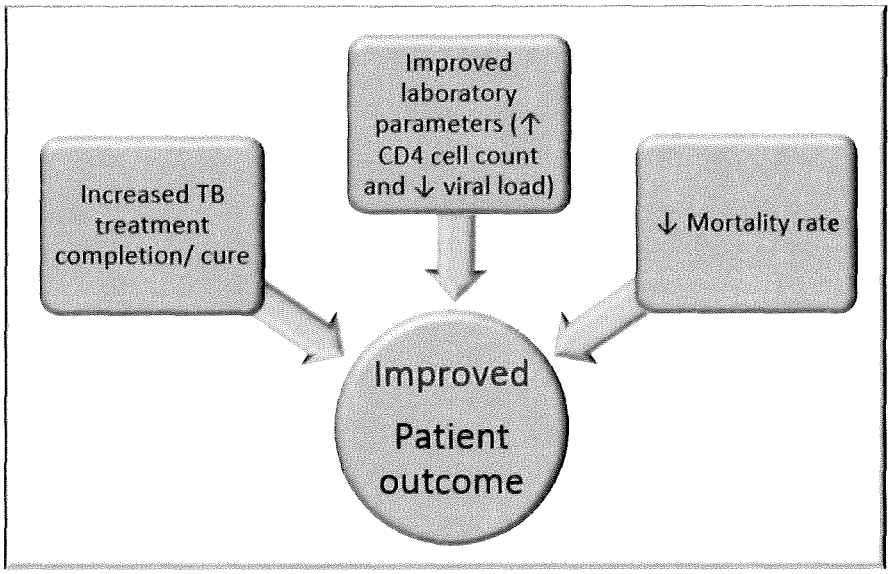


Figure 7.4: Patient outcome

7.2.4 TB & HIV Service Providers' Interrelationship with the Health Care Organisation and the Patient

The health care organisation and the health care providers together with the patient had been interconnected as the three major entities in the service triad (Cowing *et al*, 2009:74). This study also revealed that NIMART trained nurses need support, motivation and encouragement as well as continuous supervision and mentorship from the organisation. Both the service triad and the adherence to treatment guidelines can be facilitated and promoted by such interrelationships (Cowing *et al*, 2009:74).

Regarding the patients, it is not just about the outcome, they themselves also have a responsibility towards their treatment outcome, and this includes their adherence to treatment, scheduled visits and interaction with the health care organisation and their nurses. Hence, the relationship between patient and the health care organisation is said to be facilitated by the type and accessibility of the facility as well as hours of operation. Again with regard to NIMART nurses, the relationship is influenced by the mutual understanding, communication and teamwork between the NIMART nurse and the patient.

Figure 7.5 presents the interrelationship between the health care organisation, NIMART nurses and patient. Furthermore, the NIMART nurse and the patient both benefit from the adherence to treatment guidelines as they get to be satisfied at the end. Thus, if NIMART nurse is supported, motivated, supervised and mentored he/she is empowered to use and adhere to treatment guidelines which then results in NIMART nurse satisfaction.

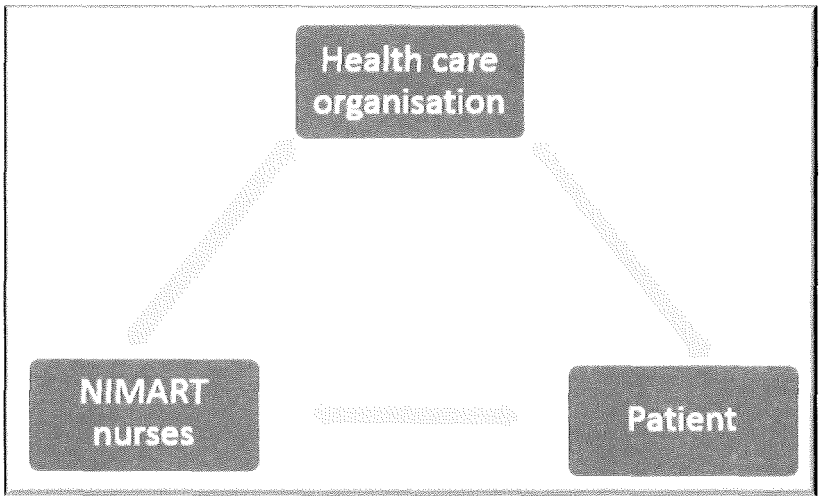


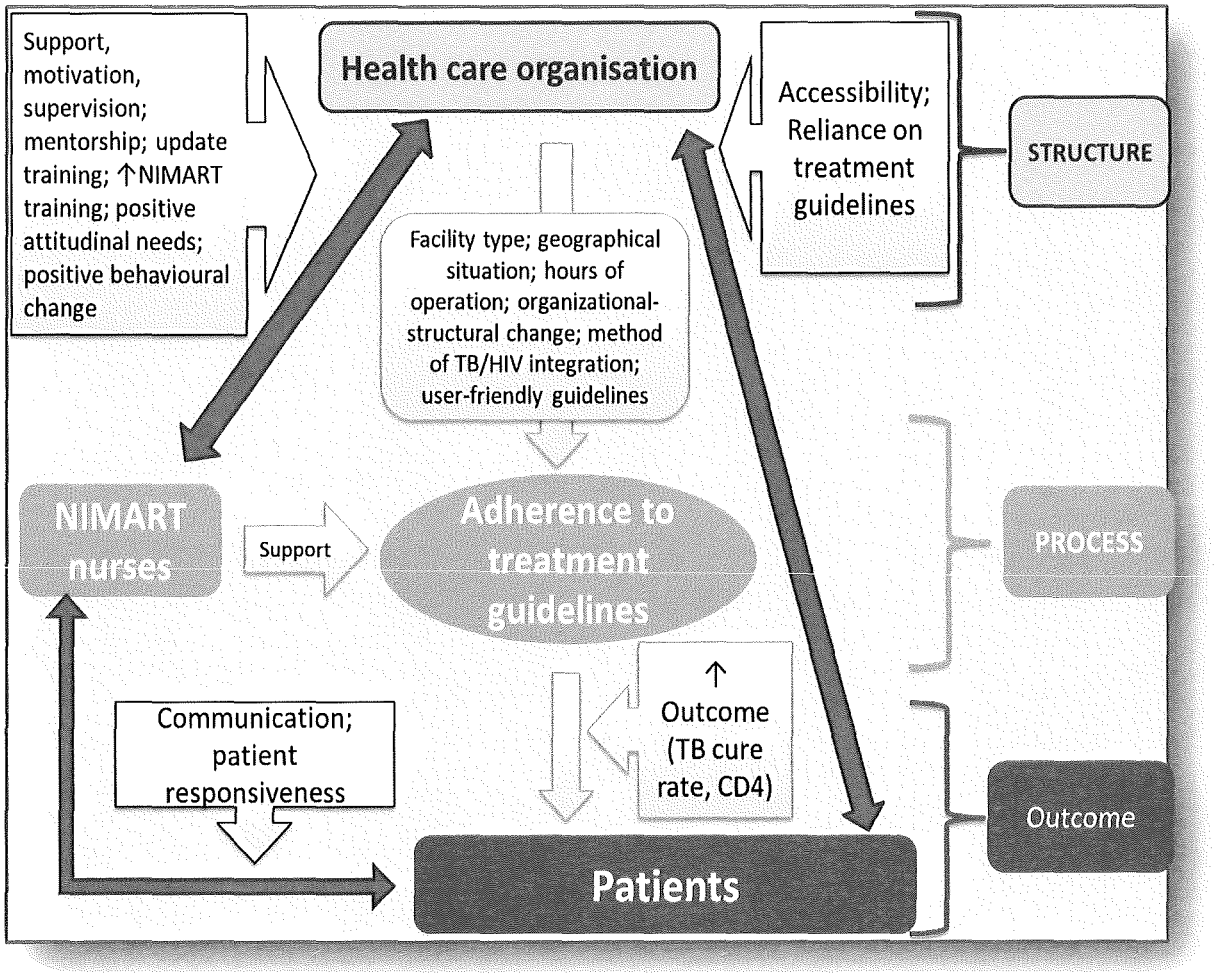
Figure 7.5: interrelationship of the service triad (health care organisation, NIMART nurse and a patient)

On the other hand, the patient having access to the health care organisation as well as reliance to treatment guidelines increases the patient's satisfaction and, as a result, increases compliance to the scheduled visits, and treatment adherence thereby promoting adherence to treatment guidelines by NIMART nurses.

7.3 Conceptual Model: Adherence to Treatment Guidelines

The adherence to treatment guidelines is influenced by the health care organisation, the NIMART nurse and the patient. The interrelationship between the health care organisation, NIMART nurse and the patient promotes a positive practice environment and thus enhances the level of adherence to treatment guidelines. This is true given the level of satisfaction that can result from adherence to treatment guidelines from both the patient and the NIMART nurse. Figure 7.6 displays the conceptual model: adherence to treatment guidelines adapted from Donabedian's SPO model and conceptual model of health care delivery performance. In this model there are 3 forms of relationship, that is, health care

organisation-NIMART nurses, NIMART nurses-patients and patients-health care organisation.



