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Ministry of Health and Social Services

Namibia Antiretroviral Therapy Adherence Baseline Survey Report

March 2013

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ACRONYMS AND ABBREVIATIONS

3TC	lamivudine
AIDS	acquired immunodeficiency syndrome
ART	antiretroviral therapy
ARV	antiretroviral
AZT	zidovudine
CD4	cluster of differentiation 4
CI	confidence interval
DSP	Directorate of Special Programmes
EDT	Electronic Dispensing Tool
EFV	efavirenz
ePMS	Electronic Patient Management System
FGD	focus group discussion
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HIV	human immunodeficiency virus
MoHSS	Ministry of Health And Social Services
IMAI	Integrated Management of Adult and Adolescent Infections
INRUD	International Network for Rational Use of Drugs
MEMS	Medication Event Monitoring System
MoHSS	Ministry of Health and Social Services
MSH	Management Sciences for Health
NGO	nongovernmental organisation
NVP	nevirapine
PEPFAR	US President's Emergency Fund for AIDS Relief
PIT	pill identification test
PLWHA	people living with HIV and AIDS
SAS	Statistical Analysis System
SEM	standard error of the mean
SMS	Short Message Service
SPSS	Statistical Package for Social Sciences
TDF	tenofovir
TWG	Technical Working Group
VAS	visual analogue scale
UNAIDS	The Joint United Nations Programme on HIV and AIDS
WHO	World Health Organization

DEFINITION OF TERMS

Adherence	For the purposes of this study, adherence refers to the extent to which patients follow the instructions of their health care providers with regard to taking their medicines as measured using either— • The multi-method tool for evaluating adherence; or • Proxy measures of adherence, for example, patients' clinic attendance and antiretroviral (ARV) medicine coverage.
e'Pap	Pre-cooked cereal made from maize, soya, and added nutrients that is recommended for patients with nutrient deficiencies.
MEMS	A special pill bottle with a microchip that records each time a patient removes a pill. The data can then be retrieved into a computer and used to calculate adherence to medication.
Outreach site	A health facility, usually a health centre or a clinic, to which health workers from the district hospital in the respective district travel once or twice a month to provide health services (usually antiretroviral therapy) that are not usually available at that facility.
Pill count	Method of measuring a patient's adherence to a prescribed regimen that involves counting the remaining doses of medication at the end of a given period and assuming that pills remaining in excess of what is expected represent missed doses.
Pill dumping	Occurs when patients intentionally throw away their remaining pills to avoid them being counted by the health care provider.
Self-report	Method of measuring adherence in which the patient voluntarily reports to the health care provider the number of doses of ARVs missed over a given period. The period may be four days, seven days, or one month.
Practical significance	The practical significance of the results was computed if the p-values were statistically significant ($p \leq 0.05$). The effects size gives an indication of the practical significance of the differences between, for example, two group means, one population proportions (frequencies), etc. (Steyn 1999, 3).

EXECUTIVE SUMMARY

The Namibia Antiretroviral Therapy (ART) Adherence and Improvement Initiative is a phased approach guiding the implementation of adherence activities in Namibia over the period May 2011 to April 2013. The approach consists of seven implementation phases of adherence activities. The initiative uses a time-series design integrating three surveys that are being implemented in phase 1, phase 4, and phase 6. Control sites will be used to enable comparison with intervention sites. The Namibia ART Baseline Adherence Survey was the first step in this systematic approach, designed to provide the baseline information required for design of cost-effective interventions.

Baseline Survey Objectives

The aim of this survey was to determine the national baseline information on adherence to ART that would guide the development and implementation of strategies to improve adherence among patients living with HIV/AIDS in Namibia. The survey's broad objectives were as follows—

- Establish baseline facility characteristics with regard to key parameters related to adherence (i.e., medicine pill coverage and appointment keeping) and 12-month patient retention rate on ART
- Establish baseline adherence levels to ART among patients in Namibia
- Identify correlates and determinants of adherence in Namibia (patient, provider, and health system related)
- Identify current adherence interventions and monitoring tools in health facilities
- Based on the findings, conceptualise and recommend evidence-based interventions to improve patient adherence to ART in Namibia

Methodology

The 2011 Namibia Baseline ART Adherence Survey was a patient survey designed to provide information that would guide the development and implementation of strategies to improve adherence among patients living with HIV/AIDS in Namibia. The patient survey carried out a retrospective review of routine patient records in the Electronic Dispensing Tool (EDT)[1] and used the multi-method approach to measure ART adherence in resource-constrained settings (WHO 2003, 5; Hirschhorn et al. 2002).

[1] The EDT captures information on appointment keeping, pill count, changes in regimen, and full dispensing data per visit per patient. The system also allows for monitoring of consumption for each antiretroviral medicine at each facility in Namibia.

For estimating national baseline adherence rates and establishing the patient determinants of adherence using EDT data, all 89,992 patients in the 46 health facilities offering ART in the country as of 30 June 2011 were included in the sample and analysed.

To establish the national baseline adherence rates, patient and facility determinants of adherence using data from the multi-method tool and the Electronic Patient Management System (ePMS) were used, which provided a sample size of 589 patients on ART (twice the size of a simple random sample). The sample size for health facilities was determined by considering the different measurement objectives of the survey.

Survey Implementation

Data collection and entry were conducted by a contracted firm known as the Survey Warehouse. Field staff were trained between 15 and 25 March 2011, followed by refresher training sessions conducted on 20 and 21 April and 7 May 2011. Data collection began 9 May 2011 and ended 1 July 2011. The Survey Warehouse coordinated supervision of the fieldwork. Quality control was ensured by periodic field visits and spot checks by three technical supervisors from the Ministry of Health and Social Services (MoHSS) and Management Sciences for Health (MSH) who validated the approach and the data collection process.

Data Analysis

Descriptive statistical analysis was accomplished using the Statistical Analysis System (SAS; SAS System for Windows, Version 9.1, 2002-2003) statistical software for the EDT and primary data collected from the field. Data were presented as proportions (percentages) and averages that were displayed in tables.

The student's t-test was used to assess whether differences in proportions in the values for the standard International Network for Rational Use of Drugs (INRUD) indicators for the various regions were statistically significant at a 95 per cent confidence interval (CI) and $p < 0.05$.

Adherence estimates by the multi-method approach were established and recorded as high, moderate, or low. A chi-square (χ^2) statistic was used to investigate whether distributions of categorical variables differed from one another.

The SURVEYFREQ procedure of SAS was used to produce estimates of survey population frequencies and totals from sample survey data. The procedure used when computing these estimates took into account the sample design used to select the survey sample. The complexity of the sampling design, with stratification, clustering, and unequal weighting, made estimation of possible sampling errors necessary.

Results

National Baseline Adherence Estimates

INRUD ART Adherence Indicators

Of patients who received ART for at least 180 days, the average percentage of days covered by ARVs ranged from 70.3 per cent with a 95 per cent CI between 67.7 per cent and 73.0 in Okakarara Hospital to 149.4 per cent with a 95 per cent CI between 147.8 per cent and 150.9 per cent in Oshikuku Hospital.

Taking into account the clustered nature of the data, only 35.6 per cent of the 55,176 ART patients who had been on ART for at least 180 days picked up their ARVs on time. (The category includes patients who attended on or before the appointment date and those who picked up their ARVs up to 3 days later than the appointment date.) A further 28.1 per cent of patients picked up their ARVs between 3 and 30 days late and 36.4 per cent picked up more than 30 days late.

With regard to medicines consumed as a measure of adherence behaviour, 70.1 per cent of patients' visits in the last six months were made before the day on which the medicine supplied at the previous visit had been consumed. A further 8.5 per cent of patients' visits in the last six months were made zero to three days after the medicine supplied at the previous visit had been consumed, and 21.4 per cent of patients' visits were made more than three days after the medicine supplied at the previous visit had been consumed.

The 12-month retention rate for patients (15 years or older) who started ART between 1 June 2009 and 31 May 2010 was 65.8 per cent.

The three measures of adherence including medicine coverage, on time pick-up, and 12 month retention presented a varying range of levels of adherence and although they are not expected to be exactly the same, they should be within explainable margins and thus will require further analysis.

Baseline Adherence Estimate by the Multi-Method Tool

According to the multi-method tool, 7.3 per cent (95 per cent CI between 3.2 per cent and 11.3 per cent) were categorised as having high adherence to ART (95% adherence and above), 84.5 per cent (95 per cent CI between 79.6 per cent and 89.5 per cent) as having moderate adherence (75% to 94% adherence rate), and 8.2 per cent (95 per cent CI between 5.4 per cent and 11.1 per cent) as having low adherence (less than 75% adherence).

Determinants of Adherence to ART in Namibia

A statistically and practically significant association ($p < 0.0001$) was found between a patient's perception of his or her change in health status since start of ART and adherence behaviour as determined by the multi-method tool. In addition, it was observed that adherence levels, measured according to on-time pill pick-up and pill coverage, were determined by the health facility attended ($p < 0.001$). Similarly, the type of ART regimen and belonging to an ART support group influenced patients' adherence to ART ($p < 0.0001$).

Because of the small proportion of patients for these determinants, further analysis is required to identify the determinants of adherence in Namibia.

The study found that age, gender, employment status, marital status, alcohol use, depression, nutrition, and highest level of formal education attained were not associated with adherence levels as measured using the multi-method tool. However, alcohol use was mentioned by a small proportion (2.7 per cent) of patients as one of the factors that made them miss doses, while lack of food was mentioned by 20.5 per cent of the respondents as the biggest problem experienced with regard to their ARV treatment.

Adherence Interventions and Monitoring Tools

The following adherence interventions or activities were identified as being carried out in the hospitals offering ART: continuous adherence counselling, defaulter tracing, continuous health education, providing outreach services to remote sites, linking patients to community support organisations (non-governmental organisations and community counsellors), provision of food support (soup kitchens, e'Pap, etc.), establishing special clinic days (e.g., paediatric clinic, family clinic, etc.), and labelling of medicine containers and clearly explaining label instructions.

Results indicate that pill count was the most frequently used adherence monitoring tool (reported by 67.0 per cent of all health worker responses), followed by self-reporting (19.0 per cent).

In this study, 57.6% of the health workers reported that the lack of communication materials was a major barrier to adherence and 41.4% reported significant challenges in the patient and health worker communication. In additional to challenges in communication, 67% of the patients that missed a dose, reported that the main reason for missing the dose was because they forgot.

Recommendations to Improve Adherence

In view of these findings, the following interventions are recommended to improve patient adherence to ART in Namibia.

Implementing Adherence Improvement Initiatives

MoHSS should explore the feasibility of and implement targeted adherence improvement initiatives that could include the following—

- *Automated SMS (text message) reminders* for patients on ART: This intervention has great potential, given that 67 per cent of patients who reported missing their doses attributed this to forgetfulness.

- *Appointment reminders via SMS* a few days before a scheduled appointment and after a missed appointment: Almost 30 per cent of the patients whose pill count data were available went to the clinic after the ARVs they had been given at the previous visit had been consumed.

- *Use of Medication Event Monitoring System (MEMS) containers* for targeted adherence monitoring among patients who seem to have problems with adherence based on the currently available data sources: MEMS will enable verification of actual adherence rates as well as strengthening adherence rates among these patients.

- *Referral to community-based support groups* and any other suitable adherence interventions.

Tracing Patients Who Are Late for Appointments, Lost, or Lost to Follow-Up More Intensively

This survey found that some facilities are carrying out defaulter tracing; however, this process is not well structured and is carried out mostly on an ad hoc basis. A structured and systematic defaulter tracing system should be set up for each health facility offering ART and tuberculosis services. The defaulter tracing system should have the following key components—

- Consent for tracing: At the time of enrolment, patients are asked if they are willing to be traced by health facility staff if they miss a scheduled appointment. Patients who consent to be traced are asked to provide personal contact information (e.g., phone number, physical address). They are also asked to identify and provide contact information of a trusted person (e.g., friend or relative) who can be contacted if the patient cannot be reached.

- Identification of patients to be traced: The EDT can easily be used to identify patients who missed their appointment after a three-day grace period.

- Defaulter tracing: Any health worker could perform this task, but a social worker would be preferred. The first tracing attempt is made by a phone call. Each ART clinic should have a dedicated (mobile) phone for patient tracing. If the patient cannot be reached by mobile phone (e.g., number no longer active or no answer), the social worker will visit the address provided at enrolment. After three unsuccessful attempts to trace the patient, the social worker should attempt to contact the trusted individual whom the patient identified at enrolment, first by phone and then in person.

- Data collection: Next, the social worker would categorise patients into the following possible outcomes (a) confirmed dead, (b) came back to clinic, (c) admitted to hospital, (d) went to another health facility, (e) refused to come back to clinic, (f) unable to come back to clinic, and (g) not possible to trace.

- Reporting: The final aspect of this system would be producing a routine report with the results of tracing activities.

Strengthening the Existing Data Management Systems

The use of existing ART patient information systems at the ART clinics should be improved to improve the quality of data and obtain more accurate statistics on patient adherence, medicine, refill patterns, and retention on therapy. Particular attention should be paid to the

health facilities that report lengthy periods of missing data: for example, Walvis Bay, Swakopmund, and Eenhana hospitals.

On-going decentralisation of ART services to lower-level facilities should be accompanied by provision of appropriate tools to the staff at these sites to ensure appropriate record keeping and reporting of key parameters to higher levels.

Developing Human Resources Capacity

Adherence monitoring and improvement practices require appropriate human resources to be available at the various levels of the health system. Namibia continues to experience a shortage of health workers to provide optimal ART and other services at public hospitals.

As on-going efforts are made to improve the situation through training of health workers at the University of Namibia, the National Health Training Centre, and other institutions, the following interventions can help mitigate the shortage—

- Shifting tasks of ART services to lower cadres in the system: This process is already in progress.

- In-service training of health workers in identified problem areas; the problem areas can be identified during supportive supervision visits or from analysis of routine reports submitted to the regional and national levels.

- Pre-service training: ART adherence should be integrated in the training curricula of local medical, pharmacy, and nursing schools.

- Other interventions such as linking training of health workers to job roles and regular supportive supervision to ensure that new skills are applied and reinforced.

Improving Routine Analysis of Adherence Data and Quarterly Review of Adherence Patterns at Facility, Regional, and National Levels

From this study, it is evident that there is a need for routine analysis of adherence indicators in order to identify facilities and patients that require additional attention and effort. The facilities with high medicine coverage require further evaluation to determine the factors underlying this very high coverage.

Improving Patient Treatment Literacy

To address various issues that were mentioned by patients and health workers as factors influencing adherence to ART (e.g., alcohol use, side effects), MoHSS's Directorate of Special Programmes (DSP) should continue with the roll-out of the comprehensive audio-visual ARV treatment literacy and adherence improvement programme to empower the patients and the public, particularly those at the grassroots level, to become knowledgeable about ART. The primary objective of this intervention is to ensure that patients and clients on ART, their treatment supporters, family members, and the community at large are well

informed. This intervention comprises a package of communication tools, namely, a pictorial flip chart, posters, and a series of DVDs that highlight salient personal experiences of ART patients. These materials aim at standardising messages used for ARV treatment counselling, which ensures that the patient actively participates in the pre-ART and post-ART initiation counselling process. The materials are suitable for use both at health facilities and in the community (support groups as well as via mass media channels and the private sector).

INTRODUCTION

Health System Background

Namibia has a population of 2.18 million people (National Planning Commission 2012) in an area of more than 825,000 square kilometres making it one of the world's most sparsely populated nations with about two persons per square kilometre (CIA 2012). Such a low population density presents challenges in the delivery of health care services, especially those related to staffing and training of health care workers and logistics of service delivery. Universal coverage of public health service delivery is complemented by a well-regulated private sector. The public health sector is structured in a three-tier hierarchy with central, regional, and district levels. The central level has devolved authority to 13 MoHSS regional directorates and 34 districts (Republic of Namibia and the Health Systems 20/20 Project 2008).

