

**Factors Affecting Adherence to Treatment in Patients on Chronic  
Medication at Mokopane Hospital**

**A Dissertation Submitted In Fulfillment Of the Requirements for the  
Degree of Masters of Pharmacy (Pharmacology)**

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## **Declaration of Authenticity**

I, Mathevula Hlayiseka Mokesh, declare that this dissertation is my original work, submitted to fulfil the purposes and objectives of this study, and that it has not been previously submitted to this or any other university for a higher degree or any other qualification.

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Signature

**MATHEVULA HLAYISEKA MOKESH**

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Date

## **Definitions of terms**

### **Adherence:**

Is defined as ensuring that medication is taken at the right time, in the right doses and in the right way or following a prescribed treatment regimen, including correct dosage, number of doses per day, and dietary restrictions

### **Compliance:**

Is the extent to which a patient follows the recommendations of a doctor or other healthcare professional, particularly with respect to medication or other forms of treatment.

### **Dispensing:**

The interpretation and evaluation of a prescription, the selection, manipulation, or compounding of the medicine, the labeling and supply of the medicine in appropriate container according to the Medicine Act and the provision of information and instructions by a health professional to ensure the safe and effective use of medicines by the patient.

### **Irrational prescribing:**

The use of drugs, in an Inappropriate, ineffective and inefficient manner, for instance when no drug therapy is indicated

### **Prescribing:**

To give directions, either orally or in writing, for the preparation and administration of a remedy to be used in the treatment of a disease

**Prescribing Pattern:**

Prescribing pattern is defined as the different ways to give directions, either orally or in writing, for the preparation and administration of a remedy to be used in the treatment of a disease.

**Rational Drug Use:**

Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, and the lowest cost to them and their community.

**Rational prescribing:**

A rational prescription is defined as one which proposes the best pharmacological approach to obtain the therapeutic objective.

## **List of Abbreviations and Acronyms**

AIDS – Acquired immune deficiency syndrome

ART – Antiretroviral therapy

ARV(s) – Antiretroviral(s)

AZT – Azidothymidine

BMI – Body mass index

BP – Blood Pressure

CDC – Centres for Disease Control

CMV – Cytomegalovirus

COPD – Chronic Obstructive Pulmonary disease

DALYS – Disability adjusted life years

DM – Diabetes Mellitus

EM – Electronic Measurement devices

HCTZ – Hydrochlorothiazide

HIV – Human immunodeficiency virus

HPT – Hypertension

MI – Myocardial infarction

NIDDM – Non insulin dependent diabetes mellitus

RCT – Randomised controlled trial

SPSS – Statistical Package for Social Sciences

TB – Tuberculosis

WHO – World Health Organization

## **Abstract**

**Introduction:** Many patients with chronic illnesses including asthma, hypertension, diabetes mellitus and HIV/AIDS, have difficulties adhering to their recommended regimens. This may result in sub-optimal management and control of the illness. What a patient understands about a specific regimen, including the reason for taking each medication and the intricacies of dosing schedules and administration requirements, can have a profound influence on adherence. Monitoring the effectiveness and safety of the treatment administered helps to decide whether this should be continued, changed or stopped. Any drug may produce unwanted or unexpected adverse reactions. The choice of drugs depends on many factors, such as the pattern of diseases, the treatment facilities, the training and experience of the available personnel, the financial resources available and demographic or environmental factors. The level of adherence to medication among with hypertension and diabetes mellitus or anti-retroviral therapy has not been studied in Limpopo province

**Aim:** The aim of the study was to determine the adherence patterns and the factors contributing to the adherence to treatment by diabetic, hypertensive and HIV/AIDS patients at Mokopane Hospital.

**Methodology:** This was a cross-sectional, descriptive study conducted through use of a questionnaire administered as an exit interview at the pharmacy after the patients had consulted the doctor and received their medication from the pharmacy.

**Results:** The data was collected over a period of two months, where every patient was seen only once using their hospital numbers to avoid repetition. The study included a total of 307

participants, 201 (60%) were patients on ARVs, 48 (16%) were on anti-hypertensive, 35 (11%) on anti-diabetic, and 23 (8%) on both anti-hypertensive and anti-diabetics. The respondents were predominantly female (n = 234; 76%) while 73 (24%) male. Similarly of the 201 participants on ARVs treatment, 153 (76%) were females and 48 (24%) were males; among those on anti-hypertensives only 11 (22%) were males. For the diabetics 6 (17%) were males and 29 (83%) were females. Of participants with both hypertension and diabetes 9 (39.1%) were males and 14 (60.9%) were females.

Seventy-nine percent (79%) of respondents on ART, 69% of those on anti-hypertensive, 72% of those on anti-diabetics, and 66% of those on both anti-diabetics and anti-hypertensives were adherent to their treatment. The younger patients (21 to 40 years) were less likely to have forgotten to take their treatment in the last one month (21% of respondents) than the older patients (41 to 87 years), 34% of whom forgot to take medication in the month prior to the study. Most respondents 250 (81%) reportedly used an alarm system/timer as reminder to take their medication. Most of them reported that they received information regarding their condition and medication, though some were not sure of the side effects or indications for the medications. Adherence was attributed to faith in the healthcare worker, fear of complications of the condition, and a desire to control the condition. Non-adherence was seen as an active decision, partly based on misunderstandings of the condition and general disapproval of medication which was only taken in order to facilitate daily life or minimize adverse effects.

**Conclusion:** The levels of non-adherence (21% to 34%) among the patients on chronic medication are not acceptable. Elderly patients were more likely to be non-adherent to their treatment compared to the younger patients. Some information gaps were identified regarding their conditions and indications for medications. It is therefore important for the health

professional to provide patients with full information about the indications, efficacy, and side effects of the medication given to them. Ways should be found to support elderly patients who are on chronic medications; for instance through directly observed therapy and/or using treatment supporters.

## Chapter 1: Introduction

Adherence is defined by the World Health Organization (WHO) as “ the extent to which a person’s behavior in taking medication, following a diet, and or executing lifestyle changes corresponds with agreed recommendations from a healthcare provider”<sup>1</sup>. Adherence is dependent on numerous factors and has been shown to vary from 0 to 100% in different populations studied,<sup>1-4</sup> Factors such as age,<sup>5,6</sup> gender,<sup>7</sup> low socioeconomic status and severity of disease,<sup>6</sup> class of drugs prescribed,<sup>8</sup> number of pills per day,<sup>5,7</sup> side effects of medication,<sup>5,6</sup> patient inadequate understanding of the disease and importance of treatment,<sup>5,6</sup> co-morbid medical conditions,<sup>9</sup> lack of social support,<sup>8</sup> poor patient provider relationship,<sup>9</sup> cost, forgetfulness and the presence of psychological problems especially depression,<sup>6,9</sup> have all been shown to affect adherence in various population.