(Adapted from Donabadien's (1966) SPO model and Cowing *et al*'s (2009) Conceptual Model of Health Care Delivery Performance)

Figure 7.6: Conceptual framework: Adherence to treatment guidelines

The relationship between the health care organisation and NIMART nurse is purely defined by the nature of support, motivation, supervision or mentorship, development in terms of training and keeping NIMART nurses up-to-date with guidelines and resources provided. These sequentially affect NIMART nurses' adherence to treatment guidelines as well as their

practice efficiency and effectiveness. Quality assurance implications may be implemented to preserve a noble health care organisational-level's operational efficiency measures while on the other hand creating conditions that NIMART nurses may feel less capable to deliver adapted care, hence this may reduce the level of adherence to treatment guidelines. This is true given the fact that factors such as time, staffing and workload affect this relationship both ways. Therefore, proper organisational-structural change can improve the level of adherence to treatment guidelines and the increased adherence to treatment guidelines by NIMART nurses will also reduce the misuse of scarce resources. That is, if patients are treated, followed up and supported in line with the guidelines there will be less defaulters, resistant TB and ART patients - which will save resources and render the service cost-effective.

Health care organisation-patients relationship is primarily defined herein as the nature in which patients are able to access the heath care organisation and services provided to them and a variety of features such as the degree of personalization of care, the expectations and needs of the patients, reliance on treatment guidelines and the ultimate health outcome. The maintenance of health care organisation-NIMART nurse and health care organisation-patient relationship promotes NIMART nurse-patient relationship. The NIMART nurse-patient relationship was found to rely mostly on the nature of communication and patients' responsiveness.

The interrelationships of the service triad (Cowing *et al*, 2009:74) have a positive impact on the level of adherence to treatment guidelines as they all contribute to its success.

Therefore, the health care organisation should support and provide the necessary resources to NIMART nurses and should be accessible to the patients to promote adherence to treatment guidelines. NIMART nurses need the support from the health care organisation to effectively and efficiently adhere to treatment guidelines which would promote and increase positive patient outcomes.

Furthermore, adherence to treatment guidelines needs the interrelationship of the service triad to be fully implemented as they are interdependent. Therefore, NIMART nurses cannot purely prosper in health care service delivery without the support of the health care organisation and the buy-in of the patient. It is important for these triads to function together to minimise the factors that reduces the level of adherence to treatment guidelines.

The health care organisational structure should be in a position to support NIMART nurses and provide them with all the necessary resources to carry on their day to day duties. The organisational environment should be conducive for both NIMART nurses and patients - this is true given the fact that a facility that operates on a 24-hour basis daily provides enough time for NIMART nurses to provide quality care to patients and, on the other hand, increases the accessibility of care to the patients. Thus, the facility type, geographical situation of the facility and hours of operation promote the adherence to treatment guidelines. Furthermore, organisational-structural changes such as reduced workload, sufficient staffing and reduced time pressures also play a vital role in the promotion of NIMART nurses' adherence to treatment guidelines. Availability of user friendly treatment

guidelines increases the smooth usage of treatment guidelines and therefore promotes the adherence to the treatment guidelines among NIMART nurses. Adherence to treatment guidelines by NIMART nurses increases patient outcomes, thus the TB cure rate and increase CD4 cell count of patients who are managed, treated and supported in line with the recommendations set out in the TB and/or HIV guidelines.

In a nutshell, the organisational support, motivation and supervision provided to NIMART nurses and the provision of a conducive working environment and resources promote NIMART nurses adherence to treatment guidelines, thereby increasing the anticipated patient outcomes. Furthermore, it is also of paramount importance to acknowledge the interrelatedness of the health care organisation, NIMART nurse and patient as this also plays an imperative role in the process of health care provision, in this case the adherence to treatment guidelines regarding TB & HIV integrated services.

7.4 Summary

The promotion of adherence to treatment guidelines has a sole dependence on the health care organisation, NIMART nurse and patient as the three major entities of the service triad. Hence, within the service triad there are factors that need to be taken into consideration to promote their interrelationship which, in turn, enhances the level of adherence to treatment guidelines.

CHAPTER 8

EVALUATIONS, LIMITATIONS, JUSTIFICATION, RECOMMENDATIONS AND CONCLUSION

8.1 Introduction

This section provides the limitations, strength, recommendations and the conclusion of the study. The study looked at the adherence to treatment guidelines among nurses initiating and managing ART with regard to TB & HIV patients.

8.2 Purpose and Rationale of the Study

The purpose of this study was to conduct a cross-sectional evaluation of TB & HIV co-infected patients receiving care at CHC and PHC clinics to determine the extent to which nurses initiating and managing ART and anti-TB treatment adhere to treatment guidelines and to conduct an exploratory-descriptive qualitative study utilising focus group interviews to explore and describe factors influencing nurse adherence to treatment guidelines.

The purpose of the study was achieved through the following objectives:

1. Describe the level of adherence to the treatment guidelines of integrated TB & HIV co-infection interventions by nurses providing care, treatment and support to HIV-infected TB patients.

2. Determine factors predicting the level of nurse adherence to treatment guidelines.
3. Establish the relationship between level of adherence to treatment guidelines and patients outcome measures.
4. Explore and describe facilitators of adherence to treatment guidelines among nurses initiating and managing ART and TB treatment.
5. Explore and describe barriers of adherence to treatment guidelines among nurses initiating and managing ART and TB treatment.

All these objectives were achieved by the study.

8.3 Evaluation of the Study

This was attained with the use of an adapted conceptual framework - both quantitative and qualitative data collection and analysis methodologies were employed. At the end the study, findings were conceptualised into an adapted model to come up with a conceptual model of adherence to treatment guidelines.

8.3 Justification of the Study

8.3.1 Strength and Depth of the Study

The nature and strength of the study derive from the mixed methods approach, that is, its sequential explanatory design. Thus, the use of both quantitative and qualitative approaches increased the study's depth. Furthermore, randomization was used to sample health care facilities and patient files or medical records. The study examined a representative sample of consecutive patients from both rural and urban areas, PHC and

CHC, 8-hour and 24-hour clinics and HIV-entry and TB-entry patients. Hence, the sample was generalizable for both KZN and NWP.

8.3.2 Contribution to the Health Care System Strengthening

The study is justifiable insofar as it responds the needs of these two provinces with regard to the TB & HIV service provision and the burden of TB & HIV. Furthermore, this study has the potential to significantly strengthen health care systems, as it provides the prospective implications to the health care system, thus, highlighting important factors contributing to the treatment guideline adherence by NIMART nurses. This study had revealed moderate to high levels of adherence, regardless of all the perceived barriers that were expressed by nurses. It is of paramount important that out of the positive findings the health care system needs to acknowledge the NIMART nurses' challenges and act to reduce or curb them to attain effective TB & HIV service provision and treatment guideline adherence.

8.3.3 Contribution to the Body of Knowledge

This study also contributes to the existing and ever-changing body of knowledge as it is the first to evaluate the level of adherence to treatment guidelines among nurses initiating and managing ART and TB treatment as well as seeking their perceived barriers and facilitators of treatment guideline adherence. Furthermore, it provided a conceptual model with regard to treatment guideline adherence that can be applied in practice and can inform guidelines and policy developers on issues that promote guideline adherence.

8.4 Limitations of the Study

The study principally used chart reviews and most of the information were not included, which might have led to inadequate recording of information or it being labelled as "not done." Also, no one was consulted to explain the missing information or records in the patient files. Another drawback of this study was that only one district in each province was selected.

8.5 Recommendations of the Study

Recommendations of this study are divided into implications to practice (PHC and health care system strengthening, health professionals, treatment guidelines & strengthening of patient support system), nurse education and training, and further research.

8.5.1 Implications for Practice

1. The study recommends that there should be an increased interrelationship between the organisational managers, NIMART nurses and patients. This is thought to be the key to the adherence to treatment guidelines. This will also promote the organisational managers, programme directors and coordinators to motivate, encourage, support and supervise the NIMART nurses in their initiating and managing of ART and TB treatment role. Weekly and monthly support and supervision visits can promote treatment guidelines usage and adherence thereof.

2. The study recommends that reduction of time pressure be a priority to nurses offering TB & HIV services as they face a lot of documentation overload. This will promote adherence to treatment guidelines. This was also seen as the major challenges affecting the quality of

care provided as the organisational managers promote quantity rather than quality. Some clinics have a specified timeframe to spend within the facility even though the patients' needs are never the same, e.g., 2 hours from facility entry; hence the quality of the care provided is hardly advocated. This study recommends the advocating of quality care provision rather than quantity.

3. However, decreasing time pressure alone may not achieve the goal with an increasing workload and decreased resources - these will definitely increase the time pressure. Otherwise resources need to be in place as well as the workload need to be reduced through augmentation of NIMART nurses within the facility.

4. The use of one patient record, register and patient card for TB & HIV services to reduce the volume of repetition in documentation.

5. The efficacy of preventive therapies, that is, IPT and CPT at reducing the burden of TB among HIV-infected patients as well as reducing the burden on HIV among TB-infected patients must be disseminated to all health care providers, especially the NIMART nurses.

6. NIMART nurses should receive motivation, support and supervision on the initiation and management of ART to sustain the TB & HIV service provision that engenders quality.