As of September 2010, the network for health service provision consisted of about 1,150 outreach points, 265 clinics, 44 health centres, 30 district hospitals, three intermediate hospitals, and one national referral hospital, as well as various social welfare service points. Namibia's overall health worker capacity (3.0 health workers per 1,000 population (WHO 2010a, 4) was above the World Health Organization (WHO) benchmark of 2.5 health workers per 1,000 population. However, this figure masked a shortage in the public sector, which had barely 2.0 health workers per 1,000 population (WHO 2010a, 4). The MoHSS has drafted a Long-Term Human Resource Framework (1997–2027), which focuses on future needs and supply of staff in the country; a Medium-Term Human Resources Plan (1997–2007); and two five-year Human Resource Development Plans.

The public and private not-for-profit health care system— accessed by the lower-income population— serve 85 per cent of the Namibian population. The private for-profit health care system serves the remaining 15 per cent of the population, consisting of the middle- and high-income groups. Access to care is an issue for a large number of Namibians. Over 40 per cent live farther than 5 kilometres from a health facility (MoHSS 2008b, 99); for some, the nearest hospital is more than 300 kilometres away. Waiting times at health facilities vary according to region, with the worst figures recorded for Hardap, where 82 per cent of visitors reported waiting for more than three hours (Synergos, McKinsey & Company 2009).

The National Medicine Policy 2003 provides comprehensive guidelines and regulations for public and private pharmaceutical sectors in line with WHO recommendations on national medicine policies. The MoHSS operates a centralised procurement system for medicines and medical supplies, which is run by the Central Medical Stores. The national Therapeutic Information and Pharmacovigilance Centre and the Pharmacy Management Information System have contributed to improved pharmacy service provision and strengthened monitoring and evaluation across the country.

The National ART Programme[2]

AIDS is the leading cause of death in Namibia (CDC 2012). The first case of HIV was reported in 1986, and the estimated antenatal HIV prevalence of 17.8 per cent (MoHSS 2008a, 13) as of 2008 is one of the highest in the world. ARV treatment is known to prolong and improve the quality of life of people living with HIV/AIDS (PLWHA) and to reduce mortality among these patients. This therapy has been available in the private sector in Namibia since 1997. The national ART programme was launched in June 2003 with funding from the US President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis and Malaria. As of January 2010, 42 main health facilities offered ART services in Namibia (complete list attached as appendix 1). As of March 2011, an estimated 188,500 Namibians were living with HIV, and of these, approximately 48.9 per cent (92,134 patients) were receiving ART in the public sector (MoHSS 2012, 16, 43).

Dispensing to all patients in the public sector is captured in real time through the EDT, which is available at all ART pharmacies, and the EDT Mobile tool, which is a hand-held device used to dispense to ART patients at outreach sites. Data from the EDT Mobile tool is seamlessly transferred to the main ART site database via a Bluetooth or cradle connection upon return to the main ART site. The EDT captures information on appointment keeping, pill count, changes in regimen, and full dispensing data per visit per patient. The system also allows for monitoring of consumption of each ARV at each facility. The national database, consisting of data from all EDTs at facilities in the country, is situated at the Pharmaceutical Services Division at MoHSS headquarters. The Central Medical Stores, a sub-division of the Pharmaceutical Services Division, handles all ARV procurement, including that supported by PEPFAR and the Global Fund.

As obstacles to ART access in Namibia are decreasing, the MoHSS is paying increasing attention to adherence to treatment. The MoHSS has long considered adherence to ART a key element in reducing the likelihood of the emergence and spread of drug-resistant pathogens. To this end, 132 health workers—mainly nurses—have undertaken a one-week adherence training, representing coverage of approximately 30 per cent of health workers at public health facilities offering ART services. Adherence sessions are included in other trainings, such as the ART training, IMAI (Integrated Management of Adult and Adolescent Infections) for doctors, nurses, and pharmacists, and IMAI trainings for community counsellors and expert patients[3]. As part of the implementation of the recommendations of the *Mid Term Review of the Third Medium Term Plan on HIV/AIDS* (MoHSS 2007), the MoHSS through the Pharmaceutical Services Division has designed and rolled out the Namibia ART Adherence and Improvement Initiative to generate evidence to inform HIV/AIDS programming with regard to enhancing adherence among patients on ART in Namibia.

[2] This section is informed by "Namibia ART Adherence Assessment and Improvement Initiative: Proposal for the Survey and Activity Plan" (MoHSS 2010).

[3] Expert patients are given a basic two-week training to enable them to provide peer counselling to their fellow patients.

Namibia ART Adherence and Improvement Initiative[4]

The Namibia ART Adherence and Improvement Initiative is a phased approach that is guiding the implementation of adherence activities in Namibia from May 2011 to April 2013. The approach consists of seven implementation phases of adherence activities. The initiative uses a time-series design integrating three surveys that are being implemented in phase 1, phase 4, and phase 6. Control sites will be used to enable comparison with intervention sites.

The adherence improvement initiative is being undertaken in seven phases—

- Phase 1: Baseline health facility survey (Survey I): This has been concluded and is the subject of this report.
- Phase 2: Development and implementation of interventions and monitoring and evaluation systems.
- Phase 3: Interventions will be piloted at 10 of the 20 facilities included in Phase 1.
- Phase 4: Health facility survey (Survey II): This will be undertaken at the same 20 district hospitals as in Phase 1, comparing changes in those that received the pilot intervention with those that did not.
- Phase 5: National scale-up of adherence interventions and tools: Successful interventions will be rolled out to all other district hospitals offering ART, including 10 hospitals in the control group in Phase 3.
- Phase 6: Health facility survey (Survey III): This will be undertaken at all 20 district hospitals surveyed in Phase 1, 10 of which will have received the intervention for the first time in Phase 5.
- Phase 7: National roll-out to all ART sites. Adherence interventions shown to be successful in earlier phases of this activity will be rolled out to all facilities, including health centres and clinics, offering ART services in the country.

All seven phases are based on an integrated framework of implementing adherence strategies that focus on organisational capacity, health care teams, community involvement, specific strategies, and on-going monitoring and evaluation activities. The Namibia ART Baseline Adherence Survey was the first step in this systematic approach, designed to provide the baseline information required for design of cost-effective interventions.

Baseline Survey Objectives

The aim of this survey was to determine national baseline information on adherence to ART that will guide the development and implementation of strategies to improve adherence among patients living with HIV/AIDS in Namibia. The broad objectives of the survey were to—

[4] This section is informed by MoHSS 2010.

- Establish baseline facility characteristics with regard to key parameters related to adherence (i.e., medicine pill coverage and appointment keeping) and 12-month patient retention on ART

- Establish baseline adherence levels to ART among patients in Namibia

- Identify correlates and determinants of adherence in Namibia (patient, provider, and health system related)

- Identify current adherence interventions and monitoring tools in health facilities

- Based on the findings for the preceding objectives, conceptualise and recommend evidence-based interventions to improve patient adherence to ART in Namibia

Limitations of the Survey[5]

This survey did not investigate adherence to ART among patients younger than 15 years of age. It is an important subgroup of patients, and examining adherence in that population would be useful. However, obtaining adherence-related information from these patients and determining the reliability of that information would be difficult because caregivers and guardians largely supervise their medication taking. Moreover, many paediatric patients were on oral liquid formulations, creating challenges to determine adherence by pill count or timeliness of pick-up.

In the analysis of the retrospective data, some health facilities had missing data representing periods during which the EDT was out of order, and therefore medicine refills were not captured for the patients who visited during such periods. The missing data from these facilities was excluded from the analysis.

This survey interviewed ART patients who were visiting health facilities and therefore was biased towards patients who were likely to be more adherent to their treatment regimen. However, to mitigate for this bias, patients were selected across five quintiles based on their pill coverage in an attempt to capture patients across the entire spectrum of low to highly adherent patients.

Although the multi-method tool was used to measure adherence levels to ART, the pill count data used as one of the four measures were able to provide adherence levels for only the previous two visits, which might not have been representative of the patients' overall adherence to ART. Pill dumping by patients may also have affected their overall adherence rating.

[5] This section is informed by MoHSS 2010.

Structure of the Survey Report

This survey report is presented as follows—

- Chapter 1 is an introduction to the survey. It includes background to the health system in Namibia, a description of the national ART programme in the context of the national HIV/AIDS epidemic, the Namibia ART Adherence and Improvement Initiative, the survey objectives, and the limitations of the survey.

- Chapter 2 presents the survey methodology. It includes the survey design, study units and population, sample size and sampling procedure, data collection, training and field work strategy, data analysis, quality assurance, and ethical considerations.

- Chapter 3 presents the survey findings under the following sub sections of—
  - National baseline adherence estimates
  - Determinants of adherence to ART in Namibia
  - Current adherence and monitoring tools in health facilities

- Chapter 4 discusses the findings.

- Conclusions are drawn and specific recommendations are suggested in chapter 5.

In addition, appendices include a list of all health facilities offering ART, additional summary tables, survey personnel, and all the interview schedules.

METHODOLOGY

Survey Design

The patient survey was conducted by carrying out a retrospective review of available patient records in the EDT,[6] and primary data collection was accomplished using a structured interview schedule that included the multi-method tool for estimating ART adherence in resource-constrained settings.

Study Units and Population

The survey had the following study units and populations—

- ART patients (15 years and older) who had been on treatment for more than six months
- Health workers, including doctors, pharmacists, nurses, and adherence counsellors, in all health facilities that offer ART services
- All public health facilities that offered ART services in the 13 administrative regions of Namibia

Sample Size, Power, and Selection

Sample of Patients on ART

The following sections discuss the sample size for each study unit and population.

For estimating national baseline adherence rates and establishing the patient determinants of adherence using EDT data, no sampling was involved. All 89,992 patients in the 46 health facilities offering ART in the country as of 30 June 2011 were considered. Table 1 shows the percentage distribution of patients whose records were reviewed by background characteristics, administrative region, age, and gender. Khomas and Omusati regions had the highest proportion of patients on ART at 14.8 per cent (n = 13,304) and 13.5 per cent (n = 12,175), respectively, whereas Omaheke and Kunene regions had the least at 1.7 per cent (n = 1,544) and 1.9 per cent (n = 1,749), respectively. Most of the patients on ART were 30–45 years of age (59.72 per cent, n = 33,563), and 62.47 per cent (n= 56,221) were female. The majority of patients were on the regimens AZT/3TC/NVP (45.6 per cent; n = 40,996); TDF/3TC/NVP (18.2 per cent; n = 18,142); and TDF/3TC/EFV (11.3 per cent, n = 10,189).[7]

[6] The EDT captures information on appointment keeping, pill count, changes in regimen, and full dispensing data per visit per patient. The system also allows monitoring of consumption for each ARV at each facility in Namibia.

[7] AZT = zidovudine; EFV = efavirenz; NVP = nevirapine; 3TC = lamivudine; TDF = tenofovir.

Table 1: Characteristics of Patients in the National EDT Database - 30 June 2011

Background characteristics	Distribution of patients on ART (%) (n = 89,992)
Administrative region	
Khomas	14.8
Omusati	13.5
Oshana	12.0
Oshikoto	11.8
Ohangwena	11.1
Kavango	9.1
Erongo	7.6
Otjozondjupa	5.6
Caprivi	5.3
Karas	3.5
Hardap	2.1
Kunene	1.9
Omaheke	1.7
Managing authority of ART site	
Government	83.2
Faith-based organization	16.8
Age group	
>15 years and ≤ 30 years	15.2
>30 years and ≤ 45 years	59.7
>45 years and ≤ 60 years	20.7
>60 years	4.4
Gender	
Male	37.5
Female	62.5

To establish the national baseline adherence rates, patient and facility determinants of adherence, the multi-method tool and ePMS data were used, assuming a design effect of 2.0 because of the clustered nature of the survey and absence of prior estimates from other surveys. The sample size was 589 patients on ART (twice the size of a simple random sampling), enabling the survey to obtain a 95 per cent CI around national estimates of ± 5.67 per cent.

Table 2 shows the percentage distribution of patients interviewed by background characteristics (region, age, and gender). Patients were fairly represented across the administrative regions of Namibia, apart from Karas, which contributed a higher than expected population of 15.3 per cent (n = 90), and Khomas, which contributed 4.2 per cent (n = 25). Because of the stringent selection criteria based on selecting patients from the entire spectrum of adherence in equal proportions from the highest to the lowest, the study sample should still be representative of the ART population in Namibia. Therefore, the findings of this study serve as a good baseline of adherence parameters in Namibia. Consistent with the demographic distribution of ART patients in Namibia, the majority of patients interviewed in this study were 30–45 years of age (58.6 per cent, n = 345) and female (67.2 per cent, n = 396).

Table 2: Patients Interviewed on ART for More Than Six Months - 30 June 2011

Background characteristics	Distribution of patients interviewed (%) (n = 589)
Administrative region	
Karas	15.3
Kavango	10.2
Hardap	10.0
Kunene	10.0
Omusati	10.0
Oshikoto	10.0
Caprivi	5.1
Erongo	5.1
Ohangwena	5.1
Oshana	5.1
Otjozondjupa	5.1
Omaheke	4.8
Khomas	4.2
Age group	
>15 years and ≤ 30 years	10.9
>30 years and ≤ 45 year	58.6
>45 years and ≤ 60 year	25.3
>60 years	5.3
Gender	
Male	33.8
Female	67.2

Sample of Health Facilities

The sample size of the health facilities was determined by considering the different measurement objectives of the survey as well as the different data sources that were to be used in the survey.

Using information from the EDT database, a comprehensive list of all patients on ART was drawn up for each of the sampled 20 ART health facilities (see following section on sampling of ART health facilities). For each facility, pill coverage was calculated for each patient on the list to establish the proportion of days that were covered by the ARVs dispensed. Each list was then sorted in ascending order based on percentage pill coverage and divided into quintiles. At each health facility, six eligible patients from each quintile who turned up for their routine clinic appointment were selected for the interview (30 patients per facility).

For estimating national baseline adherence rates and establishing the determinants of adherence using EDT data, no sampling was involved. All 46 health facilities offering ART in the country as of 30 June 2011 were selected to establish this measurement objective. Table 3 shows the distribution of all health facilities offering ART and reporting through the EDT by region. Khomas and Omusati regions had the highest proportion of health facilities offering ART with 13.1 per cent (n = 6) each, whereas Omaheke and Caprivi had the least, each contributing 2.2 per cent (n = 1). The complete list of all health facilities offering ART and reporting through the EDT as of 30 June 2011 is attached as appendix 1.

Because of the requirements of the sampling frame and logistical considerations, a sample size of 20 ART health facilities was chosen to establish the national baseline adherence rates and the determinants of adherence at the facility level using data from the multi-method tool. Facilities were selected by first stratifying all facilities into five strata based on the size of their ART patient population. Then within each stratum, facilities were chosen at random using random digits such that each stratum contributed to the survey sites a number of sites proportional to the number of facilities in that stratum. Table 3 shows that the Karas region with 15 per cent (n = 3) had the highest percentage of health facilities in which patient interviews were conducted.

Table 3: Distribution of Health Facilities by Region - 30 June 2011

Region	Number (% of total) ART sites (N = 46)	Number (% of total) of ART sites at which patient interviews were conducted (N = 20)
Khomas	6 (13.1)	1 (5)
Omusati	6 (13.1)	2 (10)
Ohangwena	5 (10.9)	1 (5)
Otjozondjupa	5 (10.9)	1 (5)
Erongo	4 (8.7)	1 (5)
Kavango	4 (8.7)	2 (10)
Hardap	3 (6.5)	2 (10)
Karas	3 (6.5)	3 (15)
Kunene	3 (6.5)	2 (10)
Oshikoto	3 (6.5)	2 (10)
Oshana	2 (4.3)	1 (5)
Caprivi	1 (2.2)	1 (5)
Omaheke	1 (2.2)	1 (5)

Sample of Health Workers

For all 20 ART health facilities included in the study, the ART clinic head was interviewed for purposes of collecting information about the facility or ART clinic characteristics. Therefore, 20 ART clinic heads were purposively selected based on their position within the ART health facility. To assess the attitudes and practices of health workers regarding adherence of patients to ART and about existing interventions to promote patient adherence, health care workers were sampled according to the number of health workers in ART clinics; 99 health workers were interviewed. Table 4 shows the distribution of the health workers interviewed by background characteristics (administrative region, professional designation, and use of a translator).