Adherence is often described as the engagement and accurate participation of an informed patient in a plan of care<sup>10</sup>. The concept of adherence therefore has a broader meaning than compliance. It encompasses the extent to which a patient follows instructions and implies understanding, consent and partnership. It also includes entering into and continuing in a programme or care plan, as well as keeping appointments and tests as scheduled<sup>10</sup>

The problem of non-adherence to medical treatment remains a challenge for medical professional and social scientists, for efforts to explain and improve patient adherence often appear to be ineffective. Although successful adherence interventions do exist<sup>11-15</sup>, half of interventions seem to fail<sup>16</sup> and the adherence theories lack sufficient explaining power. As a result of the widespread problem of non-adherence, substantial numbers of patients do not get the maximum benefit of medical treatment, resulting in poor health outcomes, lower quality of life and increased healthcare costs.<sup>17,18</sup>

There have been many reviews of non-adherence among patients.<sup>20-24</sup> DiMatteo found an average non-adherence of 24.8% of the patients<sup>23</sup> with the highest rate in patients with HIV, arthritis, gastrointestinal disorders and cancer. The lower rates were in patients with pulmonary disease, diabetes and sleep disorders<sup>23</sup>. Measured with electronic measurement devices (EM), medication adherence appeared highest in the cancer patients (80%), at about 75% in many other diseases, for example in cardiovascular, infectious disease and diabetes, and lowest in chronic obstructive pulmonary disease (COPD; 51%) and asthma (55%).<sup>25</sup>

Cramer found mean adherence rates of 58% and 65% among patients with psychiatric disorders and depression, respectively<sup>11</sup>. In general, adherence rates are higher among patients with acute conditions compared to patients with chronic diseases<sup>26</sup>. Consistent adherence among patients with chronic conditions is disappointingly low, dropping most dramatically after the first six months of therapy<sup>7</sup>. To tackle the problem of non-adherence, many intervention studies have been performed in the last decades, many of which include interventions that are quite complex and time consuming<sup>27</sup>. Unfortunately, even thmost effective interventions appear to have only modest effects<sup>28</sup>

In low income countries, adherence can be a problem for a number of reasons including those cited above. Yet studies have shown no significant difference in adherence between resource limited and resource rich countries, which suggests that patients in all environments have trouble adhering strictly to medicines. It is recommended that all anti-retroviral (ARV) programmes, whose success depends on adherence, should have a concurrent plan for adherence assessment and treatment support<sup>10, 33</sup>.

For the purposes of this study, '*near perfect adherence*' has been defined as 95% and above adherence. The ability to consistently take the medicines at exactly or approximately the same times each day depends on the individual's frame of mind as well as the support of family members, the people around them, and the community at large.

The present study explored adherence among patients on chronic medication for the three conditions – diabetes mellitus, hypertension and HIV – patients on anti-retroviral therapy

## **Chapter 2: Overview of Hypertension, HIV/AIDS and Diabetes mellitus**

This chapter presents an overview of the three conditions, and sets the stage for the justification for life-long treatment and the need for adherence to treatment in each of the conditions.

### **2.1 Hypertension (High blood pressure)**

Systemic high blood pressure, known as hypertension, is a BP reading of 140/90 mmHg or higher. A person has hypertension if either a systolic or the diastolic readings is above the respective cut-off point; hence it is not necessary for both the systolic and diastolic readings to be elevated. Once hypertension develops, it usually lasts a lifetime. The good news is that hypertension can be controlled by following a healthy lifestyle and using appropriate medication. Hypertension is controlled when treatment reduces the BP to constantly below 140/90 mmHg. Hypertension is a silent killer because it usually has no symptoms and many people with elevated blood pressure may not know they have hypertension until they develop complications of target organs such as the heart, brain, or kidneys.

Asymptomatic hypertension is only detectable through physical examination; hence people should be encouraged to have their blood pressures checked at a clinic, pharmacy or in a doctor's surgery where the necessary equipment is available. Hypertension occurs more frequently in older people and is more common in people who are overweight or obese, or in those who have diets that are high in salt (sodium) and low potassium (which is found in fruit and vegetables). People who consume a lot of alcohol also tend to have higher blood pressures.<sup>34, 35</sup>

About a quarter of all South Africans 15 years and older, an estimated six million suffer from hypertension, of whom millions are not diagnosed and even more inadequately treated. Of all these people only 26% of men and 51% of woman know that they had hypertension.<sup>36</sup>

Overall, there are no marked differences between the rates of hypertension among the different population groups<sup>36</sup>. However the rural black Africans have significantly less hypertension than the urban black African people.<sup>37</sup> South Africans with tertiary education had less hypertension than those with 12 years or less education.<sup>37</sup> People with a family history of hypertension or stroke were more likely to have hypertension than those without such a history, which suggests that there may be a genetic or familial predisposition to hypertension.<sup>37</sup>

Norman et al,<sup>37</sup> indicate that of those needing treatment, only 21% of men and 36% of women were taking drugs to reduce their BP, while only 10% of men and 18% of women had their BP levels sufficiently reduced to the level that would eliminate the risk to heart, brain and kidney complications<sup>37</sup>. It has been estimated that in South Africa in 2000, 8% of deaths in men and 11% of deaths of women 30 years and older were caused by a high BP in South Africa.<sup>38</sup> Much of the damage caused by hypertension can be prevented if diagnosed early and treated adequately. This will reduce costs to patients, the health services and the economy.<sup>34, 35</sup>

An effective approach to the management of hypertension involves, in addition to taking medication the promotion of a healthy lifestyle for all South Africans. The prevention of hypertension should include eating more fruit and vegetables and less salty food, using less

alcohol, and achieving and maintaining normal body weight. Regular exercise and no smoking will also be beneficial<sup>34,35</sup>.

Hypertension is a global challenge which ranks third as a cause of disability- adjusted life-years (DALYS).<sup>38</sup> According to the seventh report of the Joint National Committee on Hypertension (JNCH), there are approximately 50 million hypertensive individuals in the United States alone and one billion worldwide<sup>39</sup>. Indeed estimates indicate that up to three-quarter of the world's hypertensive population will be in economically developing countries by the year 2025<sup>38</sup>.

Studies worldwide indicate that despite the availability of effective medical therapy, over half of all hypertensive do not take any treatment<sup>41</sup> and more than half of those on treatment have blood pressures over the 140/90 mmHg thresholds<sup>41</sup>. The World Health Organization (WHO) describes poor adherence as the most important cause of uncontrollable blood pressure and estimates that 50 – 70% of people do not take their antihypertensive as prescribed<sup>42</sup>.

It has been well documented that uncontrollable blood pressure increases the risk of ischaemic heart disease three- to four-fold<sup>44</sup> and overall cardiovascular risk by two- to three-fold<sup>45</sup>. The incidence of stroke increases approximately three-fold in patients with borderline hypertension and approximately eight fold in those with definite hypertension.<sup>45</sup> Moreover a recent case control study has shown that non-adherence to therapy is associated with risk of stroke in patients with hypertension<sup>46</sup>

## **Complications of hypertension**

The long term effects of uncontrolled hypertension are evident in a number of end organs: the heart, the kidneys, the blood vessels, the brain and the eyes. Elevated blood pressure puts a strain on the heart, which leads to weakening of the heart muscle and eventual development of heart failure. Aneurysms are formed in arteries, common sites being the aorta; arteries in the brain, legs, intestines; and the artery leading to the spleen, Arteries to the kidneys narrow which may in the long run cause kidney failure, while arteries throughout the body develop atherosclerosis. That may contribute to myocardial infarction (heart attack), stroke or kidney failure. Blood vessels in the eyes may burst or bleed, which may cause changes in vision and result in blindness.