7. The involvement of mentors should be implemented robustly as this will increase guided and supported TB & HIV services provision.

8. Availability of the guidelines was found to be another challenge and it is therefore recommended that guidelines need to be available and accessible in each facility rendering TB & HIV services. However, the issue is not just to have the guidelines available, but to at least make simple, clear and understandable treatment guidelines available to all consulting rooms to decrease time spent looking for treatment guidelines from one consulting room to the next.

9. The size of the treatment guidelines was found to be barrier to guideline adherence and therefore it is deemed necessary for guideline developers to consider concise or abridged guidelines that can be in a form of an algorithm poster, a pocket or handbook that is simple and easy to access and quick to go through during the evaluations of patients.

10. It is important to involve nurses in the development of the treatment guidelines as well as decision making as they are the implementers at the end of the day. Hence, it is also as important as including patients to be part of the development and decision making process. This will promote agreement with the guidelines and thereafter increased use and adherence.

11. Even though the use of and adherence to treatment guidelines is an important aspect of applying evidence to practice, NIMART nurses still need to be able to understand and evaluate the current research literature.

12. Health care administrators pursuing to increase treatment guideline use and adherence among nurses initiating and managing ART should warrant that facilitators and barriers are considered and addressed.

13. It is recommended that stricter patient support be strengthened as this will be of greater assistance to their TB & HIV services provision. This is critical as the higher the support patients get the lesser the burden they will be to the already overburdened NIMART nurses

8.5.2 Recommendations for Nurse Education and Training

14. The inclusion of treatment guidelines in undergraduate, postgraduate education and continuing nursing education can increase the level of awareness and knowledge and thus improve the level of adherence to the treatment guidelines.

15. It is important for the government to provide NIMART nurses with all relevant updates and follow-up training as this will advance their skills, proficiency, knowledge and attitude towards TB & HIV treatment guidelines.

16. There is a dire need to draw and implement awareness programmes aimed at raising NIMART nurses awareness regarding the benefits of treatment guideline implementation and adherence.

17. Other nurse categories and multi-disciplinary teams must be engaged and trained in the initiating and management of ART, as they are also vital to provide support to NIMART nurses.

18. Continuous workshops, conferences, in-service and follow-up training programmes need to be in place for nurses to enhance adherence to treatment guidelines. However, emphasis on how to use the guidelines needs to be promoted and applied.

8.5.3 Further Research

Recommendations for further research include:

19. Evaluation of the conceptual model of adherence to treatment guidelines among NIMART nurses.

20. Investigation of the best strategies to promote and scale up integrated TB & HIV services among NIMART nurses.

21. Assessment of the impact of NIMART on patient outcome.

22. Appraisal of the cost-effectives of joint interventions delivered through PHC re-engineering.

23. Comparison of the models of community participation in enhancement of TB case finding and early HIV finding, reduction of delayed initiation of TB & HIV care, and their impact on reduction of TB & HIV incidence, morbidity and mortality.

8.6 Conclusion

This study revealed that there was moderate to high level of adherence among nurses with regard to evaluations done at TB & HIV diagnoses or before initiation of ART and anti-TB treatment, ART and TB regimen and TB treatment outcome. However, there was a marked low level of adherence to treatment guidelines with regard to TB & HIV monitoring in both provinces

(KZN and NWP). Furthermore, the study identified predictive factors that influence the level of adherence - the following factors were major contributors, namely: facility type; geographical situation of the facility; hours of operation; method of TB & HIV integration; guidelines availability; patient characteristics (employment status, adherence to scheduled visits, patient caregiver & living arrangements). These factors were found to be the facilitators of adherence among NIMART nurses.

There was a significant negative relationship between the level of adherence to TB monitoring and patient treatment outcome. Through focus group interviews, the study also revealed barriers to and facilitators of adherence to treatment guidelines. Barriers include negative attitude, lack of knowledge and negative behaviour and facilitators were positive attitude, sufficient knowledge and behavioural change. This study had in its entirety revealed that both major entities of the service triad are crucial in the promotion of use and adherence to treatment guidelines. Their interrelationship denotes the requirements for improved teamwork, understanding and support within the initiation and management of ART and TB treatment.

For adherence to treatment guidelines to improve, a number of service components and deliverables should be in place, principally the guidelines, recommendations, organisational and patient factors as well as support, supervision and mentorship towards the NIMART nurses. Consequently, NIMART nurses should be supported and supervised in their initiation and management of ART in order for them to be competent and confident about their TB & HIV service provision. Continuous professional development in all areas of TB & HIV should also be promoted as NIMART nurses need constant and continuous updating and orientation to new

drugs, practices and knowledge.

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ANNEXURE A

Ethical Clearance-North-West University

NORTH-WEST UNIVERSITY
YUNIBESITI YA BOKONE-BOPHIRIMA
NOORDWES UNIVERSITEIT

Private Bag X6001, Potchefstroom
South Africa 2520

Tel: (018) 299-4900
Faks: (018) 299-4910
Web: http://www.nwu.ac.za

Ethics Committee
Tel +27 18 299 4850
Fax +27 18 293 5329
Email Ethics@nwu.ac.za
2013/04/10

ETHICS APPROVAL OF PROJECT

This is to certify that the next project was approved by the NWU Ethics Committee:

Project title.
ADHERENCE TO TREATMENT GUIDELINES AMONG NURSES INITIATING AND MANAGING ART WITH REGARD TO HIV/TB PATIENTS

Project leader Prof M. Davhana-Maselesele
NWU Ethics approval no: NWU-000033-13-A9
Approval date: 2013/04/09 **Expiry date:** 2018/04/08

The Ethics Committee would like to remain at your service as scientist and researcher, and wishes you well with your project. Please do not hesitate to contact the Ethics Committee for any further enquiries or requests for assistance. The formal ethics certificate will follow soon.

Yours sincerely

Me.Marietjie Halgryn
NWU Ethics Secretariate

ANNEXURE B

Request for Permission to Conduct the Study

North-West University (Mafikeng Campus)
P/Bag X2046
Mmabatho
2735
15 April 2010

Head of Department
Kwazulu-Natal Provincial Department of Health
Research Directorate:
Attention: Jacqueline Ngozo
Kwazulu-Natal province

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am currently conducting a research project as a PHD candidate in North-West university and johns Hopkins university. We are currently investigating and evaluating the adherence to treatment guidelines as well as exploring factors influencing adherence to treatment guidelines among nurses initiating and managing ART with regard to TB & HIV patients. This study will be conducted at a total of eight (8) community health centers (4) and PHC clinics (4) around UGU district.

The improvement of care for TB & HIV co-infected patients depends on the proper adherence to treatment guidelines. Guidelines had been changing to meet the needs of patients and the health care system. Furthermore, South Africa's health system is pre-dominated by nurses and TB & HIV integrated interventions rely on nurses initiating and managing ART and TB treatment. However, there is little or no evidence of adherence and compliance to TB & HIV co-infection treatment guidelines among nurses providing care, treatment and support to HIV-infected TB patients outside of research protocols. TB & HIV patients' records will be reviewed and evaluated to measure the level of adherence to treatment guidelines, and nurses will be interviewed using focus groups to explore factors influencing their adherence to treatment guidelines.

This study is conducted under the supervision of Professor M. Davhana- Maselesele and Dr. Jason Farley. We will prefer to collect data starting around May 2013 to July 2013.

Participants will be informed that all information disclosed by them to the researcher will be kept confidential, and a written informed consent will be sought prior to the interview. In an effort to address safety, all participants will be

informed of their right to withdraw from the study at any time or refuse to answer any question without any negative consequences. Participants will also be asked what they understand about each paragraph read to them during the consent process to ensure their informed consent

The findings of this study will inform policy makers and the developers of guidelines about the factors affecting nurse adherence to treatment guidelines. Furthermore, the findings from this study can be used to inform for future intervention research to improve HIV & TB co-infection treatment and management guidelines to decrease the incidence of active TB among HIV-infected patients in South Africa and elsewhere. The findings of this study will also provide additional evidence for the effectiveness of nurse-initiated and managed integrated HIV & TB interventions.

Your positive response will be highly appreciated.

Thanking you in advance.

Kindest

Mr. Lufuno Makhado
RN, BCurNS (HONS) (UNIVEN), MCurNS (NWU-MC)
Lecturer
Community Nursing Sciences
Department of Nursing Sciences
Faculty of Agriculture, Science and Technology
North-West University- Mafikeng Campus
Internal Box 575
Tel: 018 389 2236
Fax: 018 389 2052
Cell: 082 552 6260
Email: lufuno.makhado@nwu.ac.za

North-West University (Mafikeng Campus)
P/Bag X2046
Mmabatho
2735
15 April 2010

Head of Department
North-West Provincial Department of Health
Research Directorate:
Attention:
Mmabatho
0700

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

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Your positive response will be highly appreciated.

Thanking you in advance.