Table 4: Background Characteristics of Health Workers Interviewed

Background characteristics	Distribution of health workers interviewed (%) (n= 99)
Administrative region	
Omaheke	15.2
Oshikoto	13.1
Oshana	12.1
Karas	9.1
Khomas	8.1
Ohangwena	7.1
Hardap	7.1
Kavango	6.1
Caprivi	6.1
Kunene	6.1
Erongo	5.1
Otjozondjupa	4.1
Omusati	0.0
Professional designation	
Nurses	52.3
Medical officers (doctors)	16.2
Pharmacists	16.2
Pharmacist's assistants	14.2
Social workers	1.1
Used a translator	
Never	12.2
Sometimes	55.1
Always	32.7

Selection of Health Facilities for Focus Group Discussions

The following 10 sites were selected for focus group discussions (FGDs): Rehoboth, Otjiwarongo, Oshikuku, Opuwo, Nyangana, Mariental, Lüderitz, Keetmanshoop, and Gobabis Hospitals and Katutura Health Centre. Selection of these health facilities was determined by the following factors: (a) the objective of FDGs, which was to enable the identification of current adherence interventions and monitoring tools in use at the health facilities as well as conceptualising new interventions to improve adherence of patients to ART; (b) piloting of new interventions (during Phase 3 of the Namibia ART Adherence Assessment and Improvement Initiative) in 10 of the 20 health facilities included in the baseline survey; and (c) minimising the risk of confounding by ensuring the 10 health facilities selected had no other on-going studies.

Data Collection Methods

Review of Medical Records (EDT Database)

The survey team undertook a review of medical records from the EDT databases. The review focused primarily, though not exclusively, on patient attendance dates, appointment dates, date of birth, gender, and dispensing history (i.e., name of ARV medicine and quantity of

medicine dispensed). These data were retrieved from the EDT database. The goal of this review was to obtain information to answer the key survey objective of establishing baseline INRUD adherence indicators and characteristics related to adherence and patient retention. The review was also used to guide the primary data collection, that is, the selection of patients for interviews. A total of 89,992 records were reviewed from 46 health facilities (hospitals, and health centres and clinics) offering ART services as of 30 June 2011.

The Multi-Method Tool

The 2011 Namibia Baseline ART Adherence Survey instruments were based on the multi-method tool developed and used in other ART adherence surveys in southern Africa. The adoption of the multi-method tool was based upon the WHO recommendation that "A multi-method approach that combined feasible self-reporting and reasonable objective measures is the current state-of-the-art in measurement of adherence behaviour" (WHO 2003, 5). The multi-method tool was developed based on the following previously validated elements (Steel, Nwokike, and Joshi 2007)—

- Self-report
- Visual analogue scale (VAS)
- Pill identification test (PIT)
- Pill count

Though self-reporting, VAS, pill identification, and pill count have each on its own been validated as sensitive in the measurement of adherence, they do not meet all the features of an ideal tool. Therefore, the survey adapted and used the multi-method approach that combined feasible self-reporting and reasonable objective measures. In addition to being non-invasive, simple to use, sensitive, specific, and predictive of non-adherence, the multi-method approach was able to collect data that were multidimensional in terms of being able to record not just doses taken or missed but also other dosing instructions, such as food, time of dosing, and concurrent use with other medicines. The multi-method approach was also categorical in terms of being continuous in number of pills taken rather than dichotomous in expressing pills taken or not taken.

The multi-method tool was adapted for the context of Namibia after consultation with technical staff from the MoHSS, partners, and other key stakeholders knowledgeable about both the MoHSS ART programme and pharmaceutical services in the country. The interview schedules are attached as appendices 2 to 5 and include the following: patient interview schedule, clinic head interview schedule (which incorporates the multi-method tool), health worker interview schedule, and ART adherence counsellor interview schedule. All these schedules were designed to collect quantitative as well as qualitative information. All interview schedules were drafted in English and translated into Rukwangali, Oshiwambo, Otjiherero, Silozi, and Afrikaans, the five vernacular languages commonly spoken at the facilities included in the study. These interview schedules were pre-tested at Katutura Intermediate Hospital and Okahandja District Hospital between 22 and 25 March 2011. Neither hospital had been selected for the main data collection exercise. The interview schedules were then finalised for the main fieldwork and data collection.

ART Patient Interviews

A total of 589 ART patient interviews were conducted at 20 selected health facilities (hospitals). These were used to collect information about the patients' experience at a given health facility. These interviews provided information about the following: (a) the level of adherence to ART, using the multi-method approach; (b) patient demographics and HIV disclosure status; (c) patient medical history; (d) patient perception about HIV/AIDS and ARVs; (e) how patients manage to take their medicines; (f) issues related to medicines, such as side effects and pill burden; (7) patient perception of the quality of health care received at the facility; (8) patient alcohol drinking habits as well as patient emotional state.

These interviews were conducted using an interview schedule. The interview schedule had a subsection for measuring the respondent's adherence to ART using the multi-method tool. This tool was important because it provided a measure of adherence to ART as well as information about the quality of services received from the patients' perspective.

ART Clinic Head Interviews

These interviews were used to collect information about the specific ART clinic. Twenty clinic heads were interviewed, and information was collected about (a) human resources and workload at the clinic, (b) data management at the clinic, (c) supply of ARV medicines at the clinic, and (d) issues about ART adherence and counselling.

ART Health Care Worker Interviews

A total of 99 ART health care worker interviews were conducted at 20 selected health facilities. These interviews were used to collect information about the health workers' knowledge, perceptions, and practices regarding adherence to ART.

Focus Group Discussions

FGDs were conducted with all health workers at the selected ART clinic. This method of data collection was used to collect information to enable the identification of current adherence interventions and monitoring tools that were in use at the health facilities as well as in conceptualising new interventions to improve adherence of patients to ART in Namibia. In total, 10 FGDs were conducted (one at each of the 10 selected hospitals for FDGs).

Survey Implementation

ART Adherence Technical Working Group

The MoHSS established the ART Adherence Technical Working Group (TWG) in 2009. The TWG has provided high-level policy and technical oversight of the Namibia ART Adherence Assessment and Improvement Initiative. The TWG comprises representatives from various departments of the MoHSS (Directorate of Special Programmes; Sub-division: National Medicine Policy Coordination; Sub-division: Research, Monitoring and Evaluation), MSH, US Agency for International Development, WHO, and the US Centers for Disease Control and Prevention Namibia Office. The Deputy Director: Pharmaceutical Services serves as the chairperson. The TWG met regularly and provided invaluable policy and technical guidance

during conceptualisation, planning, fieldwork, analysis, and report writing phases of the survey.

Training of Data Collectors

The training workshop for project field staff was conducted between 15 and 25 March 2011, followed by refresher training sessions conducted on 20 and 21 April, as well as 7 May 2011. The training included classroom lectures in which each instrument was introduced, the rationale for each question was explained, and the expected responses to each question were discussed. Practical demonstrations, role-playing, and field practice were also used. Personnel from the Survey Warehouse, MoHSS, and MSH facilitated all sessions.

Survey Sensitisation

Before the start of data collection, ART clinic heads, ART doctors, nurses, and pharmacy staff of all ART health facilities in the country were informed about the baseline survey during their meeting at Safari Court Hotel in Windhoek on 14 April 2011. Letters from the MoHSS communicating the same information were sent by facsimile, and follow-up phone calls were made to confirm receipt.

The MoHSS instructed Regional Pharmacists to ensure that the Regional Director received a copy of the letter from the Permanent Secretary of the MoHSS to ensure that the data collectors' presence in the region was known by the respective Regional Management Teams. They were also instructed to contact the study sites to ensure that management at these sites was aware of the study to be conducted. Regional Pharmacists were also tasked to communicate with pharmacy staff to confirm receipt of the MoHSS communication directed to them.

The ART pharmacists and pharmacist's assistants were instructed to make copies of the Permanent Secretary's letter to give to the Principal Medical Officer (or Senior Medical Superintendent for referral hospitals), the doctor and the nurse in charge of the ART clinic, and the official in charge of the data clerks. They were informed that field teams would report to the pharmacy on the first day of their visit at each of the respective study sites, and the pharmacy staff were asked to facilitate the introduction to the head of the ART clinic. Overall, pharmacy staff were tasked to coordinate the exercise with the data clerks and to ensure that all health workers understood their role in the study.

The purpose of this prior contact was to ensure the support and cooperation of the facilities in giving the interviewers access to the facilities. As a result, all facilities selected were very cooperative.

Quality Assurance

Data collection commenced on 9 May 2011 and ended on 1 July 2011. One interviewer in each team was selected to be the team leader, and he or she had the added responsibility of checking all administered questionnaires before leaving each facility. Each team was given a list of facilities to visit, with each facility's name, type, and location. Information on the intended visits was given to the facilities at least one week before the visit. On average, data collection took five days per facility. Fieldwork supervision was coordinated from the Survey

Warehouse offices. Quality control was ensured by periodic field visits and spot checks by three technical supervisors from the MoHSS and MSH who ensured that the planned data collection processes were being followed.

All completed quantitative interview returns were delivered to the survey team. Each return was checked for quality, and random checks were conducted to ensure that logical skip instructions were followed according to the instructions on the interview schedules and Data Collection Manual.

Data were captured in SPSS (Statistical Package for Social Sciences) software. All open-ended responses were captured verbatim. On completion of data capture, the survey team and the interviewers held a session to discuss the open-ended responses, and interviewers assisted in categorising and coding of these open-ended responses. All verbatim responses were then transformed into coded response categories.

All data sets were cleaned by the survey team; 10 per cent of the patient interviews were double captured. For health worker, adherence counsellor, and clinic head data sets, all cases were double-entered during the data-cleaning process. An overall error rate of 0.67 per cent was found. During data cleaning, each data set was checked question by question, and questionnaires for dubious entries were examined to verify the entered data.

During data analysis the analysis plan prepared by the survey team was revised on the basis of feedback received following a presentation to the adherence TWG to ensure that the analysis was appropriate for the purpose of the survey.

Quantitative Data Analysis

The following conventions were observed during the analysis of the survey data—

- Descriptive statistical analysis was done using SAS statistical software for EDT data and primary data collected from the field.

- The format of the outputs took the form of tabulations with proportions (percentages) and averages displayed, as deemed appropriate for the type of data.

- The standard INRUD indicators were determined and the t-test used to assess whether the various regional means of these indicators generated from EDT data were statistically different.

- Adherence estimates by the multi-method approach were established and recorded as high, moderate, or low.

- A chi-squared (χ^2) statistic was used to investigate whether distributions of categorical variables differed from one another.

- The SURVEYFREQ procedure of SAS (SAS System for Windows, Version 9.1, 2002-2003) was used to produce estimates of survey population frequencies and totals from sample survey data. When computing these estimates, the procedure took into account the sample design used to select the survey sample. This was because of the

complexity of the sampling design, with stratification, clustering, and unequal weighting, hence the need to estimate possible sampling errors.

- Graphic representation was also used, especially to show the proportions of key indicators.

Ethical Considerations

The Permanent Secretary of the MoHSS provided consent for confidential extraction and analyses of MoHSS National Database of 89,000 ART patients in the ART. The study team obtained informed consent from all persons who were interviewed after explaining the goals and objectives of the study, confidentiality safeguards, and the potential risks and benefits. In addition, patients interviewed were informed that their pharmacy ART records had been reviewed to select them for the interview. Furthermore, the team provided assurances that information collected would be used only for the purposes of the study. No names of individual informants have been used in this report without their consent.

SURVEY FINDINGS

National Baseline Adherence Estimates

One of the key survey objectives was to establish baseline INRUD adherence indicators and the baseline adherence estimate using the multi-method tool. Baseline adherence estimates were determined for dispensing-based indicators, patient attendance indicators, and patient retention indicators. An ART adherence estimate was also determined using the multi-method tool. The next subsections describe these results.

INRUD Dispensing-Based Indicators

Indicator 1a: Average percentage of days covered by ARVs dispensed for a 180-day period for all patients (N = 55,176) who had been on ART for more than six months

Analysis of data of patients who had received ART for a period of 180 days showed that the average percentage of days covered by ARVs ranged from 70.3 per cent with a 95% CI between 67.7 per cent and 73.0% at Okakarara hospital, to 149.4% with a 95 per cent CI between 147.8 per cent and 150.9 per cent at Oshikuku hospital.

Similarly, this indicator was determined for each of the 13 administrative regions of Namibia, taking into account the clustered nature of the data. Results indicated no statistically significant regional differences (p = 0.7381) in the estimated average percentage of days covered by ARVs in ART patients who received at least 180 days of therapy. Table 5 presents the average percentage of days covered by ART treatment in ART patients who received at least 180 days of therapy, by region.

Table 5: Percentage of Days Covered by ART Treatment for a 180-Day Period by region

Region	Facility name	Number of patients	Average % days covered	SEM	95% CI
Ohangwena	Eenhana	498	143.3	1.6	140.2–143.4
Ohangwena	Engela	2,243	100.3	0.5	99.4–102.2
Ohangwena	Odibo	563	101.7	0.8	101.2–103.3
Ohangwena	Okongo	969	102.8	0.7	101.4–104.2
Ohangwena	Ongha	719	104.3	0.6	103.1–105.5
Ohangwena Total		4,992	110.5	6.9	
Erongo	Omaruru	338	92	1.2	89.6–94.5
Erongo	Swakopmund	1,298	105.5	0.7	104.1–107.0
Erongo	Usakos	214	98.8	1.3	96.3–101.3
Erongo	Walvis Bay	1,542	144.4	1.4	141.6–147.1
Erongo Total		3,392	110.2	7.7	
Omusati	Okahao	1,395	90	0.5	89.0–91.0
Omusati	Okalongo	1	58		
Omusati	Onesi	1	63		
Omusati	Oshikuku	2,203	149.4	0.8	147.8–150.9
Omusati	Outapi	3,204	101.7	0.4	100.8–102.5
Omusati Total		6,804	105.2	8.2	

Region	Facility name	Number of patients	Average % days covered	SEM	95% CI
Omaheke	Gobabis	966	101.2	0.6	100.0–102.5
Omaheke Total		966	101.2	15.4	
Oshikoto	Onandjokwe	4,918	102.5	0.4	101.7–103.3
Oshikoto	Oshivelo	255	99.5	1	97.5–101.5
Oshikoto	Tsumeb	862	100.2	0.7	98.8–101.6
Oshikoto Total		6,035	100.7	8.9	
Caprivi	Katima Mulilo	3,492	100.6	0.4	99.8–101.5
Caprivi Total		3,492	100.6	15.4	
Karas	Karasburg	322	88.1	1.5	85.2–91.1
Karas	Keetmanshoop	641	99.5	0.9	97.7–101.2
Karas	Lüderitz	972	108.4	0.8	106.8–110.0
Karas Total		1,935	98.7	8.9	
Oshana	Ongwediva	816	98.2	0.5	97.3–99.1
Oshana	Oshakati	7,054	98.7	0.2	98.3–99.1
Oshana Total		7,870	98.5	10.9	
Khomas	KHC	3,393	99.7	0.4	98.9–100.4
Khomas	Khomasdal	239	102.4	0.9	100.7–104.4
Khomas	KIH	4,085	96.4	0.2	95.9–96.8
Khomas	Otjomuise	40	90.2	2.9	84.6–95.8
Khomas	Robert Mugabe	304	99.3	0.9	97.5–101.1
Khomas	WCH	1,312	100.9	0.4	100.2–101.7
Khomas Total		9,373	98.2	6.3	
Hardap	Aranos	21	91.1	3.1	85.0–97.1
Hardap	Mariental	454	100.0	1.1	97.9–102.1
Hardap	Rehoboth	504	95.9	1.1	93.7–98.0
Hardap Total		979	95.8	9.1	
Kavango	Andara	585	103.5	1	101.5–105.5
Kavango	Nankudu	659	79.5	1.1	77.3–81.6
Kavango	Nyangana	809	101.4	1	99.5–103.3
Kavango	Rundu	2,910	96.4	0.5	95.3–97.4
Kavango Total		4,963	95.2	7.7	
Kunene	Khorixas	76	92.1	3.2	85.8–98.4
Kunene	Opuwo	532	97.4	0.9	95.6–99.1
Kunene	Outjo	290	87.9	1.6	84.8–91.0
Kunene Total		898	92.5	8.9	
Otjozondjupa	Grootfontein	794	77.3	0.8	75.7–78.9
Otjozondjupa	Okahandja	837	100.2	0.6	99.1–101.4
Otjozondjupa	Okakarara	201	70.3	1.4	67.7–73.0
Otjozondjupa	Otjiwarongo	1,645	101.8	0.4	101.0–102.5
Otjozondjupa Total		3,477	87.5	7.7	
Grand Total		55,176	102.7	2.5	

Of patients who received ART for at least 180 days, the average percentage of days covered by ARVs ranged from 70.3 per cent with a 95 per cent CI between 67.7 per cent and 73.0 in Okakarara Hospital to 149.4 per cent with a 95 per cent CI between 147.8 per cent and 150.9 per cent in Oshikuku Hospital. Ohangwena region had the highest percentage of days covered by ARVs whereas Otjozondjupa region had the lowest result for this indicator. However, within regions, facilities showed considerable differences in the result for this indicator. The

results for each facility are aggregate figures, so, at a given facility, a small proportion of patients with very high or very low pill coverage could skew the average for that facility.