## **2.2 HIV/AIDS**

South Africa is the country with the largest number of people infected with HIV, with an estimate 5.7 million people living with HIV and AIDS in South Africa in 2009. <sup>48</sup> It is believed that in 2008, over 250,000 South Africans died of AIDS<sup>48</sup>. National prevalence is around 11%, with some age groups being particularly affected. Almost one in three women aged 25-29, and over a quarter of men aged 30-34 are living with HIV <sup>49</sup>. HIV prevalence among those aged two years and older also varies by province with the Western Cape (3.8%) and Northern Cape (5.9%) being least affected, while Mpumalanga (15.4%) and Kwazulu Natal (15.8%) had the highest levels. The overall HIV prevalence rate among adults was 18%.

The HIV epidemic has had a devastating impact on sub-Saharan Africa which contains four countries with the world highest HIV prevalence (Swaziland, South Africa, Lesotho and

Botswana).<sup>49</sup> The quality of life for people living with HIV infection is progressively improving; however, optimal adherence to ARVs is essential for better well-being and increased life expectancy of HIV infected individuals accessing treatment and to reduce transmission of HIV.

Poor adherence to ARVs can lead to HIV disease progression, evolution of drug resistance and subsequent immunological and clinical failure<sup>50, 51</sup> Adherence to antiretroviral therapy is essential for maximal suppression of viral replication and is believed to be the initial determinant of long term survival among HIV - infected individuals<sup>52, 53</sup>. Non-adherence to these medications can greatly lower their effectiveness, through development of resistance resulting in poor therapeutic outcomes.<sup>50, 51</sup> More than 95% of the prescribed ARV treatment doses should be taken for optimal response, and lesser adherence is often associated with virological failure<sup>54</sup>. Recent studies demonstrate that HIV infected individuals who adhere to ARVs have viral loads reduced to levels so low that HIV transmission is dramatically reduced or eliminated<sup>55</sup> Administration of ARVs imposes constraints on the daily schedule and lifestyle of the individual and it can be difficult for individuals to adapt to these demands, especially on a long term basis.

Previous studies in Tanzania on other diseases have indicated that patients often do not have enough knowledge and/or do not remember how to use various prescribed medicines, contributing to their irrational use.<sup>56,57</sup> This has also been observed in settings where ARVs are used; for example, in a previous study in Botswana, 54% of patients reported optimal adherence (defined as completing greater than or equal to 95% of prescribed doses) and 56% were seen as achieving optimal adherence on the basis of provider assessment.<sup>59</sup> The main factors affecting ARV use in Botswana were structural, disease-related and treatment-related

factors, and socioeconomic and cultural factors. For instance, patients lacked funds and had to travel long distances to the clinics providing ARVs. If cost was eliminated as a barrier, then the adherence rate was predicted to increase to 74%<sup>59</sup>

The Botswana Government has taken several initiatives to improve adherence, including increasing access to ARVs in the public sector, improving the distribution of ARVs, increasing the availability of clinical and laboratory monitoring, and strengthening health infrastructure for delivering care. The role of socio demographic characteristics, such as gender, race, age, exposure category and educational level as predictors of adherence has produced largely inconsistent results.<sup>59</sup>

The tendency to ascribe low adherence to (often deprived) social groups is a well-established trend in the general literature, dating back to 1990 when tuberculosis control exercised the minds of public health officials.<sup>60</sup> However, as later experience with antibiotics demonstrated, low adherence is not restricted to certain social classes but is widespread and unpredictable. Research in the HIV field supports this perspective. Moreover adherence rates vary not just between individuals but also for the same individual over time.<sup>61</sup> Adherence is therefore best thought of as a variable behavior rather than as a constant characteristic of an individual. Most people will exhibit low adherence some of the time.<sup>59</sup>

Psychological factors, including mental health problems such as depression, have been associated with low adherence in HIV-infected adults and adolescents, as have other psychological variables such as perception of one's ability to follow a medication regimen, or self-efficacy.<sup>62-64</sup> Beliefs about health and illness, in particular about the necessity of

medication to ward off illness and concerns about potential adverse events, have been found to be influential in both HIV and other disease areas.<sup>59</sup>

### **Complication of HIV/AIDS**

- **Tuberculosis (TB):** In resource-poor nations, TB is the most common opportunistic infection associated with HIV and a leading cause of death among people living with AIDS. Millions of people are currently infected with both HIV and tuberculosis, and many experts consider the two diseases twin epidemics.
- **Salmonellosis:** This bacterial infection is contracted from contaminated food or water. Symptoms include severe diarrhea, fever, chills, abdominal pain and, occasionally, vomiting. Although anyone exposed to salmonella bacteria can become sick, salmonellosis is far more common in people who are HIV-positive.
- **Cytomegalovirus (CMV):** This common herpes virus is transmitted in body fluids such as saliva, blood, urine, and semen and breast milk. A healthy immune system inactivates the virus, and it remains dormant in the body. When immune system weakens, the virus resurfaces — causing damage to the eyes, digestive tract, lungs or other organs.
- **Candidiasis:** Candidiasis is a common HIV-related infection. It causes inflammation and a thick white coating on the mucous membranes of the mouth, tongue, esophagus or vagina. Children may have especially severe symptoms in the mouth or esophagus, which can make eating painful and difficult. Oesophageal candidiasis is an AIDS-defining illness
- **Cryptococcal meningitis:** Meningitis is an inflammation of the membranes and fluid surrounding your brain and spinal cord (meninges). Cryptococcal meningitis is a common central nervous system infection associated with HIV, caused by a fungus that is present in soil. It may also be associated with bird or bat droppings.

- **Toxoplasmosis:** This potentially deadly infection is caused by *Toxoplasma gondii*, a parasite spread primarily by cats. Infected cats pass the parasites in their stools, and the parasites may then spread to other animals. Patients who are immune depressed due to HIV infection are prone to severe toxoplasma infections.
- **Cryptosporidiosis:** This infection is caused by an intestinal parasite that is commonly found in animals. A person contracts cryptosporidiosis through ingestion of contaminated food or water. The parasite grows in the intestines and bile ducts, leading to severe, chronic diarrhea in people with AIDS.

### **2.3 Diabetes Mellitus**

**Diabetes mellitus**, often simply referred to as **diabetes**, is a group of metabolic diseases in which a person has hyperglycemia, either because the body does not produce enough insulin, or because cells do not respond to the insulin that is produced. This hyperglycemia produces the classical symptoms of polyuria, polydipsia and polyphagia.

There are three main types of diabetes:

- Type 1 diabetes: results from the body's failure to produce insulin, and presently requires the person to inject insulin.
- Type 2 diabetes: results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency.
- Gestational diabetes: is when pregnant women, who have never had diabetes before, have a high blood glucose level during pregnancy. It may precede development of type 2 DM.