Kindest

Mr. Lufuno Makhado
RN, BCurNS (HONS) (UNIVEN), MCurNS (NWU-MC)
Lecturer
Community Nursing Sciences
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ANNEXURE C

Permission from North-West and Kwazulu-Natal Province Departments of Health

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x9051
Pietermaritzburg
3200
Tel 033 – 3953189
Fax 033 – 394 3782
Email hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM 077/13
Enquiries : Mr X Xaba
Tel : 033 – 395 2805

Dear Mr L. Makhado

Subject: Approval of a Research Proposal

1. The research proposal titled **'Adherence to treatment guidelines among nurses initiating and managing ART with regard to HIB/TB patients'** was reviewed by the KwaZulu-Natal Department of Health.

   The proposal is hereby **approved** for research to be undertaken at Primary Health Clinics under Murchison hospital

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
   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 on 033-395 2805.

Yours Sincerely

Dr E Lutge
Chairperson, Health Research Committee
Date: 01/8/2013

health
Department of
Health
North West Province
REPUBLIC OF SOUTH AFRICA

POLICY, PLANNING, RESEARCH, MONITORING AND EVALUATION

To : Mr Lufuno Makhado

From : Policy, Planning, Research, Monitoring & Evaluation

Subject: Approval Letter: Adherence to treatment guidelines among nurses initiating and managing ART with regard to HIV/TB patients.

Purpose

To inform Lufuno Makhado that permission to undertake the above mentioned study has been granted by the North West Department of Health. The researcher is expected to resue this letter as prove that the Department has granted approval to the districts or health facilities that form part of the study.

Arrangements in advance with managers at district level or facilities shall be facilitated by the researcher and the department expects to receive the final research report upon completion

Kindest regards

Acting Director: Policy, Planning, Research, Monitoring & Evaluation Date
Mr I Moaisi

Healthy Living for All

ANNEXURE D

Ethics Online Course Results

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)

RESPONSIBLE CONDUCT OF RESEARCH CURRICULUM COMPLETION REPORT

Printed on 10/14/2014

LEARNER	lufuno makhado (ID: 2101132) private bag x2046 mmabatho north-west province 2745 south africa
DEPARTMENT	NURSING - JULES STEIN EYE SERVICES
PHONE	+27735170169 / +27183892236
EMAIL	22891935@yahoo.com
INSTITUTION	University of California, Los Angeles (UCLA)
EXPIRATION DATE	

SOCIAL AND BEHAVIORAL RESPONSIBLE CONDUCT OF RESEARCH OPTIONAL This course is for investigators, staff and students with an interest or focus in Social and Behavioral research. This course contains text, embedded case studies AND quizzes

COURSE/STAGE	Basic Course/1
PASSED ON	03/16/2011
REFERENCE ID	5549663

REQUIRED MODULES	**DATE COMPLETED**
Responsible Conduct of Research (RCR) Course Introduction	01/29/11
Introduction to the Responsible Conduct of Research Archived 1248	01/29/11
Introduction to Research Misconduct Archived 1343	03/16/11
Research Misconduct (RCR-SBE)	03/16/11
Case Study - Truth or Consequences (RCR-Physical Sciences)	03/16/11
Case Study - In the Field, No One Will Know (RCR-Humanities)	03/16/11
Case Study Plagiarism (RCR-SBE)	03/16/11
Case Study No News Is Not Good News (RCR-SBE)	03/16/11
Data Management (RCR-SBE)	03/16/11
Case Study - Data Management - Share and Share Alike (RCR-SBE)	03/16/11
Case Study - Data Management 'Who Owns Research Data?' (RCR-SBE)	03/16/11
Case Study - Data Management 'The New Clinical Data Manager' (RCR-Biomed)	03/16/11
Authorship (RCR-SBE)	03/16/11
Responsible Authorship - The Chair as an Author (RCR-SBE)	03/16/11
Authorship and Publications - The Grateful Author (RCR-SBE)	03/16/11
Peer Review (RCR-SBE)	03/16/11
What is Responsible Peer Review (RCR-SBE)	03/16/11
Peer Review and Controversial Research (RCR-SBE)	03/16/11
Responsible Mentoring [illegible] Archived 1625	03/16/11
Mentoring Case Study: O, What a Tangled Web We Weave (All Disciplines)	03/16/11
Mentoring Case Study: The Graduate Student Laborer (All Disciplines)	03/16/11
Mentoring Case Study: Sherry's Secret (All Disciplines)	03/16/11
Mentoring Case Study: Lisa Bach's Case (RCR-Biomed)	03/16/11
Mentoring Case Study: The Business of Mentoring (RCR-Biomed)	03/16/11
Mentoring Case Study: Too Much Help is Just Too Much! (All Disciplines)	03/16/11
Conflicts of Interest (RCR-SBE)	03/16/11
CoI Case Study - The Case of the Promising New Technology (RCR-SBE)	03/16/11
CoI Case Study -The Case of the Entrepreneurial Psychologist (RCR-SBE)	03/16/11
CoI Case Study - Janet's Suspicions (RCR-SBE)	03/16/11
Collaborative Research (RCR-SBE)	03/16/11
When Collaborators Disagree (RCR-SBE)	03/16/11
Why Can't We All Just Get Along (RCR-SBE)	03/16/11
Collaborations Between Academics (RCR-SBE)	03/16/11
When Collaborators Become Competitors (RCR-SBE)	03/16/11
Marriage Has Its Advantages (RCR-SBE)	03/16/11
Responsible Conduct of Research (RCR) Course Conclusion	01/29/11

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Program course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)

HUMAN RESEARCH CURRICULUM COMPLETION REPORT

Printed on 10/14/2014

LEARNER	lufuno makhado (ID: 2101132) private bag x2046 mmabatho north-west province 2745 south africa
DEPARTMENT	NURSING - JULES STEIN EYE SERVICES
PHONE	+27735170169 / +27183892236
EMAIL	22891935@yahoo.com
INSTITUTION	University of California, Los Angeles (UCLA)
EXPIRATION DATE	01/30/2014

HUMAN RESEARCH - SOCIAL & BEHAVIORAL RESEARCHERS & STAFF

COURSE/STAGE	Basic Course/1
PASSED ON	01/31/2011
REFERENCE ID	5549664

REQUIRED MODULES	**DATE COMPLETED**
History and Ethical Principles - SBE	01/31/11
Defining Research with Human Subjects - SBE	01/31/11
The Federal Regulations - SBE	01/31/11
Assessing Risk - SBE	01/31/11
Informed Consent - SBE	01/31/11
Privacy and Confidentiality - SBE	01/31/11
Research With Protected Populations - Vulnerable Subjects: An Overview	01/31/11
University of California, Los Angeles (UCLA)	01/31/11

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Program course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

ANNEXURE E

Participant Consent Form

LEVEL OF ADHERENCE TO TREATMENT GUIDELINES AMONG NURSES INITIATING AND MANAGING ART WITH REGARD TO HIV & TB PATIENTS: A CONCEPTUAL MODEL

L. MAKHADO

DEPARTMENT OF NURSING SCIENCE: FACULTY OF AGRICULTURE, SCIENCE AND TECHNOLOGY

NORTH-WEST UNIVERSITY, MAFIKENG CAMPUS

Statement of Information for Nurses Participating in the Study

Purpose of the Study

The aim of the study is to describe the level of adherence to treatment guidelines explore and describe the anticipated nurses' perspectives on facilitators and barriers with regard to treatment guidelines adherence.

Procedures

You are requested to participate in a focus group interviews that will take 60-90 minutes. The purpose of this consent form is to ask your permission to do so. If you agree to participate, we shall ask you to sign a consent form. However, this form will not be linked to your activities in the focus group. Your answers will not be viewed by any of your professional colleagues or supervisors and will not in any way affect your job. They will be seen only by the researcher, who is not affiliated with the CHC/PHC clinic, and will be stored in a locked place under their control. Your name will not appear on the interview record.

The risks to you as a participant in this study are minimal. You will be asked about clinical guidelines, facilitators and barriers of adherence to treatment guidelines in dealing with TB & HIV, in the community health centre or primary health

care clinic. You will also be asked to discuss strategies that can promote positive adherence to treatment guidelines among nurses. Although you will not receive an immediate benefit from this research, you and your colleagues may benefit from this research in the future, if it succeeds in identifying ways of better supporting nurses caring for TB & HIV patients with regards to treatment guidelines adherence.

However, we hope you will feel comfortable enough to open up about your ideas about TB & HIV treatment adherence as a health worker, as your information will be particularly important for other health workers in the same position.

Right to Refuse or Withdraw

Your participation in this research is voluntary. You do not have to participate. If you do choose to participate, but prefer not to answer certain questions, you are free to do so. You are also free to terminate the interview and withdraw from the study at any time. It is also possible that you will be invited to participate in an additional interview in the future, as part of the same research.

You are free to ask questions before signing the consent form. If you have questions during the course of the study, you may contact me:

Mr. LUFUNO MAKHADO

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Informed Consent Form

(University of North- west (Mafikeng Campus))

Title of Project: Adherence to treatment guidelines among nurses initiating and managing ART with regard to HIV & TB patients.

Principal Investigator: (Lufuno Makhado)

Participant's Printed Name: .....

I would like invite you to take part in a research study, which seeks to explore and describe the anticipated nurses' perspectives on factors influencing their treatment guidelines adherence. Taking part in this study is entirely voluntary. If you decide to participate you must sign this form to show that you want to take part.