To establish whether the average percentage of days covered differed for patients who had been on therapy for longer periods, sub-sets of patients were analysed, and the following indicator results were generated—

- *Indicator 1b: Average percentage of days covered by ARVs of all patients (N = 4,229) who started treatment between 1 June 2010 and 30 November 2010*, that is, had been on ART for 7–12 months
  - The average percentage of days covered by ARVs of ART patients who had been on treatment for 7–12 months was 95.7 per cent (SEM = 2.0).
- *Indicator 1c: The average percentage of days covered by ARVs of all patients (N = 5,235) who were started on treatment between 1 December 2009 and 31 May 2010*, that is, had been on treatment for 13–25 months
  - The average percentage of days covered by ARVs of ART patients who were on treatment for 13–25 months was 98.2 per cent (SEM = 2.0).

Patients who had been on ART for a longer period had a slightly higher percentage of days covered by ARVs for the study period.

INRUD Patient Attendance Indicators

The rate of missed appointments is one measure of programme success in actively engaging patients. Missed appointments can lead to gaps in ART, which represent unstructured treatment interruptions that have been associated with worsening patient outcomes (Kranzer and Ford 2011). In Namibia, the usual dispensing practice is to issue patients with pills for two extra days after their appointment date. Thus, a patient who attends the clinic up to three days after a missed appointment will generally not run out of ARVs.

To establish patient attendance indicators, patients were classified according to the following categories—

- If the patient attended on or before the appointment date during the study period, then the patient is in the category "on or before the appointment date".
- If the patient attended one to three days later than the appointment date during the study period, then the patient is in the category ">0 and ≤3 days later than the appointment date".
- If the patient attended 4 to 30 days later than the appointment date during the study period, then the patient is in the category ">3 and ≤30 days later than the appointment date".
- If the patient attended 31 to 90 days later than the appointment date during the study period, then the patient will be in the category ">30 and ≤90 days later than the appointment date".

- If the patient attended more than 90 days later than the appointment date during the study period, then the patient will be in the category ">90 days later than the appointment date".

Indicator 2: Percentage of ART patients who were on ART therapy for at least for 180 days (N = 55,176) and attended on or before the appointment date, or between >0 and ≤3 days later than the appointment date, or >3 and ≤30 days later than the appointment date, or >30 days later than the appointment date

The analysis presented in table 6 indicates that only 20.9 per cent of patients attended on or before the appointment date. A further 14.6 per cent attended between >0 and ≤3 days later than the appointment date, 28.1 per cent of patients attended >3 and ≤30 days later, and 36.4 per cent attended more than 30 days later. The clustered nature of facilities' data was taken into account. Considering that patients are usually provided with pills for 2 extra days, 35.5 per cent of the patients could be considered on time for this indicator.

Table 6: Proportion of Patients Who Were on ART for at Least 180 Days Who Attended on, before, or later than the Appointment Date

Attendance	N	%	SE	95% CI
On or before appointment date	11,531	20.9	2.88	15.3–26.5
>0 and ≤3 days later than the appointment date	8,045	14.6	1.4	11.7–17.4
>3 and ≤30 days later than the appointment date	15,499	28.1	2.5	23.1–33.1
>30 and ≤90 days later than the appointment date	12,743	23.1	2.8	17.4–28.8
>90 days later than appointment date	7,358	13.3	3.1	7.2–19.5
Total	55,176	100		

Indicator 3: Percentage of all visits in the last six months made before, within three days, or more than three days after the medicine supplied at the previous visit had been consumed

Table 7 indicates that 70.1 per cent of patients' visits in the last six months were made before the day on which the medicine supplied at the previous visit had been consumed. A further 8.5 per cent of patients' visits in the last six months were made zero to three days after the medicine supplied at the previous visit had been consumed, and 21.4 per cent of patients' visits were made more than three days after the medicine supplied at the previous visit had been consumed.

Note that, unlike indicator 2, which considered just the lateness for appointment, indicator 3 also used pill count data to determine whether a visit happened before or after ARVs had been used up (assuming a patient was taking all his or her ARVs every day as prescribed). This indicator was calculated for patients whose pill count data were available and for whom it was therefore possible to establish the exact date their ARVs were supposed to run out.

Table 7: Proportion of All Visits in the Last Six Months Made before, within Three Days, or More Than 3 Days after the Medicine Supplied at the Previous Visit Had Been Consumed

Visit	N	%
Before medicine had been consumed	166,517	70.1
Zero to three days after medicine had been consumed	20,178	8.5
More than three days after medicine had been consumed	50 721	21.4
Total visits	237,416	

In the regions of Caprivi, Erongo, Karas, Kavango, Kunene, Ohangwena, and Oshikoto, more than 20 per cent of all patients' visits in the last six months were made more than three days after the medicines supplied at the previous visit had been consumed. Table 8 shows the performance of individual facilities in all the regions.

Table 8: Percentage of all Visits during a Six-Month Period Made before, within Three Days, or More than Three Days after the Medicine Supplied at the Previous Visit Had Been Consumed

			Categories of patient visits (%)		
Region	**Health facility**	**Total**	A	B	C
Khomas	Katutura Health Centre	16,302	82	7	11
Khomas	Khomasdal	2,526	78	9	13
Khomas	Katutura Intermediate Hospital	20,504	85	4	11
Khomas	Otjomuise	558	82	1	16
Khomas	Robert Mugabe	1,544	84	3	12
Khomas	Windhoek Central Hospital	8,096	77	10	13
Khomas total		49,530	82	6	12
Omusati	Okahao	4,817	86	6	9
Omusati	Okalongo	1,231	23	3	74
Omusati	Onesi	258	71	0	29
Omusati	Oshikuku	7,825	74	12	14
Omusati	Outapi	8,206	81	9	10
Omusati	Tsandi	33	61	21	18
Omusati total		22,370	76	9	15
Oshana	Ongwediva	5,202	72	11	17
Oshana	Oshakati	36,440	76	8	16
Oshana total		41,642	75	8	16
Otjozondjupa	Grootfontein	1,983	32	3	65
Otjozondjupa	Okahandja	3,640	81	8	12
Otjozondjupa	Okakarara	982	64	15	21
Otjozondjupa	Otjiwarongo	9,103	83	6	11
Otjozondjupa total		15,708	75	6	19
Hardap	Aranos	584	51	11	38
Hardap	Mariental	2,465	63	22	15
Hardap	Rehoboth	2,250	76	12	12
Hardap total		5,299	67	16	17

Region	Health facility	Total	Categories of patient visits (%)		
			A	B	C
Omaheke	Gobabis	5,099	66	15	19
Omaheke total		5,099	66	15	19
Oshikoto	Onandjokwe	16,791	61	14	26
Oshikoto	Oshivelo	967	89	0	11
Oshikoto	Tsumeb	4,396	80	8	12
Oshikoto total		22,154	66	12	22
Karas	Karasburg	971	43	15	42
Karas	Keetmanshoop	2,106	65	13	22
Karas	Lüderitz	4,174	65	13	21
Karas total		7,251	62	14	24
Erongo	Omaruru	1,746	75	11	14
Erongo	Swakopmund	5,653	54	7	38
Erongo	Usakos	818	31	51	18
Erongo	Walvis Bay	8,910	67	6	27
Erongo total		17,127	62	9	29
Kunene	Khorixas	324	64	12	24
Kunene	Opuwo	1,839	64	9	27
Kunene	Outjo	1,004	54	7	40
Kunene total		3,167	60	9	31
Caprivi	Katima Mulilo	10,977	58	6	36
Caprivi total		10,977	58	6	36
Ohangwena	Eenhana	2,963	27	4	69
Ohangwena	Engela	7,379	55	5	40
Ohangwena	Odibo	2,208	50	7	42
Ohangwena	Okongo	5,592	68	11	21
Ohangwena	Ongha	3,431	79	8	13
Ohangwena total		21,573	58	7	35
Kavango	Andara	2,543	43	21	36
Kavango	Nankudu	1,594	73	4	23
Kavango	Nyangana	2,590	50	11	39
Kavango	Rundu	8,792	54	7	39
Kavango total		15,519	54	9	37
Grand total		237,416	70	8	21

Note:
A: Per cent of visits made before medicines dispensed at the last visit had been consumed
B: Per cent of visits made within three days after medicines dispensed at the last visit had been consumed
C: Per cent of visits made more than three days after medicines dispensed at the last visit had been consumed
Regions are arranged in descending order by per cent of patients who attended before medicines were consumed (A).

Khomas region had the best performance with regard to attendance of pharmacy appointments before medicines dispensed during the previous visit had run out. This could be partly attributable to the relatively better availability of transport in Khomas region compared to other regions in the country. Omusati and Oshana regions also performed well for this parameter.

Kavango, Ohangwena, and Caprivi regions had the lowest percentages of ART patients attending their pharmacy appointments before their ARV medicines had run out. For Kavango and Caprivi regions, this observation could be attributed in part to the vast distances that patients needed to travel to get to the respective district hospital and the relatively fewer transport options available to the patients.

Patient Retention on ART

Retention of patients on ART is one of the key Global Fund and Joint United Nations Programme on HIV/AIDS recommended indicators for monitoring ART programmes (WHO 2010b, 5).

Retention rate of patients on ART at 12 months was determined for patients who started ART between 1 June 2009 and 31 May 2010. Retention was determined by analysing the proportion of patients who were "active" at 12 months of treatment[8], compared to the total number of patients who started ART 12 months ago (between 1 June 2009 and 31 May 2010).

Table 9: Retention Rate at 12 Months for Adult Patients Who Initiated ART between 1 June 2009 and 31 May 2010

Region	Retained adult	Started adult	Retention rate (%)
Caprivi	679	919	74
Oshana	1,578	2,197	72
Oshikoto	1,166	1,698	69
Otjozondjupa	727	1,106	66
Kavango	1,280	1,941	66
Khomas	2,191	3,314	66
Omusati	1,622	2,490	65
Ohangwena	1,080	1,664	65
Kunene	309	484	64
Karas	403	671	60
Hardap	276	478	58
Omaheke	253	440	58
Erongo	728	1,281	57
Total	12,292	18,683	65.8

Note: Adult patients are 15 years of age or older.

In this study, the average 12-month retention rate for adult patients who started ART between 1 June 2009 and 31 May 2010 was 66 per cent, ranging from 57 per cent (Erongo) to 74 per cent (Caprivi).

National Adherence Estimate by the Multi-Method Tool

A total of 589 patients on ART selected from 20 hospitals were interviewed and their adherence levels estimated using the multi-method tool. The multi-method tool comprises four different adherence measures (self-reporting, VAS, PIT, and pill count). For each of the 589 patients, adherence to ART was estimated using each of the four measures and an overall composite estimate determined. In this subsection, national adherence behaviour estimates as determined by each of the four measures are presented separately, and the national adherence behaviour estimate as estimated by the multi-method tool is presented.

[8] Active status was established by checking the status of individual patients on their 12-month anniversary date; for example, if a patient started ART on 20 April 2010, his 12-month anniversary date is 19 April 2011.

Table 10: National Adherence Estimate by the Different Measures of the Multi-Method Tool

Adherence measure	Overall adherence by percentage of patients		
	High	Moderate	Low
Self-reporting	85.0	11.6	3.4
Visual analogue scale	47.1	28.2	24.7
Pill identification test	18.3	78.3	3.4
Pill count	77.4	14.5	8.1
Multi-method tool	7.3 (1.9)	84.5 (2.4)	8.2 (1.4)

Note: SE of per cent in parentheses.

The multi-method tool provides information from the different measures that are triangulated to verify the true level of adherence behaviour. Adherence levels were assigned as follows—

- If all the results appeared in the same column, for example, the first column, then the overall adherence for that patient was high.

- When the results did not line up in a single vertical column,
  - if they were spread over two columns, the adherence level in the right-hand column was taken as the estimated adherence;
  - if they were spread over three columns, the middle column was used as the estimated adherence.

- In cases where pill count data were not available, the same method applied.

Table 11 presents the national adherence behaviour estimates according to the multi-method tool. According to this tool, 84.5 per cent of patients nationally had moderate adherence, and 7.3 per cent had high ART adherence. Between 79.6 per cent and 89.5 per cent (SE = 2.37) of patients on ART in Namibia had moderate adherence levels with a 95 per cent probability. Only 3.2 per cent to 11.3 per cent (SE = 1.9) of patients on ART had high adherence levels. These results further reveal that between 5.4 per cent and 11.1 per cent (SE= 1.4) of patients on ART had low adherence levels.

Table 11: Overall National Adherence Estimate according to the Multi-Method Tool

Overall adherence	Frequency (N = 589)	Per cent (SE of %)	95% CI range
Low (95% - 100% adherence)	48	8.2 (1.4)	5.4–11.1
Moderate (75% - 94% adherence)	515	84.5 (2.4)	79.6–89.5
High (Less than 75% adherence)	26	7.3 (1.9)	3.2–11.3

Adherence estimates for each of the 20 hospitals were established using the multi-method tool (table 12). At Rehoboth Hospital none of the 29 patients interviewed had low adherence. At Oshakati, Engela, Walvis Bay, and Mariental Hospitals, 3.3 per cent of the 30 interviewed patients had low adherence. In contrast, in Katima Mulilo and Opuwo Hospitals, 20.0 per cent and 17.2 per cent, respectively, of interviewed patients had low adherence estimates.

Results indicate that of all the patients interviewed at Nyangana, Andara, Mariental, Lüderitz, Otjiwarongo, Outjo, Katima Mulilo, and Opuwo Hospitals, none had high adherence behaviour estimates.

Table 12: Baseline Adherence Behaviour Estimate for the Sampled Hospitals according to the Multi-Method Approach

Hospital	Number of patients interviewed	Overall adherence estimate by percentage of patients		
		High	Moderate	Low
Rehoboth	29	3.4	96.6	0.0
Oshakati	30	13.3	83.4	3.3
Engela	30	6.7	90.0	3.3
Walvis Bay	30	3.3	93.4	3.3
Mariental	30	0.0	96.7	3.3
Tsumeb	29	10.3	86.3	3.4
Gobabis	28	3.6	92.8	3.6
Oshikuku	30	3.4	90.0	6.7
Karasburg	30	3.3	90.0	6.7
Lüderitz	30	0.0	93.3	6.7
Otjiwarongo	30	0.0	93.3	6.7
Okahao	29	3.4	89.7	6.9
Onandjokwe	30	20.0	70.0	10.0
Keetmanshoop	30	6.7	83.3	10.0
Outjo	30	0.0	90.0	10.0
Katutura Health Centre	25	12.0	76.0	12.0
Andara	30	0.0	86.7	13.3
Nyangana	30	0.0	83.3	16.7
Opuwo	29	0.0	82.8	17.2
Katima Mulilo	30	0.0	80.0	20.0

Note: Facilities are ranked in ascending order of the proportion of patients with low adherence behaviour according to the multi-method tool.