Other forms of diabetes mellitus include congenital diabetes, which is due to genetic defects of insulin secretion, cystic fibrosis-related diabetes, steroid diabetes induced by high doses of glucocorticoids, and several forms of monogenic diabetes.

Globally as of 2010 there were an estimated 285 million diabetic people, with type 2 making up about 90% of the cases.<sup>65</sup> The incidence of type II diabetes mellitus is increasing rapidly, and it is estimated that by 2030, this number will almost double.<sup>66</sup> Diabetes mellitus occurs throughout the world, but is more common (especially type 2) in the more developed countries. The greatest increase in prevalence is, however, expected to occur in Asia and Africa, where most patients will probably be found by 2030.<sup>66</sup>

The increase in incidence of diabetes in developing countries follows the trend of urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet. This has suggested an environmental (i.e., dietary) effect, but there is little understanding of the mechanism(s) at present, though there is much speculation, some of it most compellingly presented.<sup>66</sup>

The risk for developing type 2 diabetes increases with age. It also increases in people who are overweight or obese, in people who follow a sedentary lifestyle and in Africans who have been living in the city for a long time<sup>67, 68</sup>. Because of the increase in risk factors, diabetes rates in developing populations are also increasing, and this is a global phenomenon that is expected to continue<sup>67, 68</sup>.

Diabetes rates vary among the South African population groups. In 2000, in people older than 30 years, the highest rate was recorded among Indians, where 18% of men and 16% of women had diabetes. The rates found in the coloured and white groups were the same, with

5% of men and 7% of women having diabetes and for the African population those living in rural areas had a rate of 3% and those in the cities a 6% rates<sup>69</sup>.

It has been estimated that there are about 1.5 million South Africans with diabetes<sup>69</sup>. In 2000, diabetes caused 3% of deaths among men and 6% of deaths among women 30 years and older<sup>69</sup>. Diabetes is the most common cause of leg amputations and blindness among South Africans. It also contributes to renal failure that requires dialyses and kidney transplants<sup>69</sup>. Many people with diabetes are undiagnosed or treated inadequately, and consequently have many complications. Early diagnosis and good diabetes care can prevent many of these severe complications.<sup>70-72</sup>

Recently the Diabetes Strategy for Africa was launched, which calls upon governments, non-government organisations and industry to implement this integrated approach to reduce the burden of diabetes in Africa<sup>73</sup>. Key elements of the strategy include supporting the patients to follow a healthy lifestyle with physical activity, a healthy diet and no smoking, teaching them to monitor their blood glucose levels, to use their medication correctly, particularly if they need to inject themselves with insulin, to look after their feet adequately to ensure that ulcers are prevented or treated early, to make sure that their eyes are regularly checked, and to encourage them to recognize and act appropriately on signs of having too high or too low blood glucose levels.<sup>73</sup>

Type 2 diabetes can be predicted by age and obesity, so a dramatic rise in the incidence of this disorder in South Africa is expected as a consequence of increases in life expectancy and obesity, and continued physical inactivity, following trends similar to those in the USA. The percentage of U.S. adults who are obese (i.e., body mass index [BMI] 30 kg per m<sup>2</sup> or more) has grown from 11.6 % in 1990 to 21% in 2001.<sup>74</sup> The percentage of U.S. adults who are not

engaging in any regular physical activity has held steady at about 30%, with another 45% who are below the recommended levels of physical activity.<sup>74</sup> From 1997 to 2000, the prevalence of diagnosed diabetes in the United States increased by 12%, to 4.5%, with the Centers for Disease Control and Prevention (CDC) estimating that one third of cases are not diagnosed.<sup>75</sup>

The percentage of overweight children in this country has increased from 6.5% in 1978–1980 to 15.3% in 1999–2000<sup>76</sup>. With evidence of obesity-related impaired glucose tolerance in children as young as six years and overt type 2 diabetes in children as young as eight years.<sup>77</sup>

The Nurses' Health Study found that BMI was a powerful predictor of diabetes onset in middle-aged female nurses, with diet and exercise predicting diabetes risk even within each category of BMI.<sup>78</sup>

Evidence now demonstrates that changes in diet and physical activity can prevent or delay diabetes and its complications<sup>79-81</sup> Evidence level A (from randomized controlled trials, RCT) supports the effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance.<sup>82</sup> After intensive multi-year treatment of adult “pre-diabetics,” with a focus on diet and increased physical activity, large multisite studies in three countries have found that development of overt diabetes decreased by 32 to 58 percent, compared with usual care  
79-82

The term “pre-diabetics” describes participants in these studies who had impaired glucose regulation<sup>83, 84</sup> and participants with impaired glucose regulation who were overweight

#### Complications of diabetes mellitus

All forms of diabetes increase the risk of long-term complications. These typically develop after many years (10–20), but may be the first symptom in those who have otherwise not

received a diagnosis before that time. The major long-term complications relate to damage to blood vessels. Diabetes doubles the risk of cardiovascular disease.<sup>85</sup> The main "macro vascular" diseases (related to atherosclerosis of larger arteries) are ischemic heart disease (angina and myocardial infarction), stroke and peripheral vascular disease.

Diabetes also causes "micro vascular" complications—damage to the small blood vessels<sup>87</sup> Diabetic retinopathy, which affects blood vessels in the retina of the eye, can lead to visual symptoms, reduced vision, and potentially blindness. Diabetic nephropathy, the impact of diabetes on the kidneys, can lead to scarring changes in the kidney tissue (diabetic glomerulosclerosis), loss of small or progressively larger amounts of protein in the urine, and eventually chronic kidney disease requiring dialysis.<sup>86</sup> Diabetic neuropathy is the impact of diabetes on the nervous system, most commonly causing numbness, tingling sensation and pain in the feet and also increasing the risk of skin damage due to altered sensation. Together with vascular disease in the legs, neuropathy contributes to the risk of diabetes-related foot problems (such as diabetic foot ulcers) that can be difficult to treat and occasionally require amputation.

## **Chapter 3: The present study.**

### **3.1 Problem statement**

A comprehensive study of ARV, anti-hypertensive, and anti-diabetics adherence and possible factors facilitating or constraining adherence to ART, anti-hypertensives, and anti-diabetics in South Africa has not yet been attempted. Elsewhere, studies in other countries have described a range of factors affecting adherence ARV, anti-hypertensives and anti-diabetics treatment at various levels, including individual, community and health facility levels<sup>59, 64</sup>. These factors can be broadly grouped into three categories: structural factors, disease and treatment factors, and social and economic factors.

The structural factors include inadequate support services, limited accessibility of treatment, and long distances to the health facility, lengthy waiting times, and the attitudes and quality of care of the health care staff. The disease and treatment factors include the seriousness of the disease, adverse drug reactions, and side effects. The socioeconomic factors include poor patient knowledge and information, illiteracy, lack of social support, poverty, misconceptions about these conditions, and communication barriers between patients and doctors/care - givers.

The increasing number of patients on treatment for the three conditions in South Africa necessitated the present study as a step towards understanding what factors may affect adherence to anti-retrovirals, anti-hypertensives or anti-diabetic medication in the South African context.