I understand that:

1. I am free to end my involvement or to recall my consent to participate in this research at any time.
2. Information given up to the point of my termination of participation could however still be used by the researcher.
3. The researcher grants anonymity and that data will under no circumstances be reported in such a way as to reveal my identity.
4. The researcher will make no reimbursement for information given on my participation in this study

Signature of the participant .....

Signature of the researcher .....

ANNEXURE F

Data Abstraction Tool-Forms 1, 2 and 3

ADHERENCE TO TREATMENT GUIDELINE STUDY

DATA ABSTRACTION TOOL (Form 1)

Section A: Facility information

Facility code : _____

A01. Facility type ____: CHC

____: PHC

A02. Province ____: KZN

____: NW

A03. Area ____: Urban

____: Rural

A04. Hours of operation ____: 8 hours

____: 24 hours

A05. Integrating TB & HIV services ____: Yes

____: No

A06. If yes, which integration delivery model? ____: Partial integration

____: Full Integration

A07. HIV services are provided by? ____: NIMART-PHCN

____: NIMART-PN

A08. TB services are provided by? ____: NIMART-PHCN/PN

____: PN/EN

A09. Total # of nurses trained in Basic HIV & TB management : _____

A10. Total # of NIMART trained

A10a. PN : _____

A10b. PHCN : _____

A11. Total No. of HIV patients in care : _____

A12. Total No. Of TB patients in care : _____

A13. Total No. Of HIV-infected TB patients in care : _____

A13a. Access to rapid HIV testing onsite ____: Yes

____: No

A13b. Access to rapid TB (GenXpert) testing ____: Yes

____: No

A14. TB epidemiological data for 2012

A14a. Total # of patients registered in 2012 :_____

A14b. Total # of TB suspects screened in 2012 :_____

A14c. Total # of TB suspects tested in 2012 :_____

A14d. Total # of TB suspects tested smear positive in 2012 :_____

A14e. Total # of TB suspects tested culture positive in 2011 :_____

Total # of TB patients put on treatment

1. Regimen 1
2. Regimen 2

A14g. Total # of TB patients tested for HIV in 2011 :_____

A14h. Total # of TB patients tested positive for HIV :_____

A14i. Total # that started ART :_____

A14j. Total # of MDR-TB patients among your TB patients :_____

A14k. Total # that started ART :_____

A14l. Among MDR-TB patients, total # of re-treatment cases :_____

A14m. Total # of HIV+ patients with MDR-TB? :_____

Based on these data is the clinic adherent to:

TB screening? Yes:_____ or No:_____

HIV testing? Yes:_____ or No:_____

2nd line regimen Yes:_____ or No:_____

A15. HIV epidemiological data for 2012

A15a. Total # of patients/clients tested for HIV in 2011 :_____

A15b. Total # of patients/clients tested positive in 2011 :_____

A15c. Total # of HIV+ patients screened for TB :_____

A15d. Total # of HIV+ tested smear positive :_____

A15e. Total # of HIV+ patients tested culture positive :_____

A15f. Total # of HIV+ TB patients started ART :_____

A15g. Total # HIV+ patients started ART :_____

A15h. Among HIV+ TB patients, total # of re-treatment cases :_____

A15i. Total # of MDR-TB patients among HIV+ patients :_____

Section B: Provider Information

	Provider 1	Provider 2	Provider 3
Code	:_____	:_____	:_____

B01. Qualification	____: PN ____: PN ____: PN		
	____: PHCN	____: PHCN	____: PHCN
B02. Age	:____	:____	:____
B03. Gender	____: Male	____: Male	____: Male
	____: Female	____: Female	____: Female
B04. Race	:_____	:_____	:_____
B05. Years in TB services	:____	:____	:____
B05. Years in HIV services	:____	:____	:____
B07. Year trained in Basic TB management	:____	:____	:____
B07. Year trained in Basic HIV management	:____	:____	:____
B07. Year trained in NIMART	:____	:____	:____
B08. Duration in years Initiating and managing ART	:____	:____	:____
B09. Integration model of HIV & TB delivery	___: PI	___: PI	___: PI

	___: FI	___: FI	___: FI
B10. Guidelines present in the clinic	___: GTPT	___: GTPT	___: GTPT
	___: SANGTB	___: SANGTB	___: SANGTB
	___: SAATG	___: SAATG	___: SAATG
	___: IMCI	___: IMCI	___: IMCI
	___:PALSA-PLUS	___:PALSA-PLUS	___:PALSA-PLUS

Any additional information:

_____

_____

_____

_____

NURSE ADHERENCE TO TREATMENT GUIDELINES

DATA ABSTRACTION TOOL (Form 2)

Section A: Patient Demographics **Date of Review: _ _/_ _/_ _ _ _**

A01. Provider code : _____

A02. Medical record number : _____

A03. Date of birth : _ _/_ _/_ _ _ _ _

A04. Age : _ _

A05. Gender ___: Male

___: Female

A06. Race/Ethnicity ___: African

___: Colored

___: Asian

___: White

A07. Patient postal code : _____

A08. Patient's highest level of education ___: No National Senior Certificate

___: National Senior Certificate

___: FET Certificate

___: University Graduate and above

___: No record on the chart

A09. Employment status ___: Employed

___: Not employed

___: No record on the chart

A10. Living Arrangements ___: Living more than one family member

___: Living more than one family relative

___: Living one family member or relative

___: Homeless

A11. Number of family members or relatives within the household : ___ ___

A12. Patient's caregiver ___: Community/Home based caregiver

___: Family member

___: Family relative

___: Friend

Section B: Patient History

B01. Total # of scheduled visits attended : ___ ___ out of __ __

B02. Total # of HIV clinic visits scheduled : ___ ___ out of __ __

B03. What is the patient's TB & HIV services entry point? ___: TB

___: HIV

B03. What year and month was the patient's TB diagnosed? : __ __/__ __ __ __

B04. What year and month was the patient's HIV diagnosed? : __ __/__ __ __ __

Section C: evaluations done at HIV diagnosis

C01. Evaluation date : _ _/_ _/_ _ _ _

___: Date not recorded

C02. Patient weight (kg) : _ _ _ _ kg

C03. Patient height (m) : _ _ _ _m

C04. Is the patient pregnant? ___: Yes

___: No

___: N/A

C05. Clinical staging done ___: Yes

___: No

Date done : _ _/_ _/_ _ _ _

C06. Clinical stage ___: Stage 1

___: Stage 2

___: Stage 3

___: Stage 4

C07. TB screening done ___: Yes

___: No

Date done :_ _/_ _/_ _ _ _

C08. Clinical findings ___: Coughing (24hrs or more)

___: Weight loss

___: Night sweat

___: Fever

C09. TB suspect ___: Yes

___: No

C10. Sputum smear microscopy collected ___: Yes

___: No

C11. Results ___: Negative

___: Positive

C12. Smear culture and drug susceptibility test ___: Yes

___: No

C12a. Results ___: Negative

___: Positive

C12b. Sensitivity : _____

: _____

C13. Tuberculin Skin Test (TST) ___: Done

___: Not done

___: not applicable (N/A)

C13a. Results : _____

C14. Chest X-Ray ___: Done

___: Not done

___: N/A

C14a. Results : _____

C15. CD4 cell count ___: Done

___: Not done

C15a. CD4 cell results : _____ cells/mm³

C16. Viral load ___: Yes

___: No

C16a. Viral load results : _____ copies/mL

C17. If CD4≤ 200, was PCP given ___: Yes

___: No

C18. Pre-ART counseling ___: Yes

___: No

C18a. General HIV education ___: Given

___: Not given

C18b. Antiretroviral therapy information ___: Given

___: Not given

C18c. Adherence planning ___: Done

___: Not done

Section D: ART initiation

D01. Date of ART initiation : _ _/_ _/_ _ _ _

D02. Patient CD4 cell count ___: Yes

___: No

D02a. Results : _____ cells/mm^3

D03. Patient viral load ___: Yes

___: No

D03a. Results : _____ copies/mL

D04. Creatinine ___: Yes

___: No

___: N/A

D04a. Results : _____ mg/dL

D05. FBC or HB ___: Yes

___: No

___: N/A

D05a. WBC : _____

D05b. RBC : _____

D05c. Hb : _____

D05d. HCT : _____

D05e. Platelet : _____

D06. ALT ___: Yes

___: No

___: N/A

D06a. Results : _____ IU/L

D07. Fasting cholesterol and triglycerides ___: Yes

___: No

___: N/A

D07a. Results : _____ mg/dL

Section E: ART regimen

E01. 1st line ___: Yes

___: No

E01a1. NRTI ___: Zidovudine (ZDV or AZT)

___: Stavudine (D4T)

___: Lamivudine (3TC)

___: Didanosine (ddI)

___: Abacavir (ABC)

___: Emtricitabine (FTC)

E01a2. Drug dose : _____

E01a3. Dose Amount ___: g

___: mg

	___: Tablet/capsule
	___: mL
E01a4. Frequency	___: once a day/daily
	___: BID
	___: TID
	___: QID
	___: other
E01b1. NNRTI	___: Nevirapine (NVP)
	___: Efavirenz (EFV)
E01b2. Drug dose	:_____
E01b3. Dose Amount	___: g
	___: mg
	___: tablet/capsule
	___: mL
E01b4. Frequency	___: once a day/daily
	___: BID
	___: TID