Results indicate that the majority of patients interviewed had moderate adherence. Table 12 illustrates that 70 per cent to 96.6 per cent of patients in all 20 hospitals had moderate adherence according to the multi-method tool. These findings are similar to those from health worker and adherence counsellor interviews, in which 99 health workers (ART clinic nurses, pharmacists, and doctors) and 44 adherence counsellors were asked to give their opinion about what they thought the estimated adherence of their patients on ART at the hospital was. They were asked to grade high adherence as 95 per cent and more, 75–94 per cent as moderate adherence, and less than 75 per cent as low adherence.

A study conducted in Uganda using a multi-method approach (combining self-report and clinic pill count data) found that 90 per cent and 94 per cent of patients had optimal adherence (>95 per cent) based on pill count data and self-report, respectively (Kunutsor et al. 2010). These figures are higher than those reported for Namibia. However, the Uganda study

design differed from that used in Namibia in a number of ways (it was a prospective cohort study and utilised just two methods of estimating adherence).

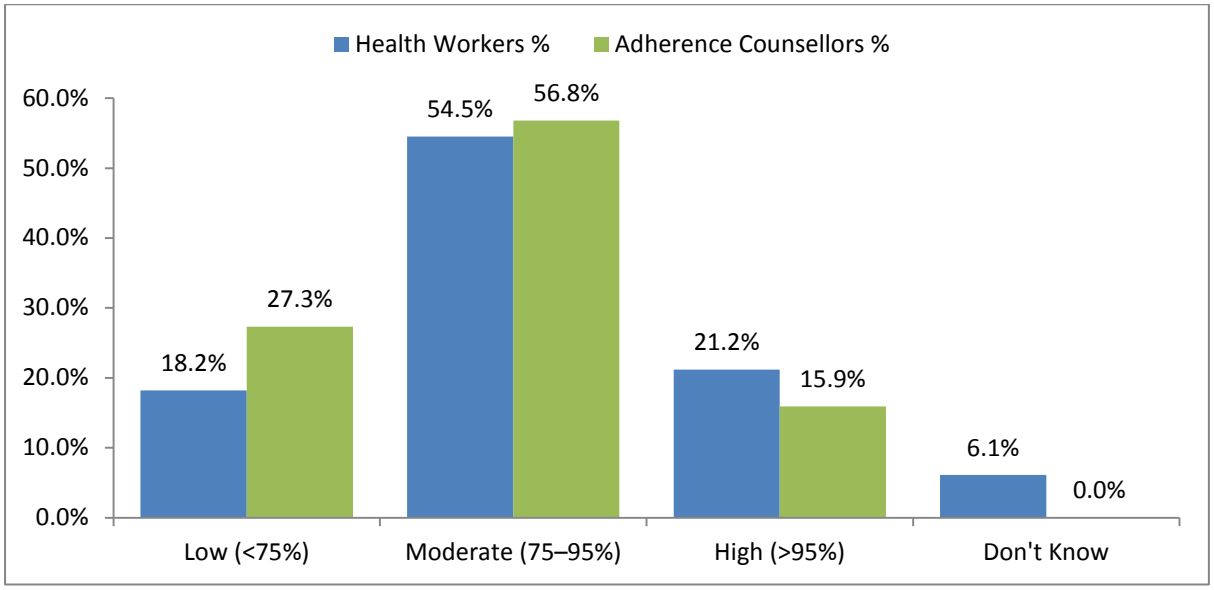


Figure 1: Distribution of health workers' and adherence counsellors' opinions about approximate adherence rate of the majority of patients on ART at their hospital

Figure 1 shows the percentage distribution of opinions of health workers and adherence counsellors at the 20 hospitals. About equal proportions of health workers and adherence counsellors (54.5 per cent and 56.8 per cent) believed that the majority of the patients on ART at their hospitals had moderate adherence; 18.2 per cent of health workers (n = 99) were of the opinion that the majority of the patients on ART at their hospitals had low adherence, as compared to 27.3 per cent of adherence counsellors (n = 44) who thought the same.

Determinants of Adherence to ART in Namibia

This section presents results of associations of adherence to ART determined by different methods (multi-method and INRUD indicators) with specific patient and health system factors mentioned in literature as having an association with adherence behaviour. The subsequent part of this section presents perception of patients, health workers, and adherence counsellors of the factors that cause patients to miss a dose.

Determinants of Adherence Based on Multi-Method Tool Data

Table 13 shows that with regard to adherence, a statistical and practical significance association ($p > 0.0001$) exists between one's perception of change in health status since start of ART and adherence measured by the multi-method tool. A higher proportion (14 per cent) of patients who thought their health status had worsened since starting ART had lower adherence than those who thought their health status had remained the same or improved (8 per cent).

There was no statistically significant difference between the overall adherence of males and females, for patients in different age groups, and for overall adherence of patients with different WHO status at start of treatment. No statistically significant differences were found between overall adherence and employment status, marital status, and highest level of formal education attained.

Table 13: Measures of Association of Patient Factors to Adherence Estimates Determined by the Multi-Method Tool

Patient factor (n = 589 patients)	(Pr > ChiSq)
Gender	0.3019
Age	Null
Level of formal education	Null
Marital status	Null
Employment status	Null
Regularity of source of income	0.1180
Disclosure of HIV status	Null
Perception of one's health status since start of ART	0.0001
Having someone to support	0.7918
Alcohol	Null
Depression	Null

Note: "Null" indicates that there were null values in the cross-tabulation of the parameters, and therefore the statistical test could not be run; that is, in the cross-tabulation, one of the three adherence categories had zero patients. In such cases, the statistical test could not be run.

Health system determinants of adherence were explored for their association with adherence as measured by the multi-method tool for the sample of 589 patients. Results are presented in table 14.

Table 14: Measures of Association of Health System–Related Factors with Adherence Estimates Determined by the Multi-Method Tool

Health system determinants (n = 589 patients)	(Pr > ChiSq)
WHO stage at start of therapy	0.4028
Managing authority of facility	0.6368
Health facility	Null
Current ART regimen	Null
Being treated differently	0.7918
Start ART at present facility	0.9405
Belonging to an ART support group	0.6371
Change in therapy	0.8006

Note: "Null" indicates that there were null values in the cross-tabulation of the parameters, and therefore the statistical test could not be run; that is, in the cross-tabulation, one of the three adherence categories had zero patients. In such cases, the statistical test could not be run.

None of the factors assessed was found to significantly affect adherence estimates as measured using the multi-method tool. However, patients who reported that their therapy had been changed had a statistically significant difference in overall adherence as measured using the VAS, compared with those who stated that their therapy had never been changed. For those whose therapy had been changed, 88.9 per cent had medium or high adherence as

measured using the VAS, whereas for those whose therapy had never been changed, 72.1 per cent had medium or high adherence.

No statistically significant differences were found between the overall adherence and the WHO stage at start of therapy, managing authority of facility, starting ART at the present health facility, current ART regimen, being treated differently, and belonging to an ART support group.

Determinants of Adherence Based on Dispensing and Attendance Data

Probable determinants of adherence were explored for association with INRUD adherence estimates determined for patients who had been on ART therapy for at least 180 days (n = 55,176).

Table 15: Measures of Association of Patient-Related Factors to Adherence Estimated Based on Dispensing and Attendance Data

Patient factor (n = 55,176)	Pill coverage (Pr > |t|)	Appointment keeping (Pr > ChiSq)
Gender	0.3110	0.0137
Age	0.4136	0.1211
Managing authority of facility	0.0826	0.4526
ART regimen	< 0.001	Null

Note: "Null" indicates that there were null values in the cross-tabulation of the parameters, and therefore the statistical test could not be run.

Table 15 shows that the kind of ART regimen a patient was on was the only variable that had a statistical and practical significance association with adherence based on dispensing and attendance data. Patients on AZT/3TC/NVP had a statistically and practically significant lower average percentage of days covered than those on the ART regimens AZT/3TC/TDF/LPV-r, D4T/3TC/NVP, and D4T/3TC/EFV. This finding requires further investigation.

Tables 16 and 17 relate to the sample of 589 patients selected for the in-depth interviews; national adherence estimates according to dispensing data and attendance data were determined taking into account the clustered, stratified sample design. Because of the complexity of the sampling design, with stratification, clustering, and unequal weighting, estimation of possible sampling errors was necessary. The SURVEYFREQ (SAS) was used to implement clustering according to health facilities.

Table 16 shows there was no statistically significant difference between overall adherence and gender, age, employment status, marital status, highest level of formal education attained, alcohol, depression, disclosure, and having someone to support patients.

Table 17 shows that with regard to adherence based on dispensing and attendance data, a statistical and practical significance association ($p > 0.0001$) existed between adherence estimates and the different health facilities. Patients in different health facilities exhibited

different levels of adherence calculated by pill coverage and timeliness of ARV pick-up. Similarly, belonging to an ART support group was associated with better adherence ($p < 0.0001$) when pill coverage was used as a proxy adherence indicator.

Table 16: Measures of Association of Patient Factors with Adherence Based on Dispensing and Attendance Data

Patient factor	Pill coverage (Pr > |t|)	Appointment keeping (Pr > ChiSq)
Gender	0.1722	0.6145
Age	0.8326	0.0431
Level of formal education	0.0941	Null
Marital status	0.8668	Null
Employment status	0.0545	0.0337
Regularity of source of income	0.8400	0.3893
Disclosure of HIV status	0.4912	0.7806
Perception of one's health status since start of ART	0.2589	Null
Having someone to support	0.9631	0.0201
Alcohol	0.3685	0.1495
Depression	0.7706	Null

Note: "Null" indicates that there were null values in the cross-tabulation of the parameters, and therefore the statistical test could not be run.

Table 17: Measures of Association between Health System Factors and Adherence Based on Dispensing and Attendance Data

System determinants	Pill coverage (Pr > |t|)	Appointment keeping (Pr > ChiSq
WHO stage at start of therapy	0.0033	Null
Managing authority of facility	0.2913	0.0475
Health facility	< 0.0001	Null
Current ART regimen	0.0166	Null
Being treated differently	0.6593	0.7500
Start ART at present facility	0.0716	< 0.0001
Belonging to an ART support group	< 0.0001	0.1758
Change in therapy	0.7699	0.0955

Note: "Null" indicates that there were null values in the cross-tabulation of the parameters, and therefore the statistical test could not be run.

Patient Perceptions of What Caused Them to Miss a Dose

Overall, of the 589 patients on ART who were interviewed, 73.3 per cent (n = 432) indicated they had never missed a dose of their medication while 26.7 per cent (n = 159) reported that they had missed a dose. This result compares well with the findings for INRUD indicator 3, which showed that during the study period, 29.9 per cent of patients had gone for their clinic appointment after their ARVs were supposed to have been consumed[9]. A considerable

[9] INRUD indicator 3: percentage of all visits in the last six months made before, within three days, or more than three days after the medicine supplied at the previous visit had been consumed

proportion of this group of patients is likely to be among those who reported they missed doses. All 159 patients who reported ever missing a dose were asked to mention all the things that had ever caused them to miss a dose. Figure 2 shows the reasons they gave.

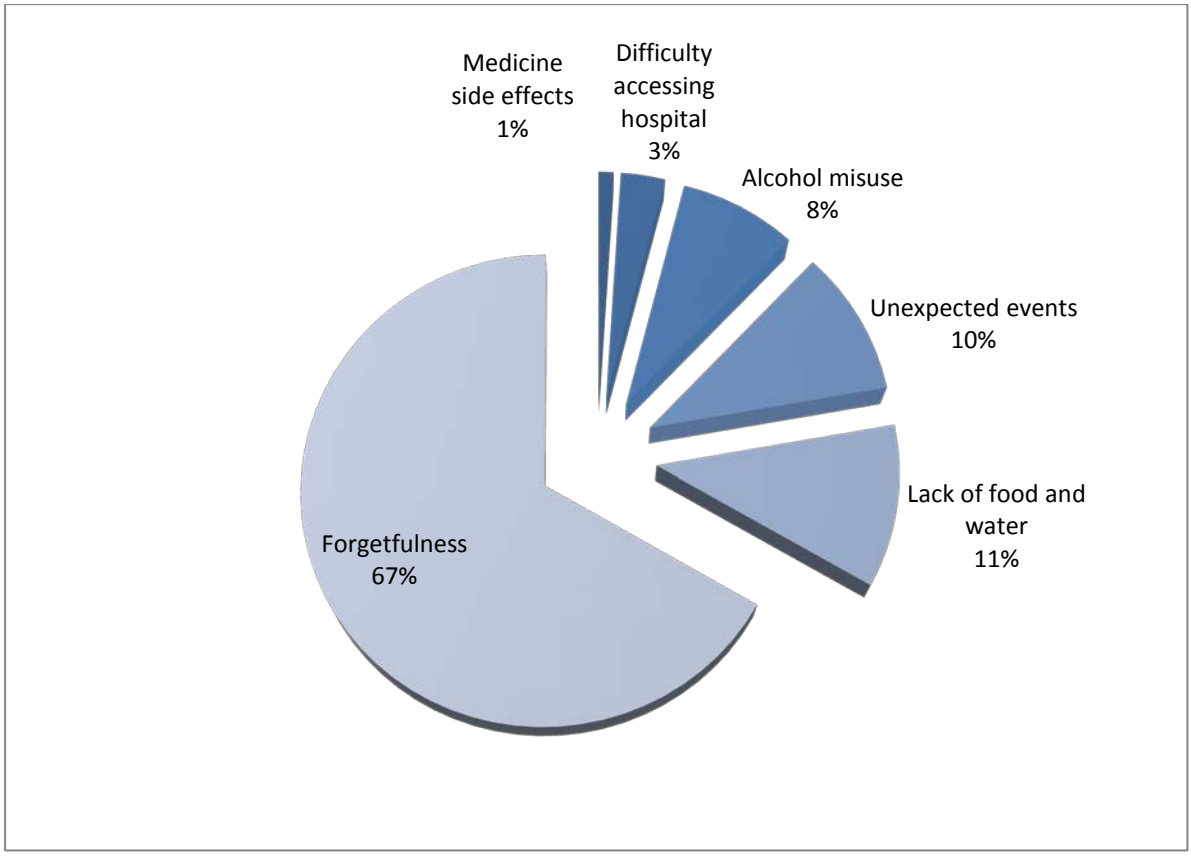


Figure 2: ART patient responses about factors that caused them to miss a dose

A total of 198 responses were elicited from 159 patients. Of these responses, 67.0 per cent were categorised under the theme of forgetfulness, comprising responses such as the following: *"Misplacing or losing my medicine"; "Not knowing what time it was"; "My alarm or other reminder was not near me"; "Being preoccupied with something else"; "Not waking up in time to take my pills"*. Another 11.1 per cent of responses were categorised as lack of food and water, and 10.1 per cent of responses where categorised as unexpected events. Unexpected events included responses such as *"Not being close to home"; "Travelling away from home";* and *"Working later than normal hour"*. Alcohol misuse (8 per cent), difficulty accessing the hospital, and medicine side effects were the other factors patients mentioned has having caused them to miss a dose.

Health Worker Perceptions of Factors Keeping Patients from Attaining High Levels of ART Adherence

Health workers were asked to give their opinion about what factors they thought made it difficult for their patients to attain high levels of ART adherence. Multiple responses were elicited from each health worker, totalling 245 responses for this aspect of the investigation. These responses were categorised under the following themes: forgetfulness, difficulty accessing the hospital, poverty issues, alcohol and drug abuse, unexpected events, stigma, not

understanding instructions, and lack of family or community support. Figure 3 shows the themes of reasons given by health workers of factors making it difficult for their patients to attain high levels of ART adherence.