The study aimed to establish the adherence patterns and the factors contributing to adherence to treatment by diabetic, hypertensive and HIV/AIDS patients at Mokopane Hospital. The

level of information given by health professionals on efficacy, side effects and drug usage to the patients was also assessed.

### **3.2 Hypothesis.**

Poor knowledge or lack of understanding of the disease condition leads to poor adherence in patients on treatment for the three conditions (diabetes mellitus, hypertension and HIV/AIDS).

### **3.3 Research Questions.**

1. How well do patients on chronic medications (ARV's, anti-hypertensive's, anti-diabetics) adhere to treatment?
2. What factors contribute to adherence and/or non-adherence to prescribed medication by patients on chronic medication for three diseases namely: diabetes, hypertension, and HIV/AIDS at Mokopane Hospital?

### **3.4 Objectives of the Study.**

The objectives of the study were:

- To determine what information is given to patients regarding their illness and medication;
- To determine if the patients understood the instructions given to them by the health professionals, and
- To identify the factors that promote adherence to treatment among patients on (diabetes, hypertension, and HIV/AIDS) chronic medication

## **Chapter 4: Methodology.**

### **4.1 Study design**

This was a cross-sectional, descriptive study, using a quantitative method to investigate the factors affecting adherence in patients taking chronic medications at Mokopane hospital. The study tool was a structured questionnaire administered as an exit interview at the pharmacy after the patients had consulted the doctor and received their medication at the pharmacy. The questionnaire was administered over a period of two consecutive months where every participating patient was included only once using the hospital numbers to avoid repetition. Systematic sampling was used taking every third person from the relevant clinics on Monday, Tuesday and Thursdays. This strategy was used to avoid disruption of service delivery at the pharmacy where the exit interview took place.

### **4.2 Study site**

Mokopane Hospital is a regional hospital situated in the Waterberg District at Mokopane in Limpopo province. The hospital is built to accommodate 376 beds, but at the time of the study had 266 usable beds. There are 10 wards, one main pharmacy, and one ARV pharmacy. Mokopane Hospital had a staff of 60 doctors (comprising of specialists, Medical officers, doctors on community services and intern doctors), 362 nursing staffs and 16 pharmacy personnel. The hospital supplies 14 clinics (9 fixed clinics and 5 mobiles clinics), and serves approximately 7000 patients per months. Mokopane Hospital receives referred patients from George Masebe Hospital and Voortrekker Hospital. The majority of the patients using the facility were from the surrounding rural areas, and the nearby mines.

### **4.3 Study Population.**

The study involved patients with prescriptions from the Diabetic, Hypertensive and Wellness (HIV) clinics at Mokopane Hospital. Empirical observation suggested that at least 300 patient on ART, at least 50 on anti-diabetics and at least 150 on anti-hypertensive were seen every week at Mokopane Hospital and this study aimed to include at least 10% of each group.

The population consisted of patients on treatment for the three conditions i.e. HIV/AIDS, hypertension, and diabetes mellitus (aged 15 - 87 years).

### **4.4 Data Analysis**

The data was captured onto an Excel spreadsheet from which summary statistics were generated. Association between different variables, for instance age and adherence, was tested by the Chi-square test, with  $P < 0.05$  as the limit of significance. SPSS (version 18) software package was used for the analysis.

### **4.5 Inclusion criterion**

The study included male and female patients from 15 years to 87 years, presenting with prescriptions for ARVs, anti-diabetic or anti-hypertensive medication.

### **4.6 Exclusion criteria**

Those who were not willing or refused to participate in the study and patients younger than 15 years were excluded.

## Chapter 5: Results

### 5.1. Gender Distribution

There were 307 respondents, of whom 201 (65%) were on ARVs (n=153, 76% were females and 48; 24% were males), 48(16%) were on anti-hypertensives, (n=38, 79% were female and n=10, 21% were males), 35(11%) were on anti-diabetics (n=29, 83% were females and 6, 17% were males), and 23(8%) were on both anti-hypertensives and anti-diabetics, (14, 61% females and 9, 39% males). Thus all the conditions, there were more females than males as summarized in table 5.1.

**Table 5.1 Gender distribution per condition**

	ART	HPT	DM	HPT/DM
M	48 (24%)	10 (21%)	6 (17%)	9 (39%)
F	153 (76%)	38 (79%)	29 (83%)	14 (61%)
Total	201(65%)	48 (16%)	35 (11%)	23 (08%)

### 5.2 Age range

The average age and age range per condition are summarized inTable 5.2 below

**Table 5.2 Average age and age range per condition**

	ART	HPT	DM	HPT&DM
Age range	21-67	26-74	25-81	44-84
Average	44	50	53	64

Patients on ART were relatively younger than the other groups, while those on a combination of anti-hypertensives and anti-diabetics were the oldest of the four groups.

## 5.3 Drugs

### 5.3.1 ART Drugs

The distribution of respondents by drug regimen type is shown in Table 5.3. Of the 201 respondents who were on ARV treatment, 146 (73%) respondents were on regimen 1A and 43 (29%) of them were taking their ARV's with co-trimoxazole. Another 43 (21%) respondents were on regimen 1B and only 12 (27%) were concurrently taking co-trimoxazole, 10 (5%) were on regimen 1A mixed which are labeled below as 1C and 6(3%) respondents were on co-trimoxazole. Two (n=2, 1%) respondents were on regimen 1D.

**Table 5.3 Distribution of patients on different ART regimen**

Regimen				Number of patients
1A	Stavudine 30mg	Lamivudine 150 mg	Efavirenz 600mg	146 (73%)
1B	Stavudine 30mg	Lamivudine 150mg	Nevirapine 200mg	43 (21%)
1C	AZT 300mg	Lamivudine 150mg	Efavirenz 600mg	10 (5%)
1D	AZT 300mg	Lamivudine 150mg	Nevirapine 200mg	2 (1%)

### 5.3.2 Hypertension drugs

The first line treatment of hypertension (South African Standard treatment guidelines) is the use of thiazide diuretics (e.g. hydrochlorothiazide), with angiotensin-converting enzyme

inhibitors and calcium channel blockers as second line treatment of hypertension. Of the 48 respondents who were taking anti hypertensives 52% of them were on hydrochlorothiazide and perindopril, 13% were on hydrochlorothiazide only, 7% on perindopril only, 13% on nifedipine and hydrochlorothiazide and 13% were on hydrochlorothiazide, perindopril and nifedipine.

### **5.3.3 Anti Diabetics drugs**

Among the 35 respondents on anti-diabetic treatment (21) 60% were on metformin and gliclazide, 26% (n=9) were on metformin only, 11% (n=4) were on metformin and glibenclamide, and only one (3%) was on insulin (actraphane).

### **5.4 Drug information**

Ninety six percent (96%, n=295) of all respondents stated that they knew what the medication was for, while 4% (n=12) said they did not know what the medicine was for. Only (111) 36% of the respondents indicated that they knew the side effects of their medications, 62% of all respondents said they did not know any side effect of their medication, while 2% were not sure what side effects were.