___: QID

___: other

E01c1. PI

___: Indinavir (IND)

___: Nelfinavir (NFV)

___: Saquinavir (SQV)

___: Ritonavir (r) *

___: Lopinavir/ritonavir (LPV/r)

___: Atazanavir (ATV)

___: Fosamprenavir (f-APV)

___: Amprenavir (APV)

E01c2. Drug dose

: _____

E01c3. Dose Amount

___: g

___: mg

___: Tablet/capsule

___: mL

E01c4. Frequency

___: once a day/daily

___: BID

	___: TID
	___: QID
	___: other
E02. 2ND line regimen	___: Yes
	___: No
E02a1. NRTI	___: Zidovudine (ZDV or AZT)
	___: Stavudine (D4T)
	___: Lamivudine (3TC)
	___: Didanosine (ddI)
	___: Abacavir (ABC)
	___: Emtricitabine (FTC)
E02a2. Drug dose	: _____
E02a3. Dose Amount	___: g
	___: mg
	___: tablet/capsule
	___: mL
E02a4. Frequency	___: once a day/daily

	___: BID
	___: TID
	___: QID
	___: other
E02b1. NNRTI	___: Nevirapine (NVP)
	___: Efavirenz (EFV)
E02b2. Drug dose	: _____
E02b3. Dose Amount	___: g
	___: mg
	___: tablet/capsule
	___: mL
E02b4. Frequency	___: once a day/daily
	___: BID
	___: TID
	___: QID
	___: other
E02c1. PI	___: Indinavir (IND)

___: Nelfinavir (NFV)

___: Saquinavir (SQV)

___: Ritonavir (r) *

___: Lopinavir/ritonavir (LPV/r)

___: Atazanavir (ATV)

___: Fosamprenavir (f-APV)

___: Amprenavir (APV)

E02c2. Drug dose : _____

E02c3. Dose Amount ___: g

___: mg

___: tablet/capsule

___: mL

E02c4. Frequency ___: once a day/daily

___: BID

___: TID

___: QID

___: other

Section F: Patient Monitoring

F01. CD4 monitored at:

F01a. 6 months after initiation of ART ___: yes

___: NO

F01b. 12 months ___: yes

___: NO

F02. VL monitored at:

F02a. 6 months after initiation of ART ___: yes

___: NO

F02b. 12 months ___: yes

___: NO

NURSE ADHERENCE TO TREATMENT GUIDELINES

DATA ABSTRACTION TOOL (Form 3)

SECTION A: TB ASSESSMENT AND DIAGNOSES

A01. Did the patient complain with the following

___: Cough ≥ 2 weeks?

___: Recent unintentional weight

___: Drenching night sweats

___: Fever ≥ 2 weeks

___: Loss of appetite

___: Blood stained sputum

___: Chest pain

A02. If yes to A01, was counseling for TB done

___:Yes

___: No

___: No record

A03. TB screening

A03a1. Sputum smears microscopy done

___: on spot

___: on spot and morning sputum

___: sputum received after 24 hours

A03a2. Sputum smear microscopy results _____: 1st smear

_____: 2nd smear

A03a3. AFB Turnaround time : ___/___/_____ Date collected

: ___/___/_____ Date received

A03a4. If positive, date started on treatment : ___/___/_____

A03b. Has the client been treated for TB before? ___: Yes

___: No

A03b1. Smear culture and drug susceptibility test done ___: Yes

___: No

A03b2. Date collected : ___/___/_____

A03b3. Date results received : ___/___/_____

A03b4. Results

A03b4a. Culture results : _____

A03b4b. Drug susceptibility test : _____

A04 HIV testing

A04a. HIV test done ___: Yes

___: No

A04b. If yes, results ___: Negative

___: Positive

A04c. Cd4 collected for HIV positive client? ___: Yes

___: No

A04d. CD4 cell count results : _____

If both sputum specimens AFB are negative manage according to form 2 (HIV), if at least one sputum specimen is positive treat for TB (continue to section B)

SECTION B: TB TREATMENT AND FOLLOW-UP

B01. Assess nutritional status

B01a. Height : _____ m

B01b. Weight : _____ kg

B01c. BMI : _____ kg/m

B02. Adherence counseling done ___: Yes

___: No

B03. Family planning reviewed ___: Yes

___: No

B04. Regimen ___: Regimen 1

___: Regimen 2

B05. Dosage according to pretreatment weight

___: 30-37 kg

___: 38-54kg

___: 55-70 kg

___: ≥71 kg

B06. If HIV & TB client, cotrimoxazole & pyridoxine given

___: Yes

___: No

Start ART if CD4 ≤ 350/ stage four/MDR/XDR TB, if criteria met go to section D of form 2.

B07. TB contacts screened

___: Yes

___: No

B08. Follow up visits

B08a. Assess clinically

___: Yes

___: No

B08a1. Weight

: _____ kg

B08b. check adherence

B08b1. Measures used to measure adherence by the nurse

___: TB card

___: Treatment supporter

___: Patient's self-report

B08c. Laboratory measures (monitoring effectiveness of treatment)

B08c1. Sputa collected at 7 /11 weeks

___: Yes

___: No

B08c2. Sputa results

___: Negative

___: Positive

___: 1 Positive & 1 Negative

B08c3. Sputa collected at after 5/7 months

___: Yes

___: No

B08c4. Sputa results

___: Negative

___: Positive

___: 1 Positive & 1 Negative

B09. Patient treatment outcome

___: Cured

___: Treatment completed

___: Treatment failure

___: Lost for followup

ANNEXURE G

Focus Group Guideline

Guideline for Focus Group (Participants)

I. OBJECTIVE

1. To explore and describe the challenges and prospects faced by nurses initiating and managing ART and TB treatment with regard to treatment guidelines adherence.
2. To explore and describe the prospects faced by nurses initiating and managing ART and TB treatment
3. To explore the barriers influencing adherence to treatment guidelines among NIMART nurses
4. To define the gap, the needs and suggestions for future responses

II. METHODOLOGY

1. Date / Time & characteristics

Groups	Date / Time	Participants character	Characteristics	Place
1st group Two sessions	February 2014 1st 10h00-12h00 2nd 13h00–15h00	Typical	Nurses initiating and managing ART and TB treatment, for 12 months and above, working under KZN province CHCc/PHCc.	One of the districts in KZN
2nd group two sessions	February 2014 1st 10h00-12h00 2nd 13h00–15h00	Typical	Nurses initiating and managing ART and TB treatment, for 12 months and above, working under NWP CHCc/PHCc.	One of the districts in NWP

2. Process of focus group meeting

1. Warm-up: -Introduction and welcome, Introduction of subjects (10 min)
2. Discussion on main themes (80 min)

1. Adherence to treatment guidelines (10 min)

2. Barriers of adherence to treatment guidelines (25 min)

3. Motivators of treatment guidelines (25 min)

4. Future planning towards treatment guidelines adherence (20 min)

5. Closing (5 min)

1. Recording & Analysis: 2 Tape recorder, Note-Taker who will also be an observer

III. INTRODUCTORY SCRIPT FOR PARTICIPANT FOCUS GROUP

1. Welcome the group: Explain the background

Good morning and welcome to our meeting

Thank you for taking the time to join our discussion on the experience of participants and impact it has on your life. Selected participants here were involved for this focus group.

2. Introduces herself for the recorder

Participants will be asked to introduce themselves by saying their name, organisation

E.g., could you introduce yourself: name, church etc.?

3. Provides an overview of the objectives and process of the focus group

We're primarily interested in finding out about your experience and perspective about adherence to treatment counseling with regard to barriers, challenges and prospects that you encounter during initiation and management of ART and TB treatment.

There is no right or wrong answers, because everyone experiences and perceives things differently and you're working in different working conditions. We are interested in the full range of experience, so please feel free to share your point of view even if it differs from what others have said.

4. Provides discussion group rules

Before we begin, let me suggest some guidelines that will make our discussion more productive.

1. Please speak up, Only one person should talk at a time
2. Please before you speak, tell your name.

My role here is to ask question and to listen:

1. I'll be summarising information at times.
2. I won't be actively participating in the conversation, only guiding it.
3. I'll also move the discussion from one question to the next to try to keep us on track so that we can finish by on time.

If you need to go to the bathroom or want to get up and get more to drink during discussion, please feel free to take care of your needs.

If you would like to add to tour comments after the group, we will be around to talk you privately.

Any questions before we start?

IV. DISCUSSION

1. Start with more general question first

How is the initiating and managing of ART and TB treatment going for you?

2. Review of study goal: The study goal is to explore and describe nurses' perspectives on barriers, challenges and prospects with regard to treatment guidelines adherence.

3. Outlines of questions

1. a. What are your barriers regarding adherence to treatment guidelines while initiating and managing ART/anti-TB treatment?" and
2. What can motivate you to adhere to treatment guidelines while initiating and managing ART/anti-TB treatment?
3. What do you think can be done to improve your adherence to treatment guidelines?

4. Conclusion of discussion

We had a great time today. I'll summarise major points.

(Major points will be displayed)

5. Q & A

Do you have any questions?