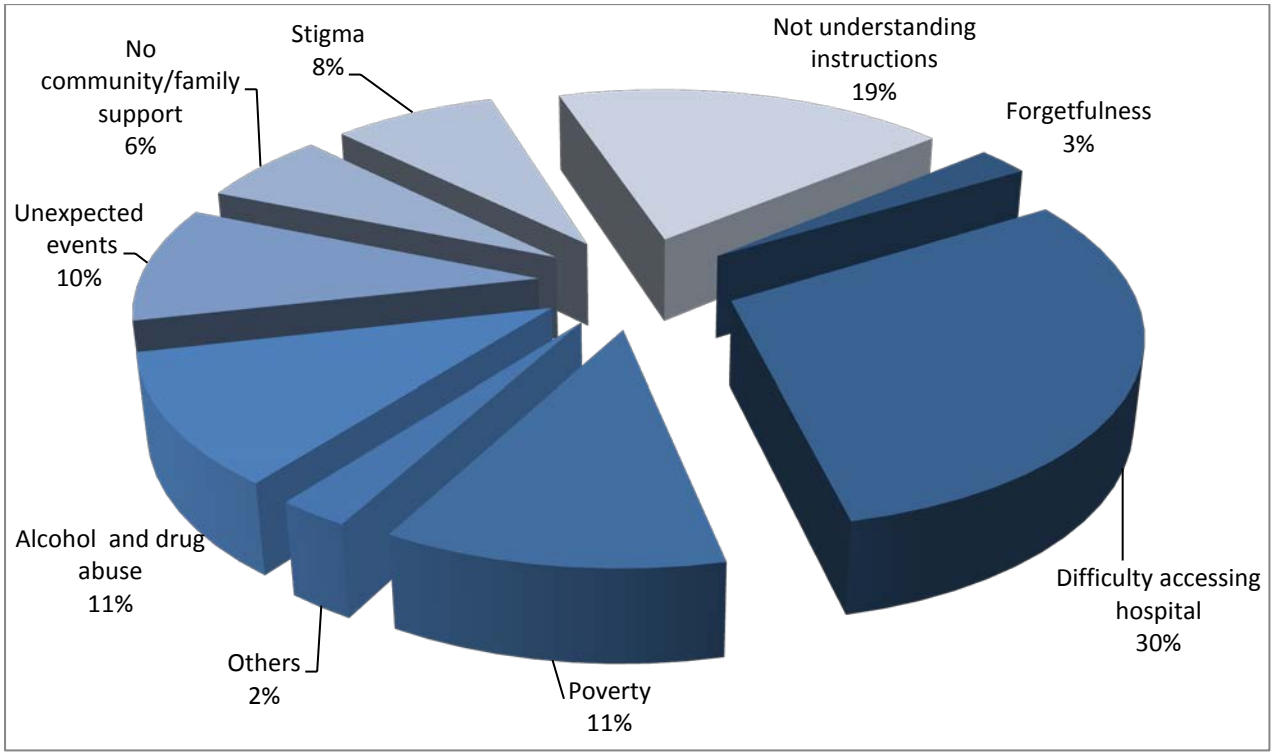


Figure 3: Health worker responses about what factors make it difficult for patients to attain high levels of ART adherence

The findings reveal that 30.0 per cent of responses by health workers as one of the reasons why patients found it hard to attain high adherence to ART were related to difficulty accessing the hospital. Responses in this theme included the following: *"There being long distances to the health facility"; "Patients having no transport"; "The cost of transport being high"*.

Not understanding instructions (19.0 per cent) was a key issue in the opinion of health workers for why patients found it hard to attain high adherence to ART. Some of the responses in this theme were *"Patients do not understand instructions on ARVs"; "Patients just ignore instructions given by the health workers"; "There are too many medicines with confusing instructions"; "There are also language barriers between some heath workers and patients"; "Religious beliefs and traditional healers confuse the patients"*.

Unexpected events cited by the health workers included patients having travelled away from home, floods, and patients not having a routine job and hence no fixed working hours.

All 99 health workers were asked to what extent they agreed or disagreed with the following statements: inadequate communication materials are a significant barrier to adherence counselling and patient information at this facility; staff overloaded with too much work or too many clients is a significant barrier to adherence counselling and monitoring of patients on ART at this facility; health worker–patient communication is a significant barrier to

provision of services to patients on ART at this facility; and waiting time is a major barrier to patients' adherence at this facility. Figure 4 shows the proportion of health workers who agreed or disagreed with the statements.

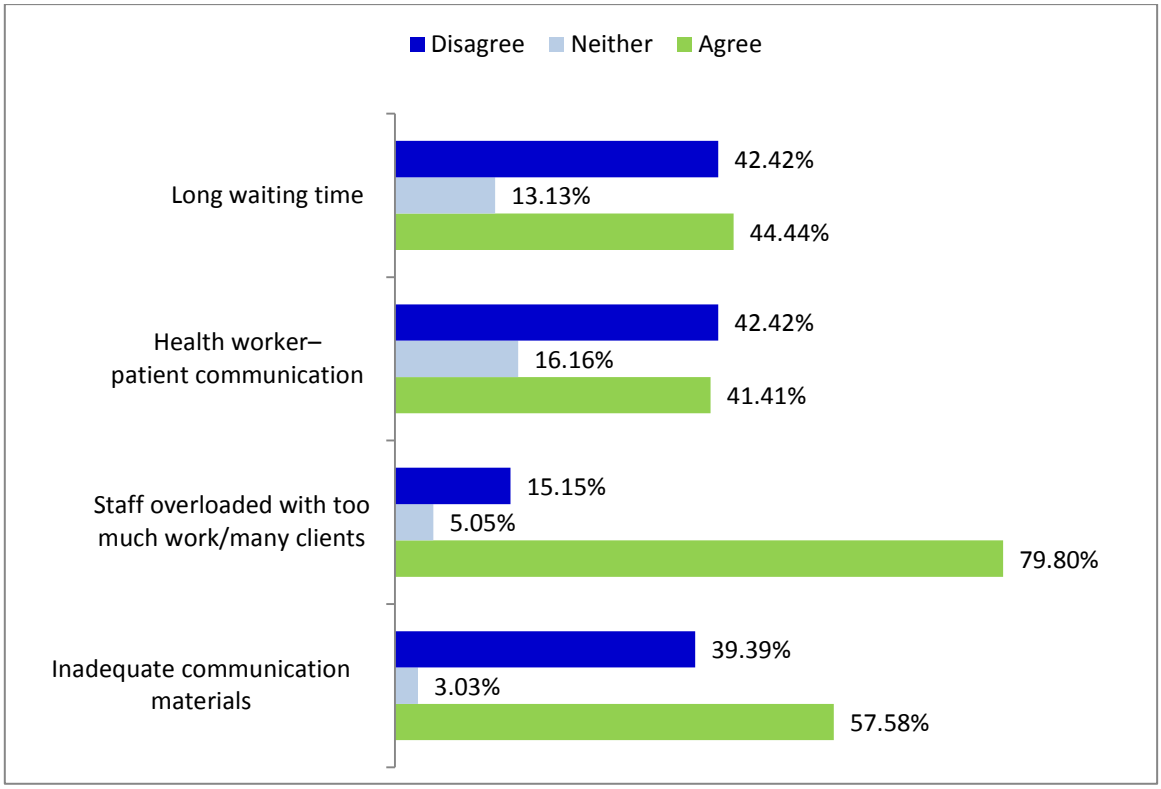


Figure 4: Proportion of health workers who agreed or disagreed with statements regarding significant barriers to adherence

Results indicate that about an equal proportion of health workers agreed (44.4 per cent) and disagreed (42 per cent) with the statement regarding waiting time. Similarly equal proportions of health workers agreed (40.8 per cent) and disagreed (42 per cent) with the notion that health worker–patient communication was a significant barrier to provision of services to ART patients at their facility. These factors require further investigation. "Staff overloaded with work or too many patients" was the one statement to which the majority of health workers (79.8 per cent) agreed. Therefore, high workload at facilities is a key limitation to improving adherence in Namibia.

In this study, 57.6% of the health workers reported that the lack of communication materials was a major barrier to adherence and 41.4% reported significant challenges int eh patient Health worker communication. These findings are associated with the fact that a proportion of Doctors and nurses providing ART services are foreign citizens and do not know the local languages of the patients. In additional to challenges in communication, 67% of the patients that missed a dose, reported that the main reason for missing the dose was because they forgot. These important finding points to the need to enhance information availability and access to enable patients understand the importance of ART and prevention of HIV drug resistance. Because most patients reported forgetfulness, a reminder system to enable patients not to miss their medication will be an important strategy to enhance adherence to ART.

Adherence Counsellor Perceptions of Factors That Make It Difficult for Their Patients to Attain High Levels of ART Adherence

Forty-four adherence counsellors were asked what reasons they thought make it difficult for their patients to attain high levels of ART adherence. One hundred responses were elicited and categorised into themes. Figure 5 shows the proportion of themes of responses.

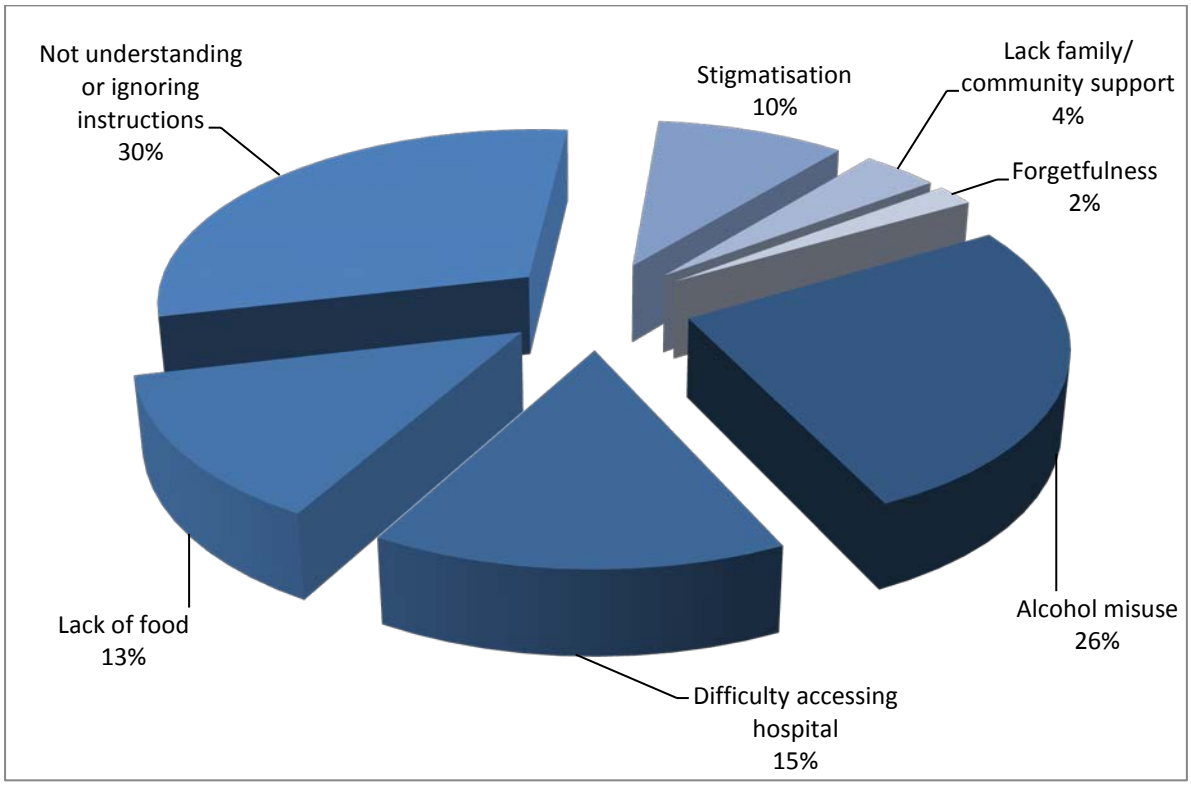


Figure 5: Adherence counsellor responses about what factors make it difficult for their patients to attain high levels of ART adherence

Survey results indicate that 30.0 per cent of respondents were of the view that not understanding or ignoring instructions was one of the key factors that caused patients to miss a dose. Alcohol misuse accounted for 26.0 per cent of responses, while difficulty in accessing the hospital and lack of food were 15 per cent and 13 per cent, respectively. Stigma accounted for 10.0 per cent of responses. Responses in the stigma category included the following: *employers refusing to give permission to go for clinic visits* and *patients not wanting to be known to be receiving ART*.

All 44 adherence counsellors were asked to what extent they agreed or disagreed with the following statements: inadequate communication materials are a significant barrier to adherence counselling and patient information at this facility; staff overloaded with too much work or too many clients is a significant barrier to adherence counselling and monitoring of patients on ART at this facility; health worker–patient communication is a significant barrier to provision of services to ART patients at this facility; and waiting time is a major barrier to patients' adherence at this facility. Figure 6 shows the proportion of adherence counsellors who agreed or disagreed with the statements.

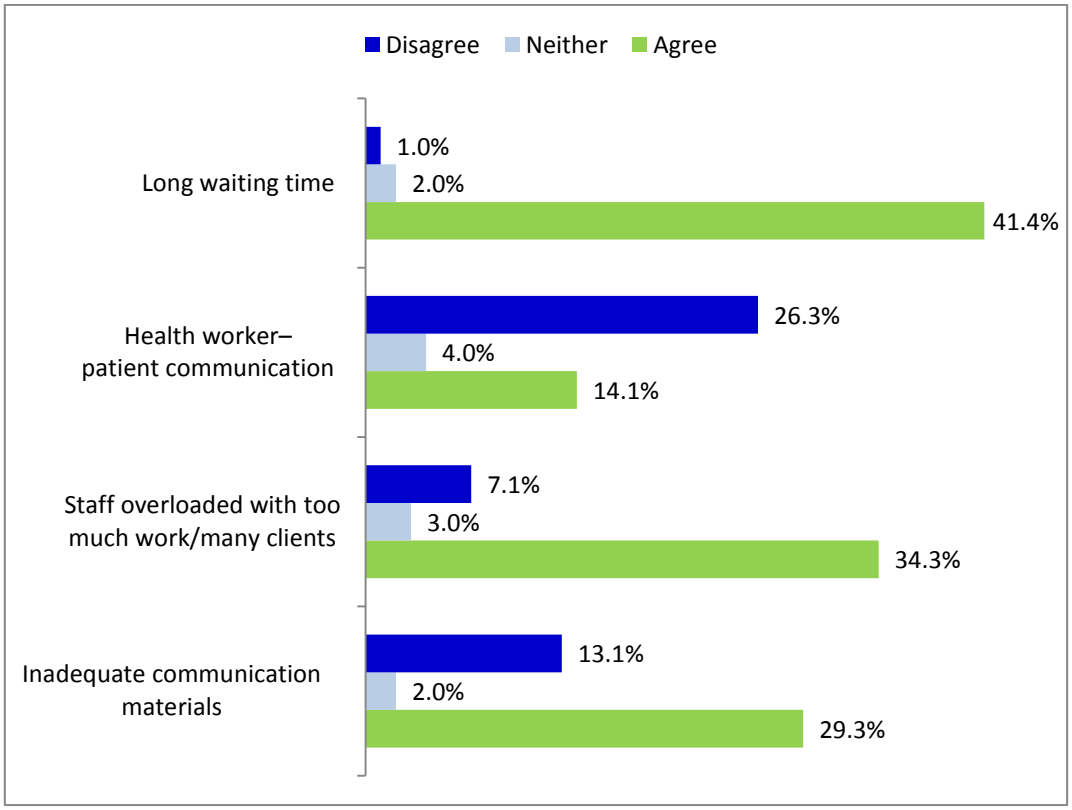


Figure 6: Proportion of adherence counsellors who agreed or disagreed with the statements regarding significant barriers to ART adherence

Findings indicate that, unlike health workers, the majority of adherence counsellors (70.5 per cent) agree with the statement that waiting time was a major barrier to patients' adherence at the facility. Another notable difference of opinion between heath workers and adherence counsellors was with regard to health worker–patient communication as a significant barrier; a significant majority (65.9 per cent) of adherence counsellors agreed with that statement. Counsellors also agreed that workload (77.3 per cent) and lack of communication materials (65.9 per cent) were key limitations to improving ART adherence.