#### *How to open packet of own medications and the storage of conditions*

Among 307 respondents, 99.35% knew how to open their packet or container of medication, while only 0.65% which did not know how to do so. All the 307 respondents were aware of how to store their medication but when it came to who told them how to store the medication, 0.65% said they used common sense, 1.95% said they were told by the nurse, 3.58% said

they heard it from the radio, 8.47% cited the source as a relative, 25.08% said they read the patient information leaflet, 26.38% said that they heard it from the doctor and 30.94% said they were told by the Pharmacy personnel

#### *What makes it easy to take medications*

Eighty two percent (82%) of the respondents reportedly used an alarm system/timer as reminder to take their medication, 2.3% said what reminded them to take the medication was when they felt sick, 1.3% said they were reminded after eating, 3.9% said they relied on their relatives to help them remember to take their medication, and 10.4% said that they simply knew when it was time for medication, no one reminds them.

#### *Taking medicines before or after meals*

Among the 307 respondents 94.79% said they took the medication after meals and 5.21% said they took their medication before meals. The reasons for the respondents taking their medications before or after meals varied, 1.3% said they just did for no reason at all, 0.33% said they wanted to have energy, 0.33% said that was the pharmacist's instruction, 3.26% said they avoid things like feeling drowsy and vomiting, 4.23% said they did so to comply well to prescription, 86.97% said they did so as per Doctor's instruction.

#### *Frequency of administration, and understanding the label*

All the 307 respondents knew the frequency of administration of their medication and also the duration, only 0.98% of the respondents did not understand what was written on their labels but the rest (99.02%) of respondents knew or understood what their medication label

said. This information contributes to ensuring that the respondents will take their medication as per label instruction.

#### *Waiting time, doctor's question and what is the medication for*

Among the 307 respondents, 39.7% had waited 1 hour or less for the service, 45.9% waited two to three hours for the service and 14, 3% waited for three to six hours for their service. 95.1% of respondents were asked a question by the doctor and while 4.9% were not asked anything by the doctor. The latter just got their renewed script and left for medication at the pharmacy. in a scenario where the patients received their prescription without talking to the doctors about how they were feeling and they were coping with treatment, or making any progress. That may not only jeopardize the trust implied in the doctor patient relationship, but it may also affect adherence to medication

### **5.5 Source of Information on storage of medication**

Ninety eight respondents (n=98;32%) got the information about storage of medicine from the pharmacist, 81(26%) respondents from the doctor, 76 (25%) respondents they said they used common sense, 24 (8%) got the information from the member of the family, 12 (5%) respondents got the information from the radio, 7 (2%) respondents got the information from a friend and 7 (2%) respondents got the information from the nurse.

### **5.6 Adherence**

More than three quarter (n=233, 76%) of the respondents said that they knew the consequences of defaulting on their treatment and 24% (n=74)said they did not know what would happen if they defaulted on their treatment. Furthermore, 81% of the respondents said

they never missed to take their treatment as prescribed, while 19% indicated that they had forgotten to take their medication at least once in the previous month. Forty two (n=42, 21%) of the respondents taking ARVs indicated that they missed a dose at least once in the previous month, while 159 (79%) said they never missed any dose; By comparison 15 (31%) of those on anti-hypertensives said they missed a dose in the previous month while 33 (69%) said they never missed, 10 (28%) of those taking anti-diabetics had missed a dose in the previous month while 25 (72%) said they never missed. Among those on both anti diabetics and anti hypertensive's 8 (34%) said they missed a dose in the previous month and 15(66%) said they never missed. The differences in the adherence between the different treatment groups were not statistically significant (P=0.316)

Among the younger patients (from 15-40 years) only 15% forgot to take treatment in the previous month, while for the older ones ( 41-87 years) 21% of the participants forgot to take medication in the last month. The difference between the two age groups was not statistically significant (P>0.1). Among the respondents on ART, who missed a dose of their medication, most gave the reason that they were not at home at the time of missing the medication. Most of the respondents knew how to store their medicine, out of reach of children.

The highest percentage of respondents who missed a dose of a prescription was among those taking a combination anti-diabetic medication and anti-hypertensive (34%) followed by those taking anti-hypertensive (31%), anti-diabetics (28%) and those on ART had the lowest rates (21%). The respondents who were taking both anti-diabetics and anti-hypertensive were on average older than the groups on ARVs and those on anti-hypertensive alone. This shows that the elderly were less likely to adhere to the treatment compared to the younger respondents.

Ninety five percent (95%) of the respondents said that they took medication after meals as per doctors' prescription, 90% of the respondents knew how long they were going to take the medicine and when asked for how long they stated that they would take it for the entirety of their life. The majority of the respondents (82.1%) reportedly used an alarm system/timer as reminder to take their medication; and 97% of the respondents reported that they had received information regarding their condition and medication, though 50% of the respondents were not sure of the side effects of their medications.

## Chapter 6: Discussion, conclusion and recommendations

### 6.1 Discussion

Three hundred and seven (307) respondents on ARV, anti-hypertensives, and anti-diabetics were interviewed at Mokopane Hospital for this study. This research lays the groundwork for future quantitative and qualitative studies, and should contribute to future interventions aimed at improving adherence.

Many developing countries have a limited budget allocated to health care especially for drug procurement.<sup>88, 89</sup> Therefore it is imperative to optimize expenditures for drug purchases by selecting an essential drug list and promoting the rational use of drugs. Essential drugs are selected to fulfill the real needs of the majority of the population in diagnostic, prophylactic, therapeutics and rehabilitative services using the criteria of risk-benefit ration, cost-effectiveness, quality, administration as well as patient adherence and acceptance.<sup>88-91</sup>

The facility involved in the present study, Mokopane Hospital, is a public facility and had all first-line and second line ART, anti-hypertensive and anti-diabetics according to the South African national guidelines.<sup>34</sup> Medicines to prevent opportunistic infections were available for the patients on ARVs and the facility used mostly generic medicines not patented medicines.

#### *Missing a dose*

From the literature it is clear that sub-optimal adherence is a widespread problem.<sup>50, 51, 61, 68</sup> Internationally, estimated rates of sub-optimal adherence to ART range from 10%-92% with an average of 50%, while reports of optimal adherence (usually defined as taking 80% or more of the prescribed regimen) range from 25%-85%.<sup>91</sup> However, in patients on ART, 80%-

90% adherence has been associated with failure to achieve complete viral suppression in 50% of patients.<sup>92</sup> So it is strongly advised that individuals on an antiviral regimen not miss any doses of their medications, which is not always achievable. In the present study, 21% of patients on ART, 31% of those on anti-hypertensives and 28% of those on anti-diabetics did not adhere to their treatment (by missing at least one dose in the month prior to the study). Those figures are comparable to findings from elsewhere, as cited above.<sup>23, 25, 7, 91, 92</sup> Reasons given by our respondents for missing doses included just forgetting to take the medication and leaving town without the medication. Ideally when a dose is missed, the patient should contact his or her physician without delay to discuss the course of action. The options in this situation are to take the missed doses immediately or simply resume the drugs with the next scheduled dose. Gaps in adherence call for supportive action, including continuing patient education, and the support of family and friends.<sup>7, 30, 31</sup> At the time of the study there was no specific adherence support protocol or procedure at Mokopane Hospital.