6. Closing

Thank you for your attending. Your opinions will contribute to better adherence to treatment guidelines.

Main themes (Pilot test)	Categories	Current study
		Group (NIMART)
		1. Adherence to treatment guidelines 2. Barriers of adherence to treatment guidelines 3. Motivators of treatment guidelines 4. Future planning

ANNEXURE H

Focus Group Transcript

Focus group interview

Group 1 participants: NIMART trained nurses

Date: 13th September 2013

Time: 12:00 -13:45

Context:

Physical setting:

The focus group interview was conducted in a public hospital in a small nursing class in Ugu district KZN.

Participants:

1. A similar group comprising of 12 African female and male NIMART nurses working indifferent facilities in Ugu district.
2. The participants were selected using purposive sampling from a variety of CHC and PHC facilities who are initiating and managing ART and TB treatment in their facilities
3. The years of experience for participants ranged from 3-4years

Key:

R- Researcher

P-Participant

Speaker	Dialogue	Comments
R	What are the barriers of adherence to treatment guidelines?	
P5	"The only thing I find problematic is people who are NIMART trained and then people are coming in the system and there is no update done to these people. And the people that go for an update are few and when they come back from the update they tell us only things that are not written down like the amendment will be made and it is just said and not written in the guideline"	
P9	"The information that we are hearing is a change but the guideline is still the same. Hence all changes are just hearsay and not what the guideline is saying	
P4	"And when you implement the hearsay and something goes wrong it goes back to saying what does the guidelines say?"	
R	so what you trying to say is that there is a guideline for ART and for TB, but what is happening is that if there is a new amendment on that guideline there is no circular which follows to say there is this new developments in the guideline that you need to follow instead you follow the hearsays that will be brought to you when the programme managers for HIV & TB come for support visits, what do they normally say when you are facing those	

	problems?	
P	"YES and The other problem with this thing is only that the very same people who attend the very same workshop all over again and others who don't even get the training and exposure as them so they end up not knowing the information they are supposed to know. For example they should come back and give us feedback, but maybe leave out some important point. Whereas if I was part of the same workshop or training they went to, I would know and come back with the full information that the training was all about"	
P7	"the programme managers took long to come back to us, they don't even visit for support unless there is some provincial visit that when the will come and you will find that all the wrongs would have been made right earlier if they took support visits seriously and we wouldn't have been stuck with the old guidelines or protocols that we using even now"	
P3	"I would not say we do not adhere to the guidelines, the patient had already went through all the logistics for pre-ART and PITC, because the client coming to me had gone through PITC and Pre-ART I follow everything said by the guidelines on my part, collect the blood, she comes back I do all for initiating"	
R	With my understanding you said you don't do PITC and it's done by counsellors, even the pre-ART register is not staying with you?	
P	"no"	

	so to me I think the most part for you as a professional nurse, when I am analysing your statement, you only do blood collection and initiating as well as managing ART only	
P3, P4, P8, P6	yes	Nodding their heads
R	Other than that going back to say in the ART register entering the client in the register is not part of your job?	
P5	"not in the pre-ART register, the client goes back to the counselor"	
R	You have initiated the client but you just have to tick actually to say I have got so many that I had initiated today?	
P	"yes in the clinical chart and the pink form"	
R	mmmh	
P2	"workload is a major challenge when it comes to proper adherence to treatment guidelines, we don't have enough time"	
P4	"yes we don't have enough time to use the guidelines hence the workload prevent us from adhering to treatment guidelines"	

P9	"it is not easy to use the guidelines that you don't understand and again the guidelines have other things that are confusing to me and no one seems to have answers to my quires as well"	
R	What do you mean by confusing?	
P	"the guidelines contradicts themselves and we dealing with integrated services (TB & HIV) so the TB guidelines says this and the HIV or ART guidelines says this whereas the PALSA Plus is saying this on the other side"	
R	Ok, what else?	
P5	"We are not supported or motivated to use the guidelines. We do have programme coordinators, managers and supervisors but they are not supportive or encouraging to us. They hardly worry about our adherence to guidelines all they worry about is whether we promoting adherence to treatment among patients"	
P10	"yes you are right they don't care they only visit when there is a provincial visit just to prepare the clinic for their own good"	
P12	"I have a problem with the guidelines because I don't get to be involved in the development of it, I don't know about you nurses but I do have a problem. We are not engaged in the development but are fully expected to implement it whether we agree or not"	

P3	"In addition, we don't even get to be consulted before hand if the guideline is suitable for use or not. It's an obligation and it's not easy to adhere to something you do not agree to"	
P11	"Guidelines are not clear and easy to use they are too complex for me. Why can't they simplify them and make them user friendly. The problem is not adherence but use. You can only adhere to something that you are using"	
P12	"I agree with p11, we have to use the guidelines to adhere to it. However majority of you will agree with me the past speaker that we normally don't find guidelines user friendly"	
P1; p2;p4; p6;p9; p11	yes	nodding their heads
R	mmmhhh	
P6	"We don't have the necessary resources to carry on some of the duties that the guidelines stipulated or recommended. Some of our clinics don't even have the so called treatment guidelines and this truly affects the level of adherence and guideline use"	
P10	"That's the point there are no resources provided for the recommendations stipulated in the treatment guidelines, even if you follow or adhere to it without resources it's a waste of time."	

R	Any other challenge or barrier?	
P9	"I think it is very difficult to change, it is very hard to move from the previous practice and the way we use to do things to this NIMART and TB & HIV integrated services. So I think change is a huge problem that needs attention"	
P1	"there is just too many changes in a short space of time, the government does not even give us time to breath, when you certain about a guideline another one will be introduced"	
P11	"lack of training really affects the adherence to treatment guidelines"	
P7	"Being the only trained NIMART nurse is a challenge as you won't always be on duty, what happens when you not there? Somebody not train might be taking on your duties and this really affects the level of adherence as the person might do incorrect thing just because he/she is unaware of the guidelines recommendations"	
R	mmmhhh ok do you have any other challenges or barriers? Ok now let's move to the next question and is anyone thinks of anything just note it and we will add at the end of the session.	Silence observed
R	What do you think can facilitate adherence to treatment guidelines?	

P2	"for TB and HIV guidelines to be congested in a form of a hand book so that it can be accessible to us all the time"	
R	Congested?	
P	"yes"	
R	When you say congested you mean that all this guidelines should be combined into one?	
P	"not in one but I think it will be easier to read a big book that just draw everything than just reading something that's short for one guideline"	
P4	"like the one that's for the MDR-TB and its only for MDR-TB and its easily accessible you can just flip and read on"	
P6	"normally we need the PITC to be smaller; we have the big ones, then the smaller ones"	
R	So you want the smaller guidelines, like a pocket one?	
P	"yes as a pocket book or hand book"	
R	all right	

P3	"A portable guidelines that can be accessible and owned by any health care provider not just one for the clinic, do you remember the handbook for family planning?"	
R	yes	
P	It had those questions like exclude pregnancy, eligibility criteria and it was very user friendly and easy and very easy to utilise and guiding. But now they came with a guideline which is just too big to go through and we don't have time as the patients are there to be assisted"	
P10	"someone come from HIV asking do you have this guidelines and yes we only have one for the clinic and one have to move from one cubicle to the other to access these guidelines"	
P5	"reduced workload and reduced time pressure can increase adherence to treatment guideline and also promote the provision of quality care to our TB & HIV patients"	
P12	"we don't get the time to go through the guidelines, we know they are available but not accessing them as it is only one for a specific programme"	
P2	"I had never been in-serviced in using the guidelines"	
P3	"in-service training are carried out but they are just not on guidelines usage	

	so as a result it is very important to be in serviced in utilising guidelines"	
P5	"some of us do receive in service training about guidelines but the way they do it is not proper they teaches us what they think it is important and only what is important to them"	
P9	"mostly about this ordinary nursing"	
P7	"others will just take the guidelines and read them line to line and try clarifying it"	
P8	but I do believe that if someone can take just a short time to read the section and understand it that may assist in adhering to it because some charts flows are clear but some of us don't even know the reason for doing what the chart flow is saying"	
R	Okay what else do think can be done?	
P3	"A good communication between the implementers, programme managers, coordinators and supervisors can promote adherence to treatment guidelines. Any change need to be communicated way beforehand not just in the implementation phase. "	
P9	"We need enough time to work with patients as well as to follow the guidelines correctly. Instead of the system pushing us to do more quantity meaning more headcount per day it should provide time for us to provide quality care to our patients. There is no use for a patient to spend the	

	prescribed 2 hours in the clinic and you find that no quality care was provide to this patient"	
P2	"Guidelines need to be made available in the facilities for easy use and accessibility. However not just one guideline but enough for each health care provider as this will reduced time for looking for a guideline or waiting for one to be done with It so that one can use it"	
P1	"It should be researched when they do guidelines to see if they really do work before they can be thrown in the clinic and not being utilised. Because they just come and then tell us this is what you are going to do because it was decided at the national level, you see"	
R	mmmh	
P10	"but if they go and sit down with the people who are doing that and get to understand the feasibility part of implementing the guidelines and get their inputs it will make it easier and increases adherence"	
R	Okay, when they start developing guidelines to go into the facilities to people who are going to implement the guidelines?	
ALL	"yes"	
R	Not from top down?	