Current Adherence Intervention and Monitoring Tools in Hospitals

Adherence Interventions

Interviews with health workers revealed that the following adherence interventions or activities were carried out in the hospitals offering ART—

- Continuous adherence counselling
- Defaulter tracing
- Continuous health education
- Outreach

- Linking patients to community support organisations (non-governmental organisations [NGOs] and community counsellors)
- Provision of food support (Soup kitchen, e'Pap)
- Establishing special clinics (e.g., paediatric clinics, family clinic, etc.)
- Labelling medicine containers and explaining instructions written on the labelled containers

Interviews with 20 ART clinic heads revealed that pre-ART adherence counselling was carried out mostly by nurses and community counsellors. All but one ART clinic head revealed not having a private space in the ART clinic for adherence counselling. Group and one-on-one pre-ART adherence counselling were reported as being provided concurrently at the hospitals, with one-on-one counselling being reported by 17 of the 20 ART clinic heads and 10 of the 20 ART clinic heads reporting also providing group counselling.

With regard to labelling of medicine containers, the majority of patients interviewed (85.9 per cent, N = 506) did have their ARV medication with them on the date of the interview. For those that had their medicines on the day of the interview, the majority (99 per cent) of medicine labels were legible. The labels on the medical containers were assessed for legibility of the following: name of the patient; generic name of the medication; quantity dispensed; date of dispensing; quantity of medication dispensed; and number of pills to take and the frequency thereof.

The results indicated that—

- The name of the patient was not legible on 21.8 per cent of the labels.
- The generic name of the medication was illegible on 0.8 per cent of the labels.
- The quantity dispensed was not legible on 1.4 per cent of the labels.
- The date was not legible on 16.9 per cent of the labels.
- The strength of the medication was not legible on 1 per cent of the labels.
- The number of pills and frequency was not legible on 25.8 per cent of the labels.

Only 5.1 per cent (n = 30) of the respondents did not understand the instructions written on each of the ARV medicine containers. Reasons for not understanding the written instructions included not being able to read English and not understanding the dosage instruction or the names of the pills.

Two types of challenges stood out to the health workers when they were faced with ART patients who were lost or lost to follow-up. In most cases, patients had provided incorrect contact details (physical addresses; names and contact details). Second, health workers noted the lack of a dedicated transport system for conducting defaulter tracing.

Other responses elicited included the following: *"Some patients do not have permanent address"*; *"there is poor communication infrastructure (cell phone network coverage)"*; *"hospitals not having dedicated staff to conduct defaulter tracing"*; and *"ART clinic information systems are not linked with other hospitals hence one cannot see when patients visit other clinics"*.

Current Monitoring Tools

Interviews with health workers revealed the current adherence monitoring tools used in the hospitals. Multiple responses were elicited from each health worker; hence, 140 responses were elicited for this aspect of the investigation. These responses were categorised into the following themes: pill count, provider assessment, self-reporting, pick-up, and plasma levels. Figure 7 shows the proportional representation of each adherence monitoring tool used by health workers in the hospitals across Namibia. Results indicate that pill count (67.0 per cent) was the most frequently used tool, while self-reporting was used as a method of measuring adherence by 19.0 per cent of health workers.

All 589 patients on ART were asked to indicate which of the following statements applied to them when they were being served by the nurse, doctor, and pharmacist during that visit: "They only gave me the medicines and then left me"; "They counted (or asked me to count) the pills I had left"; "They asked me to identify the pills"; and "They asked me if I missed any doses, and if so, how many I had missed". Table 16 shows that for 16 per cent of patients, nurses gave them the medication and then left them to go. A further 32.8 per cent of patients mentioned that the nurses counted the pills or asked them to count their pills. For 24 per cent of the patients, nurses asked them to identify their pills, while for 40.0 per cent of patients the nurse tried to find out if they had missed any doses.

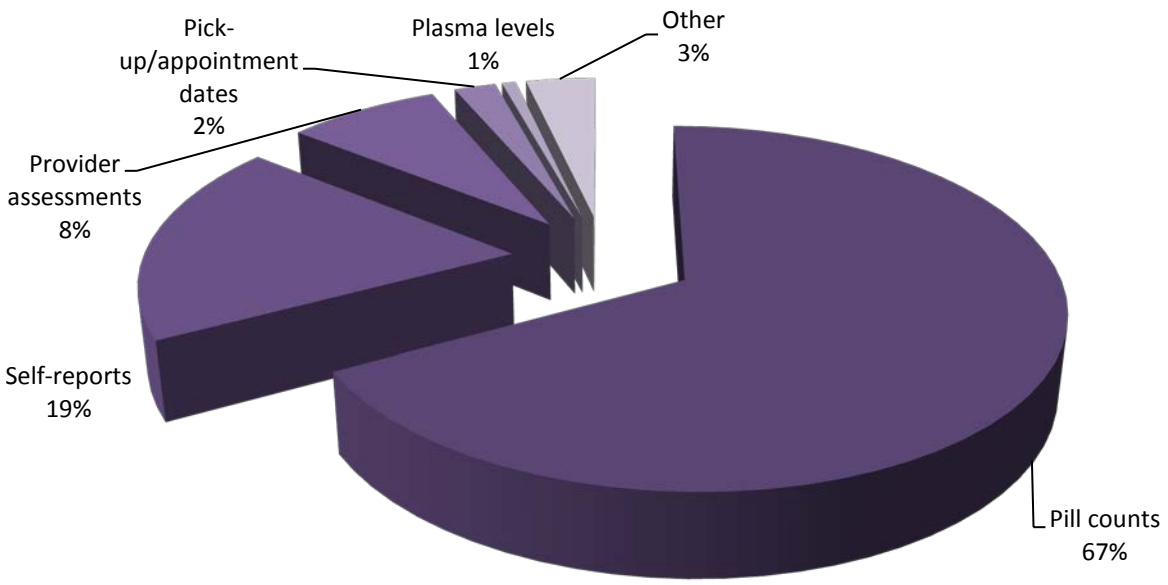


Figure 7: Health worker responses about the current adherence monitoring tools used in hospitals

Table 18: Responses by Patients about "Adherence Actions" by Health Workers

Adherence monitoring method	% patients reporting nurses	% patients reporting doctors	% patients reporting pharmacy staff
They only gave me the medicines and then left me	16.3	6.8	23.1
They counted (or asked me to count) the pills I had left	32.8	24.3	51.6
They asked me to identify the pills	23.6	24.6	43.3
They asked me if I missed any doses, and if so, how many I had missed	39.6	40.0	49.4

About 24.3 per cent of patients mentioned that doctors counted the pills or asked patients to count their pills. A further 24.6 of patients indicated that doctors asked them to identify their pills, and 40 per cent of patients mentioned that the doctor tried to find out if they had missed any doses. The relative proportions were similar for nurses.

About 23.1 per cent of patients indicated that pharmacists just gave them the medication and then left them. The prevalence of this trend is much higher for pharmacists than for nurses and medical practitioners. In all the public hospitals, patients get their ARVs from the pharmacy, and the nurses mainly provide a limited category of medicines, notably isoniazid for prophylaxis of tuberculosis. A larger percentage of patients (51.6 per cent) mentioned that the pharmacist counted the pills or asked patients to count their pills than the other health professionals. Forty-three per cent of patients indicated that the pharmacist asked them to identify their pills, and nearly 49.4 per cent of patients mentioned that the pharmacist tried to find out if they had missed any doses.

Measures to Improve ART Adherence

Health workers and adherence counsellors were asked what suggestions they had about how patient adherence to ART could be improved. The following themes emerged—

- Continuous adherence counselling (using support materials) and monitoring
- Food support (e.g., soup kitchen; e'Pap)
- Community/family/employer education
- Transport support
- Defaulter tracing, e.g., home visits, telephone follow-up and reminders
- Increase the number of staff
- On-going staff training
- Outreach activities
- Increase the number of clinics providing ART
- Improve clinic infrastructure, e.g., provide more space
- Improve recordkeeping
- Provide a dedicated ART pharmacy

In addition, health workers and adherence counsellors were asked to give their opinion regarding the values of various measures of ART adherence. They were asked to respond "very helpful", "somewhat helpful", or "not helpful at all" to seven different strategies or

activities to improve adherence. Figure 8 shows the proportion of health workers and adherence counsellors who viewed the respective strategies and activities as “very helpful”.

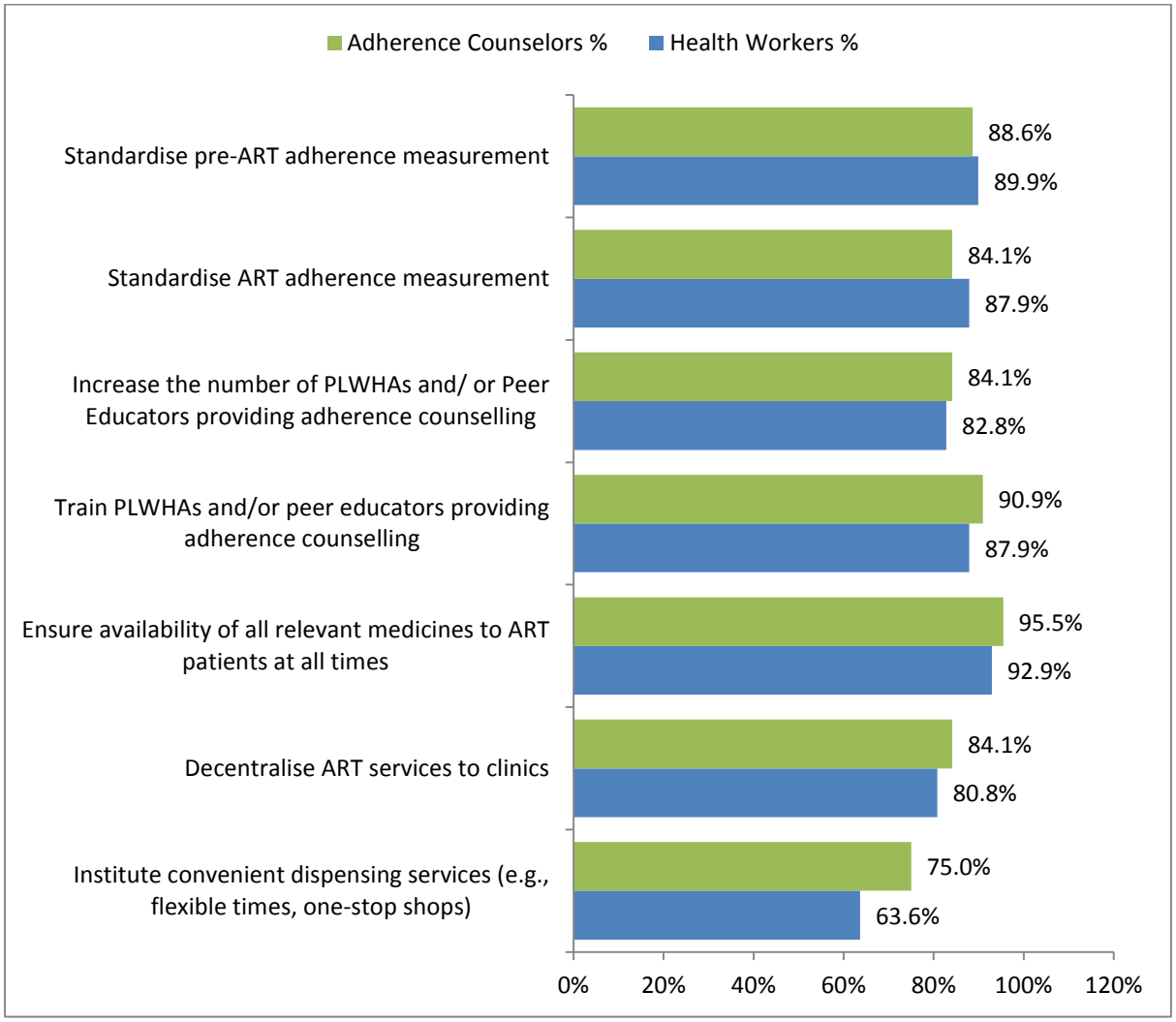


Figure 8: Health workers and adherence counsellors who viewed the respective strategies and activities as “very helpful”

The results in figure 8 indicate that, overall, more than 63.3 per cent of all adherence counsellors and 75.0 per cent of health workers interviewed were of the opinion that all the strategies and activities were very useful.

CONCLUSIONS AND RECOMMENDATIONS

National Baseline Adherence Estimates

The goal of this survey was to determine national baseline information on adherence to ART to guide the development and implementation of strategies to improve adherence among patients living with HIV/AIDS in Namibia. National baseline information on adherence to ART was determined using INRUD adherence indicators and the baseline adherence estimate used the multi-method approach. The problem with measuring adherence to ART is that the behaviour takes place in the privacy of the patient's home. Therefore, all measures are indirect and subject to different biases and inaccuracies. Thus, the estimates presented in this report should be viewed with these facts in mind.

Dispensing-Based Measures

It is important to keep in mind that using dispensing data may overestimate true adherence because the patient may have received the medicine but not consumed it correctly. However, if the patient never received the medicine, then he or she cannot adhere to treatment. In this spirit, the following dispensing-based measures of adherence were established.

Days Covered by ARVs

This survey shows that on average 117.2 per cent of days were covered by ARVs with a small standard error of 0.67, which indicates a good estimate of the percentage of days covered by ARVs of any HIV/AIDS patient who received more than one prescription during the study period (1 July 2010 until 31 July 2011) in Namibia. Similar analysis was applied to patients who have received ARV treatment for at least 180 days or more, and the average percentage of days covered by ARVs was estimated at 102.7 per cent (SEM = 2.48). One can thus conclude that for patients who were on ARV therapy for at least 180 days, the average percentage of days covered by ARVs is expected to lie between the limits of 97.7 per cent and 107.7 per cent with a 95 per cent probability ($p < 0.0001$). This measure was further disaggregated into the average percentage of days covered by ARVs of ART patients who were on treatment 7 months ago (between 1 June 2010 and 30 November 2010), which was 95.7 per cent (SEM = 2.0), and the average percentage of days covered by ARVs of ART patients who were on treatment between 13 and 25 months ago (start between 1 December 2009 and 31 May 2010), which was estimated at 98.2 per cent (SEM = 2.0).

Consistent with other reports of high availability of ARVs in all health facilities in Namibia, it is evident that all patients on ART received their ARVs as scheduled and gave 100 per cent of the days covered with medication.

Not much information is available about the average percentage of days covered by ARVs in the Southern African Development Countries. A survey conducted during 2006 and 2007 at 20 health facilities (5,890 patients) in four East African countries[10] by teams from INRUD and the respective country national AIDS control bodies revealed that the average percentage of days covered by ART dispensed over 180 days was 91.1 per cent (SEM = 0.4) (Chalker

[10] Kenya, Rwanda, Uganda, and Ethiopia

2009). Namibia shows a higher coverage than that of the East African settings in the INRUD studies. Evidently, availability of ARVs in Namibia is very high, and therefore the use of ARVs is an issue to focus on.

Patient Attendance Measures

A missed appointment should trigger programme action to reach out to patients at risk of defaulting on their treatment; however, because the patient may have had extra days of medicine, attendance failure within three days of an appointment can also be a trigger point. Finally, the programme's failure to re-establish contact with patients within 30 days of a missed appointment indicates the level of treatment defaulting (INRUD–IAA 2009). For these reasons, this survey was designed to establish baseline values for this measure of adherence.