Patients who are stigmatized may avoid taking their medicines in the presence of other people.<sup>7, 24</sup> If this situation continues (for example, when patients have to attend large traditional funerals which usually last for several days), it is likely to have an impact on adherence.<sup>93-94</sup> Eighty six percent (86%) of the respondents in the present study gave the reason for missing the dose as not being at home; this might be related to the stigma and discrimination still associated with ARVs making patients reluctant to take their medications along when they travel for fear of being found out. Although HIV-related discrimination and stigma has been (and still is) vigorously addressed in South Africa, there remains a lot of secrecy around HIV/AIDS which many contribute to poor adherence when patients on ART find themselves in situations (such as funerals and family gathering) where they do not have enough privacy.<sup>103, 104</sup> Although every missed dose increases the chance that

the virus will develop resistance to the drugs, a single missed dose should not be cause for alarm. On the contrary, it is an opportunity for the patient to learn from the experience and determine why it happened, if it is likely to happen again, and what can be done to minimize missing future doses.<sup>7, 95</sup> Furthermore, if a patient cannot resume medication for a limited time such as in a medical emergency, there still is no cause for alarm, though caution needs to be taken in re-introducing the treatment to ensure no further interruptions.<sup>95-96</sup> Under such circumstance, the patient should work with their HIV service provider to restart therapy as soon as is feasible.<sup>95, 96, 106</sup> Stopping antiviral is associated with some risks of developing drug resistance, and those who wish to stop therapy for any one of a number of reasons should discuss this with their health-care provider in advance to establish the best strategy for safely accomplishing this.<sup>95, 96, 106</sup> In this study, 42 patients (21%) missed a dose, which gives an adherence rate of less than 80%, below the threshold for optimal adherence, which further emphasizes the need for supportive action to improve adherence among these patients. It was however not established to what extent the individual patient (among the 21%) were non-adherent during the past one month and even earlier.

The main challenge with uncomplicated hypertension is the fact that it occurs without any symptoms, hence the label “silent killer” as it can progress to develop any one or more of the several potentially fatal complications of hypertension such as heart attacks or strokes.<sup>44, 45</sup> Almost fifty percent of those who are hypertensive are unaware of their problem.<sup>97-98</sup> Patients who are taking treatment without any symptoms are likely not to take the medication until complications develop.<sup>97, 98, 105</sup> Whereas the presence of symptoms is a good thing in that it can prompt patients to consult a doctor for treatment and make them more adherent in taking their medications, in the context of hypertension symptoms may indicate late complications.<sup>38, 39</sup> Patients should therefore be encouraged to take their medication

regardless of symptoms. Much of the damage caused by hypertension can be prevented if diagnosed early and treated adequately. This will reduce the costs to patients, health services and the economy.<sup>99-100</sup>

#### *Knowledge on indications for the medication and any alternative(s) to the medication*

It was one of the objectives of the present study to establish the information given to the patients. Ninety six percent (96%) of the respondents were informed of their condition, though 24% of the respondents did not know the consequences of defaulting on their treatment, while 76% of the respondents knew the consequences of defaulting on their treatment. Mokopane Hospital as a referral hospital has a large number of patients to attend to in the various clinics. That may translate into short individual consultations times per patient, which may explain why 4% of respondents did not know their condition, and 24% had not been counseled on the consequences of defaulting on their treatment. It has to be appreciated that it is not easy for a person to take medication for an unknown condition, more especially chronic medication when they do not know why they are taking it; hence all effort should be made to counsel the patient's properly.<sup>7</sup> The present study therefore points to a gap in patient education on aspects of their medication that needs to be addressed to ensure optimal adherence.

#### *Drug information*

Information given to respondents is reportedly a major influence on increased or decreased adherence.<sup>5, 6, 9</sup> Patients sometimes have difficulty understanding health care information. Studies by Ley<sup>101</sup> and others have shown that patients are often unfamiliar with health information due to complex concepts and words. This is, in part, caused by the tendency of health professionals to use the same technical terminology and complex sentence structures in

communicating with patients that they use in communicating with their professional peers.<sup>9</sup> Another reason is the inherent complexity and uncertainties involved in the topics being discussed. As a result, health professionals may qualify statements and speak in broad generalizations to patients who want specific information that applies to them, personally.<sup>101</sup>

Gazmararian et al<sup>102</sup> reported, in a study of 3260 enrollees in a national managed care organization in the United States that 23% of the English-speaking and 34% of the Spanish-speaking respondents could not adequately read and comprehend medical information in their spoken languages. They also found that these problems were especially prevalent among minority, low income and low education populations.<sup>102</sup>

In this study the information given to patients on their visit was assessed, and questions were also asked in the exit interviews. In particular, patients were asked whether health workers provided them with information about how the medicines work; how to administer the medicines; if they knew how long they were going to take the treatment; what side effects or adverse drug effects could occur; if they have missed to take their medication once in the last two months, how to store their medication and who told or advise them on the storage conditions.

Gaps were identified on the issue of side effects, and yet side effects are often the reason patients abandon their treatment.<sup>10</sup> Those that understood the importance of taking their medications regularly devise strategies such as such as setting the alarm as a reminder of when to take their medications.<sup>7</sup> Researchers have found that the relationship between information given to the patient and the extent to which instructions are followed is not always strong. Information alone does not seem to affect the degree to which patients follow

recommendations given by health professionals. Situational, personality, or socioeconomic factors often play a more important role in the extent to which patient follow recommendations than do the knowledge and understanding about what they are to do.<sup>22</sup>

The counseling and information given to the respondents at the facility was apparently inadequate given that 62% of the respondents stated that they did not know the side effects of their medication. Only 32% of the respondents said they got the information about the storage of medicines from the pharmacist, 25% said they used common sense. A situation where only 32% of the respondents get drug-related information from the pharmacy personnel is worrisome, since the patients may get the information about the use of medication from non-health professionals. The heavy burden of the healthcare workers, who are usually overworked, might be the reason for not giving quality counseling to their patients, and this could partly explain the perception by patients of health care workers as rude. This clearly shows that patients are able to take information from different individuals as long as they trust that particular individual. This may also have an effect on adherence because patients tend to follow the instruction from the people they trust.

The responses from the respondents who were reminded to take their medication when they felt sick suggest that they may not be so keen to take medicines when they recover or are no longer feeling sick they will not remember to take the medication and that will affect their adherence. In the group of respondents who said they remembered because of eating, there is a possibility that if their eating patterns change, the way they are taking their medication will also change and this will affect their adherence.

These responses by the respondents show that patients received different information from different individuals and that some seemed not to have any knowledge on why they were

supposed to take medication before and after meals. This lack of information from some of the respondents about why they had to take their medication in a particular way raises a concern as this may affect adherence if patients are not sure of the approach to their treatment.