P7	"We nurses as implementers we need to participate in the development of the guidelines, because we always question the guidelines but no one listen to us. It is not easy to use some of the guidelines as they contradict each other. If we are engaged in the development we would be able to avoid these contraindications"	
P12	"I agree because even the person who brings the guidelines doesn't even understand the guideline when you ask them all they can say is the national department of health said so, hence we cannot question the guidelines, and we just have to follow it as is even if we don't agree with it. One guideline will say this and the other one this and it's confusing"	
R	So it makes your life difficult?	
All	"yes"	
R	Anything else?	
P11	"We need to be part of the guideline development because it is for us and we need to agree to it"	
R	So what must be done?	
P8	"The only way is to come to us the implementers to get our inputs and engage us in the process. Most people who form part of this process are not	

	even nurses and this undermines our profession"	
R	Okay, anything else?	
P4	"Guidelines are a positive wave roller because they guide and protect us in case something happens. When that happens, I can always say 'I did it according to the guidelines'. But change is always difficult. So when the change come one get to be trained and when this person comes back we all confused, we don't get the chance to go for this update all of us and people become very hostile nje. And the person end up doing the old things that he/she is used to because the understanding of the information and time is not there. When new things come from the government like guidelines it doesn't even go to the media to tell people that there is this change. We are the last people to hear that there is this change and it needs to be implemented and blah blah blah, we haven't heard of it yet, not ready yet so i become very, I don't know if I should say offended or what, it's more of a political aspect of the government. At the end we are the last people to hear about it and at the same time the people to implement it"	
P7	"at the end of the day the person who suffers is the patient because we don't know what to do"	
P5	"another thing is that the guidelines are standardised for someone working at the hospital and clinic stings because you will do something at the clinic like let's say I must refer the patient to the hospital, its difficult because we use different guidelines they should be a one guideline which have both PHC and hospital care and management guidelines. So that even at PHC we know what the hospital nurse would do on receipt of the patients and she	

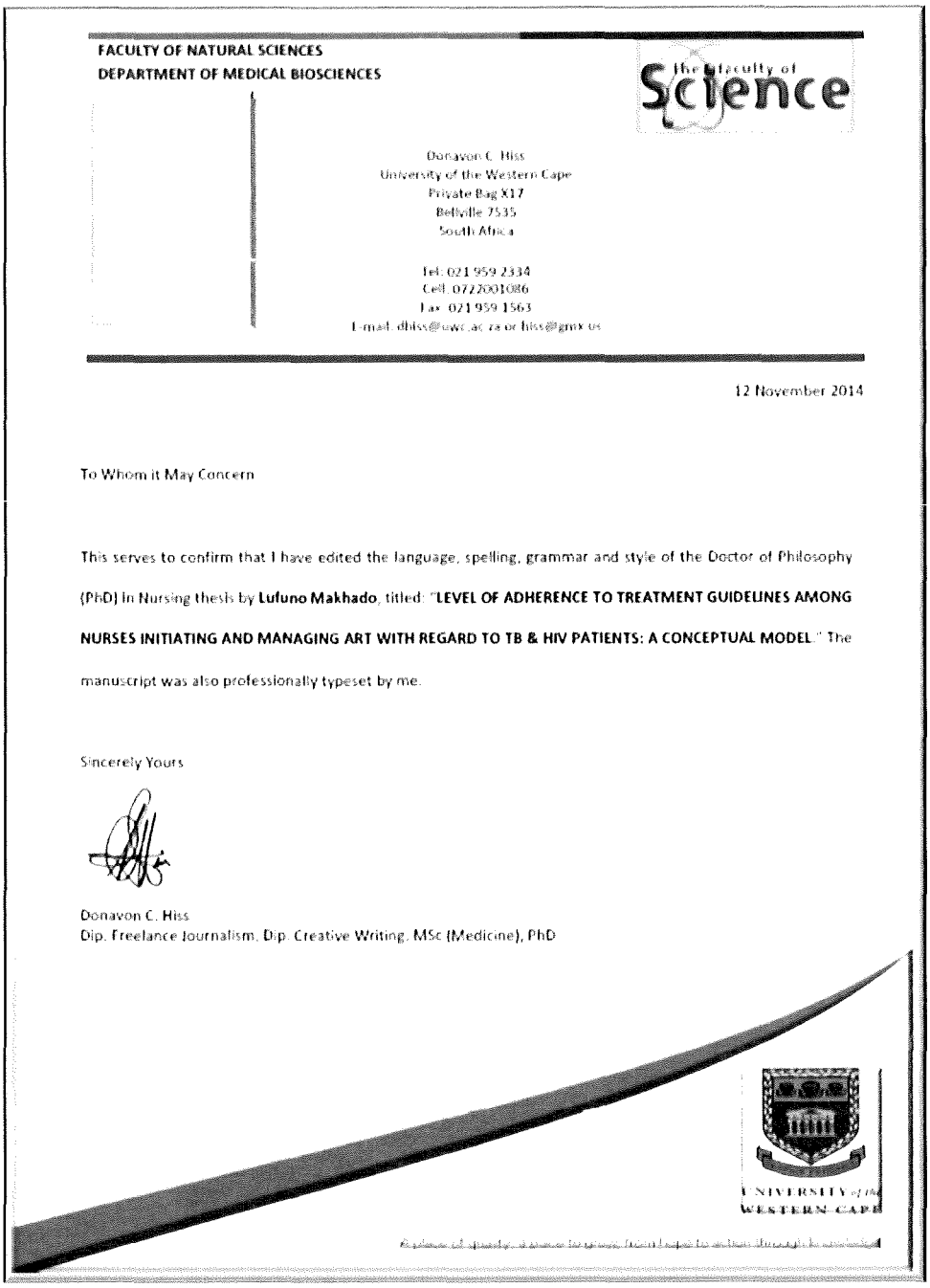
	will know where to start because she knows where I ended."	
R	It should be a continuation from the clinic?	
All	"yes"	
P5	"That's why we go through a holistic or comprehensive nursing course. Even if the nurse is down referring the patient from the hospital to the clinic, it will be easy to carry on with the care"	
P1	"A simple guideline that is clear and at the level of nurses can be of help to us as it will be easy to understand and go through. The chart or that diagram like poster will be of greater help. Yes algorithm type of guidelines. it is simple and easy to follow rather than the book"	
R	okay	
P3	"we know it is impossible to train everyone in time but if there is something new coming, even if it's not a formal training but trainers can visit the facilities just to provide an insight on the available change while training are taking place because one person will go to and come back and give report but it is not going to be the way he/she heard it, it is going to be mostly things he/she understood better and those that interest him/her"	
P11	"to add on its just feedback of a five day training given within an hour, that just a summary of a summary"	

P2	"they just choose what they feel it is important and that's it"	
P11	"We need support and encouragement to be able to carry our nursing duties at ease and to the best of quality possible. Fortnightly supervision or support visits can increase the level of adherence and guidelines usage among nurses and this will promote quality provision of care to our patients"	
P4	"We would love to to..... For our doctors to attend these workshops because you find that our doctors are not, they don't know any guidelines. It even amazes me in ART some doctors don't know anything that needs to happen during initiation and as a nurse you will be referring clients and you will be afraid to tell the doctor to say please do one, two ,three and this as it will be like you are undermining or what so ever. But if the doctors can come and attend the workshops I think they will know where to start than what they know now"	
R	okay	
P12	"the doctors needs to be orientated on the guidelines because they follow their own I don't know what it is but as a country we need to use one standard guidelines for a programme"	
P3	"a good working relationship can promote adherence to treatment guidelines as not only nurses provide care to TB & HIV patients"	

P7	"Yes some of the challenges that we face are due to lack of teamwork between enrolled nurses, doctors, ENAs and us as professional nurses, there is no communication between this categories. And we are supposed to work hand in glove with one another for the provision of quality care to our patients".	
P6	"The department of health should allow us nurses to move slowly as this was not our scope of practice to be well orientated and skilful. The reason we don't want to move from our past routines is because it takes time to acclimatise to the new things. I was trained for NIMART in 2011 but I still find it hard to fully understand the initiation and management of ART. Maybe they should be some follow-up training or mentorship to put us in the right path of initiating and managing ART"	
P8	"provide necessary resources and guidelines to the facilities"	
P3	"Always wanted to know why the enrolled nurses were the ones nominated to work with TB than professional nurses and even in trainings it's them. This also has an impact as it like TB belongs to enrolled nurses and not professional nurses. This need to be looked at as it reduces the adherence of professional nurses with regard to TB management"	

ANNEXURE I

Confirmation by Language Editor and Typesetter



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To Whom it May Concern

This serves to confirm that I have edited the language, spelling, grammar and style of the Doctor of Philosophy (PhD) in Nursing thesis by **Lufuno Makhado**, titled: "**LEVEL OF ADHERENCE TO TREATMENT GUIDELINES AMONG NURSES INITIATING AND MANAGING ART WITH REGARD TO TB & HIV PATIENTS: A CONCEPTUAL MODEL**." The manuscript was also professionally typeset by me.

Sincerely Yours

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UNIVERSITY of the WESTERN CAPE

A place of quality, a space for growth, hope to action through knowledge