## **6.2 Conclusion**

In this study many of the respondents who missed at least one dose, did so because they were not at home, which shows the reluctance to take the medication with them when they visit other places, a sign that they do not want other people to know/see that the respondent is taking treatment. Efforts to minimize constraints and improve adherence levels will require a focus on community, health workers and patient levels as well as government commitment to resolve stigmatization by implementing more awareness campaigns. Other barriers to adherence include communication difficulties which may arise from language and cultural differences, or as demonstrated in this study, due heavy workloads leading to short consultations times.

The patient and provider ought to work together to address these barriers at the patient level, while the health system can address the barriers at the service delivery level. To optimize treatment of hypertension, diabetes and HIV/AIDS, it is important to form a therapeutic alliance in which patients' doubts and difficulties with therapy can be detected and addressed. For this, effective patient-healthcare worker communication is of vital importance, and yet this is often undermined by the long waiting periods and heavy workloads.

### **6.3 Recommendations**

1. Patient education and counselling about the use of their medication should be done diligently, primarily by the prescriber then the pharmacist and other pharmacy personnel.
2. Health professionals should give full information to the patients about the medicine prescribed to them as well as explain the consequences of defaulting on the treatment.
3. Public hospitals that face heavy workloads need to devise effective ways of providing such patient education, for instance, talks could be given to patients while they are at the clinic waiting to be seen by the doctor, since one on one counselling is often limited by lack of time.

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## Appendix A: Data Collection Tool

Information of Drug usage by the Patients

### Questionnaire

Hospital no.	Age:	Gender:	

**Primary Diagnosis:**

**Any other illness:**

Medication	Dose	Duration	Frequency
1.			
2.			
3.			
4.			
5.			

**Other drugs (except specific for the diagnosis)**

Medication	Dose	Duration	Frequency
1.			
2.			
3.			
4.			
5.			

1. How long did you wait before seeing the doctor?

-----

2. Did the doctor ask you any questions?

Yes----- or No-----

3. Did the doctor tell you about alternatives to your medication?

Yes\_\_\_\_ or No\_\_\_\_

5. Did the doctor tell you the name of the medication?

Yes\_\_\_\_ or No\_\_\_\_\_

6. Do you know what the medication is for?

Yes \_\_\_\_\_or No \_\_\_\_\_

If yes explain

-----  
-----

7. How long will your packet of medication last?

-----  
-----

8. When do you take you medication, before or after meals?

-----

If after meal why?

-----

If before meals why?

-----

9. How many times in a day do you have to take your medicine?

-----

10. If more than once state when?

-----

11. Did anyone tell you what would happen if you miss a dose?

Yes \_\_\_\_\_ or No \_\_\_\_\_

12. Do you know what the common side effects of your Medication are?

-----  
-----  
-----

13. Do you know how many times you need to come to collect your medicinst?

Yes\_\_\_\_ or No \_\_\_\_

14. Have you missed any dose?

Yes ----- or No -----

If yes why \_\_\_\_\_

15. Did the Pharmacist ask you any question?

-----

If yes state -----

16. Did the pharmacist explain to you how to use the medicine, and can you repeat the explanation to me?

Yes \_\_\_\_\_ or No \_\_\_\_\_

17. Do you know how to open package(s) or container(s) with the medicine?

Yes \_\_\_\_\_ or No \_\_\_\_\_

18. Do you understand the labels on the medication package(s) or container(s)?

Yes \_\_\_\_\_ or No \_\_\_\_\_

19. How should you store your medication?

-----  
-----  
-----

20. Who explained to you how to store your medicines?

-----  
-----  
-----

21. What would make it easier for you to take medication as instructed?

-----  
-----

## Appendix B: Data Collection Tool - Sepedi Translation

Tsela ya maleba yeo balwetši ba swanetšego go šomiša dihlarere ka gona

### Diputšišo

Nomoro ya sepetlele	mengwaga	Bong(mona/mosadi)

**Bolwetši bag ago:**

**Malwetši a mangwe:**

Moriana/sehlare	Matla a sehlare	Lebaka le le kakang	Ga kae ka letsatsi
1.			
2.			
3.			
4.			
5.			

**Meriana/dihlare tše dingwe (ntle le tša malwetse a gago)**

Moriana/sehlare	Matla a sehlare	Lebaka le le kakang	Ga kae ka letšatši
1.			
2.			
3.			
4.			
5.			

1. O eme/letile sebaka se se kakang pele o bona ngaka?

-----

2. Ngaka e o botšišitše dipotšešo naa?

Ee----- or Aowa-----

3. Ngaka e o sedimošitše ka mehuta e mengwe ya meriana/ dihlarere ya o alafa bolwetši ba gago naa?

- Ee \_\_\_\_ or Aowa \_\_\_\_
5. Ngaka e o boditše maina/mabitso a meriana/dihlare naa?  
Ee \_\_\_\_ or Aowa \_\_\_\_
6. Obe o tseba gore dihlare/meriane ye e felwa/galafa eng?  
Ee \_\_\_\_\_ or Aowa \_\_\_\_\_  
Ge o tseba, hlalosa  
-----  
-----
7. Naa meriana/dihlare tsa gago ditla fetša nako/lebaka le le kakang?  
-----  
-----
8. Naa o nwa dihlare/meriana ya gago neng? Pele goba morago ga dijo?  
-----  
Ga ele morago ga dijo, lebaka ke eng?  
-----  
Ga ele pele ga dijo, lebaka ke eng?  
-----
9. Naa o nwa dihlare tsa gago ga kae mo letšatšing?  
-----
10. Ga e le gore o fetisa ga tee, efa dinako tsa gonwa?  
-----
11. Naa go na le motho yoo a go hlalošeditšego gore go tl diragala eng ge o ka lebala go nwa dihlare/meriana?  
Ee \_\_\_\_ or Aowa \_\_\_\_
12. Naa o tseba gore dihlare/meriana ya gago e ka hlola mathata /malwetji a mangwe ka thoko?  
-----  
-----
13. Naa o a tseba gore o swanetše go tsea dihlare/meriana ya gago ga kae?  
Ee \_\_\_\_ or Aowa \_\_\_\_
14. Naa o ile wa tshedisa go nwa dihlare/meriana?  
Ee ----- or Aowa -----  
Ge ole bjalo, tse di feng \_\_\_\_\_
15. Naa rakhemisi o go botšisitše diputšiso

-----  
Ge o le bjalo tse di feng-----

16. Naa rakhemisi o go hlalošeditše ka mokgwa woo dihlare/meriana ya gago e berekiswa go ka gona?

Ee \_\_\_\_\_ or Aowa \_\_\_\_\_

17. Naa o kgona go bula dihlare/meriana ya gago?

Ee \_\_\_\_\_ or Aowa \_\_\_\_\_

18. Naa o kwesisa ditaello tšeo di ngwadilego mo?

Ee \_\_\_\_\_ or Aowa \_\_\_\_\_

19. Naa o swanetše o boloke dihlare/meriane ya gago kae??

-----  
-----  
-----

20. ke mang yoo a go hlalošeditšego ka ga go boloka dihlare/ meriana?

-----  
-----  
-----

21. ke eng seo se ka dirago gore o berekise dihlare/meriana ya gago bjale ka ge o laeditšwe?

-----  
-----