Appointment Keeping

Of the 456,545 ART patient visits, 70.7 per cent took place on or before the official appointment date during the study period. A further 9.9 per cent attended the clinics > 0 and ≤ 3 days after the appointment date, and 11.0 per cent attended the clinic > 3 and ≤ 30 days after the appointment date. A total of 38,393 patient visits (8.4 per cent) were 30 days later than the official appointment date.

Results further reveal that of the 55,176 visits by patients who were on ART for at least 180 days, only 20.9 per cent attended all visits on or before the appointment date. A further 14.6 per cent attended > 0 and ≤ 3 days later than the appointment date, 28.1 per cent of patients attended > 3 and ≤ 30 days later, and 36.4 per cent attended more than 30 days later. The findings for this indicator (six-month period) are not comparable with those from studies by INRUD's Initiative on Adherence to Antiretroviral Therapy in Rwanda and Uganda, which revealed that for ART patients who were on therapy for at least 180 days, the percentage of patients who attended on or before their next appointment was 78.4 per cent (SEM = 1.8) and 71 per cent (SEM = 2.2), respectively. With regard to the percentage of patients on ART who attended within 3 days of the appointment in Rwanda and Uganda, the proportions were 93.4 per cent (SEM = 1.0) and 76.3 per cent (SEM = 2.0), respectively. It is important to note that the Rwanda and Uganda results were at study sites that implemented specific interventions and monitored adherence. The Namibia study takes place in a natural setting of day-to-day delivery of ART services in a resource-constrained setting.

Attendance before ARV Medicines Previously Dispensed Were Consumed

With regard to medicines consumed as a measure of adherence behaviour, this survey established a baseline of 70.1 per cent of patient visits in the last six months made before the day on which the medicine supplied at the previous visit had been consumed. A further 8.5 per cent of patient visits in the last six months were made zero to three days after the medicine supplied at the previous visit had been consumed, and 21.4 per cent of patient visits were made more than three days after the medicine supplied at the previous visit had been consumed. Therefore, 78.6 per cent of patients pick up their refills on time (not in terms of keeping the appointment date but before medicines are consumed) and 21.4 per cent of the patients do not pick up their refills on time and are at a high risk of running out of medication and increasing the risk of drug resistance.

Patient Retention

This survey established that a 12-month retention rate at baseline for patients on ART between 1 June 2009 and 31 May 2010 was 66 per cent. Therefore, the annual attrition rate (from all causes) of ART patients is 34 per cent. This finding is comparable with other findings in other ART programmes in Africa. A systematic review of patient retention in ART programmes in Sub-Saharan Africa revealed that ART programmes in Africa had retained about 60 per cent of their patients at the end of the second year (Rosen, Fox, and Gill 2010). Loss to follow-up was the major cause of attrition, followed by death. Better patient tracing procedures, better understanding of loss to follow-up and earlier initiation of ART to reduce mortality were needed if retention was to be improved.

National Adherence Rates Estimated by the Multi-Method Tool

National adherence rates were determined using the multi-method tool developed and used in other ART adherence surveys in southern Africa. The adoption of the multi-method tool was based upon the WHO recommendation that states, "A multi-method approach that combined feasible self-reporting and reasonable objective measures is the current state-of-the-art in measurement of adherence behaviour" (WHO 2003, 5). The multi-method tool comprises the following four components that had been previously validated: self-report, VAS, PIT, and pill count (see table 19).

Until recently, self-report has been the main measure of ART adherence at public health facilities in Namibia. This survey shows that using self-reporting methodology, 11.6 per cent of patients on ART nationally had moderate adherence and 85.0 per cent (CI 79.7–90.4 per cent, SE = 2.6) had high ART adherence. However, several studies have shown a mismatch between self-reported adherence and biomedical indicators of adherence. In a sample of South Africans, only 57 per cent of patients who reported 100 per cent adherence achieved an undetectable viral load, that is, less than 50 copies per millilitre (Brown, Friedland, and Bodasing 2004).

In this study, adherence measurement using the VAS found that 28.2 per cent of patients nationally had moderate adherence and 47.1 per cent (CI 33.6–60.6 per cent, SE = 6.5) had high ART adherence. These estimates were lower than those determined with the self-reporting methodology, but patients are known generally to overestimate their adherence when asked to report.

Results using the PIT showed 78.3 per cent of patients nationally had moderate adherence. These estimates were much higher than those of the other two methodologies reported. Only 18.3 per cent of patients according to the PIT methodology had high adherence, which was much lower than those of the estimates by other adherence measures. Other studies in Namibia determining ART adherence levels using self-report, VAS, and PIT have revealed similar results (Hong et al. 2012).

According to the pill count method, only 5.9 per cent of patients nationally had moderate adherence, and 77.4 per cent of patients had high adherence levels. The results of pill count should be viewed with the knowledge that this method has been shown to be liable to pill dumping, white-coat adherence (Feinstein 1990), fabrication, and manipulation.

According to the multi-method tool, 84.5 per cent (CI 79.6–89.5 per cent, SE = 2.37) of patients nationally had moderate adherence and 7.3 per cent (CI 3.2–11.3 per cent, SE = 1.9) had high ART adherence. These results further reveal that 3.2 per cent (CI 5.4–11.1 per cent, SE= 1.4) of patients on ART had low adherence levels. No previous studies using this adherence measurement approach have been conducted in Namibia for comparison. However, one study conducted at two hospitals in South Africa using the multi-method tool revealed that the overall adherence rating tended to be conservative, yet the individual methods tended to overestimate adherence to varying extents. This finding is consistent with the findings of this survey, as illustrated in table 19.

Table 19: Components of the Multi-Method Tool and the Composite Score

	Estimated patient adherence level (%)		
Adherence measurement approach	**Low**	**Moderate**	**High**
Self-report	3.4	11.6	85.0
VAS	24.7	28.2	47.1
PIT	3.4	78.3	18.3
Pill count	16.7	5.9	77.4
Multi-method	11.1	84.5	3.2

The results from the multi-method tool are consistent with the perceptions of health workers and adherence counsellors, where equal proportions of health workers and adherence counsellors (54.5 per cent and 56.8 per cent, respectively) were of the opinion that the majority of the patients on ART at their hospitals had moderate adherence.

Baseline adherence behaviour estimates according to the multi-method tool for each of the 20 sampled hospitals reveal that all but one hospital (Rehoboth) had a proportion of interviewed patients with a low adherence estimate, and a sizable proportion had moderate adherence estimates. These varying adherence estimates at the various health facilities could imply that different facilities are currently carrying out different adherence strengthening activities, leading to the differences in patient adherence.

Determinants of Adherence

Patient-related factors are individual factors peculiar to the patient and under the patient's control. Health care providers have little or no control over the patient's behaviour, the decisions that the patient makes with regard to intake of medication, and the patient's perception of the need to take the medication and the resulting outcomes. According to the Multi Method Tool, only 7.3% of the patients had high adherence, which made difficult to identify predictors. However, a statistically and practically significant association ($p < 0.0001$) existed between one's perception of change in health status since start of ART and adherence behaviour determined by the multi-method tool. A statistical and practical significance association ($p > 0.000$) existed between adherence estimates using dispensing and attendance data and the different health facilities. Similarly, the type of ART regimen and belonging to an ART support group were statistically and practically significant ($p < 0.0001$).

The results also revealed no statistically significant differences between the overall adherence of males and females; no statistically significant difference between the overall adherence of patients in the different age groups; and no statistically significant difference between the overall adherence of patients with different WHO statuses.

No statistically significant differences were found between the overall adherence and the employment status, marital status, and highest level of formal education attained. A similar study conducted in Senegal (Sow, et al. 2012) revealed that patients on ART with at least a minimum of elementary education complied better with ART than those with no formal education but found no statistically significant difference between educational background of PLWHA and adherence to ARV medications. This same study noted that there were no statistically significant differences between the overall adherence according to age, gender, and occupational status.

This outcome is probable because government initiatives have made ARVs accessible and affordable for PLWHA in the country irrespective of educational status, age, gender, employment status, and marital status.

Perceptions of Patients and Health Workers on What Factors Caused Patients to Miss a Dose

Overall, 589 patients on ART were interviewed, of whom 73.3 per cent (n = 432) indicated they had never missed a dose of their medication, and 26.7 per cent (n = 159) reported they had missed a dose. All 159 patients who reported ever missing a dose were asked to mention all the things that had ever caused them to miss a dose: 11.1 per cent of responses were categorised as lack of food and water, and 10.1 per cent of responses where categorised as unexpected events. Unexpected events included responses such as *"Not being close to home"; "Travelling away from home";* and *"Working later than normal hour"*. Alcohol misuse, difficulty accessing the hospital, and medicine side effects were the other factors mentioned by patients has having caused them to miss a dose.

Health workers were asked to give their opinion about what factors made it difficult for their patients to attain high levels of ART adherence. Multiple responses were elicited from each health worker; hence, 245 responses were elicited for this aspect of the investigation. The findings revealed that 30.0 per cent of responses by health workers were related to difficulty accessing the hospital as one of the reasons patients found high adherence to ART hard to attain. Responses in this theme included *"There being long distances to the health facility"; "Patients having no transport";* and *"The cost of transport being high"*.

Not understanding instructions was, in the opinion of health workers, a key issue why patients found it hard to attain high adherence to ART; 19.0 per cent of responses were categorised under this theme. Some of these responses were *"Patients do not understand instructions on ARVs"; "Patients just ignoring instructions given by the health workers"; "There are too many medicines with confusing instructions"; "There are also language barriers between some heath workers and patients";* and *"Religious beliefs and traditional healers confuse the patients"*. Unexpected events cited by the health workers included *Patients having travelled away from home, floods,* and *patients not having a routine job hence no fixed working hours.*

Adherence Intervention and Monitoring Tools

Adherence Interventions

The following adherence interventions or activities were identified as being carried out in the hospitals offering ART: continuous adherence counselling; defaulter tracing; continuous health education; conducting outreach; linking patients to community support organizations (NGOs and community counsellors); providing food support (soup kitchen, e'Pap, etc.); establishing special clinics (e.g., paediatric clinics, family clinics); and labelling medicine containers and explaining instructions written on the labelled containers

Only 5.1 per cent (n = 30) of the respondents did not understand the instructions written on each of the ARV medicine containers. Reasons for not understanding the written instructions included not being able to read English and not understanding the dosage instruction or the names of the pills.

Two challenges stood out to the health workers when they were faced with ART patients who were lost or lost to follow-up. In most cases, patients provided incorrect contact details (physical addresses; names and contact numbers). Second, health workers noted no dedicated transport system existed for conducting defaulter tracing.

Current Monitoring Tools

Results indicate that pill count was the most frequently used tool, at 67.0 per cent of all responses. Self-reporting was also mentioned in 19.0 per cent of responses.

Sixteen per cent of patients indicated that nurses gave them the medication and then left them. Another 32.8 per cent of patients mentioned that the nurses counted the pills or asked patients to count their pills. Twenty-four per cent of patients indicated that nurses asked them to identify their pills, and nearly 40.0 per cent of patients mentioned that nurses tried to find out if they had missed any doses.

Of the patients interviewed, 24.3 per cent mentioned that doctors counted the pills or asked them to count their pills. Twenty-five per cent of patients indicated that doctors asked them to identify their pills, and 40 per cent of patients mentioned that doctors tried to find out if they had missed any doses.

Twenty-three per cent of patients indicated that pharmacists just gave them the medication and then left them. The prevalence of this trend is much higher for pharmacists than for nurses and medical practitioners. A larger percentage of patients (51.6 per cent) mentioned that the pharmacist counted the pills or asked patients to count their pills than other health professionals. Forty-three per cent of patients indicated that the pharmacist asked them to identify their pills, and 49.4 per cent of patients mentioned that the pharmacist tried to find out if patients had missed any doses.

Recommendations

In view of the preceding findings, the following interventions are recommended to improve patient adherence to ART in Namibia.

1. Most of the community adherence counsellors and health workers interviewed cited workload (77.3 per cent and 79.8 per cent, respectively) and lack of communication materials (65.9 per cent and 57.6 per cent) as key limitations to improving ART adherence. To address these issues as well as others mentioned by patients and health workers as factors influencing ARV therapy (e.g., alcohol use, side effects) and to improve on-time pick-up, the MoHSS/DSP should continue with the roll-out of the comprehensive audio-visual ARV treatment literacy and adherence improvement program to empower the patients and the public, particularly those at the grassroots level, to become knowledgeable about ART. The primary objective of this intervention is to ensure that patients and clients on ART, their treatment supporters, family members, and the community at large are well informed. This intervention comprises a package of communication tools, namely, a pictorial flip chart, posters, and a series of DVDs that highlight salient personal experiences of patients on ART. These materials aim at standardising messages used for ARV treatment counselling, which ensures that the patient actively participates in the pre-ART and post-ART initiation counselling process. The materials are suitable for use at both health facilities and in the community (support groups as well as through mass media channels and the private sector).

2. The share of patients who report for a refill 3–90 days late is 51.2 per cent. This is a large proportion of patients who can be considered "lost" (for those 30–90 days late) in the system for one reason or another. Further investigation is needed into why patients do not keep appointments so that interventions to enhance adherence monitoring and interventions to enhance adherence including structured appointment systems, and down-referral can be considered and implemented. Although only 21.4 per cent of all patients on ART actually report for a refill when their medicines have run out, emphasis should be on educating patients about the need to keep appointments to minimise the risk of running out of medication. Treatment literacy and other interventions that will make service delivery efficient and client-friendly are therefore key areas that should be regularly examined and implemented to enhance on-time pick-up and minimise the risk of patients running out of medication. With a national average of 21.4 per cent of the patients reporting after their medication has been consumed, the number of patients in this group needs to be reduced. Key focus should be on the poorly performing regions, which should be regularly reviewed and supported with targeted interventions. The regions of Caprivi, Erongo, Karas, Kavango, Kunene, Ohangwena, and Oshikoto, which reported more than 20 per cent of all patients attended more than 3 days after medicines had run out, need urgent attention. Further analysis is required to determine why these regions and facilities have the highest proportion of patients reporting late. This indicator is closely related to the on-time pick-up indicator, because once on-time pick-up improves, the proportion of patients who report after their medication has run out should decrease. The good performance of all Khomas region facilities (12 per cent on average), Rehoboth Hospital (12 per cent), Otjiwarongo Hospital (11 per cent), and Okahao Hospital (9 per cent) should be reviewed. Less than 13 per cent of their patients

showed up after their medicines had been consumed. Similarly, all facilities that had less than 70 per cent of their patients showing up before their medicines had been consumed need a lot of targeted support to understand the factors behind this low performance and to determine effective interventions that can be implemented to enhance on-time medicine pick-up.

The MoHSS should explore the feasibility of, and implement, targeted adherence improvement initiatives that could include the following—

- Automated SMS reminders for patients on ART: this is a potentially effective intervention, given that 67 per cent of patients who reported missing their doses attributed this failure to forgetfulness.

- Appointment reminders via SMS a few days before a scheduled appointment and after a missed appointment. Almost 30 per cent of the patients whose pill count data were available went to the clinic after the ARVs they had been given at the previous visit had been consumed.

- Use of MEMS containers for targeted adherence monitoring among patients who seem to have problems with adherence based on the currently available data sources. MEMS will enable verification of actual adherence rates as well as strengthen adherence rates among these patients.

3. Interestingly, despite one of the highest proportions (36 per cent) of patients who report for a refill after their medication has been consumed, Caprivi has the highest retention rate (74 per cent). Kavango also has a high proportion (37 per cent) of patients reporting for a refill after medication has run out, but it had a high retention rate of 66 per cent. This finding is a high indication of two scenarios: either (a) gaps in the accuracy of data, which need to be verified and attended to by enhancing accuracy of data and calling for data quality audits, or (b) a large proportion of patients are retained on treatment at sub-optimal levels, which increases the risk of HIV drug resistance in these regions. Further analysis is required. Overall retention rates in Namibia need to be increased, with greater focus on Erongo, Omaheke, Hardap, Karas, and Kunene regions.

   The retention rate of 66 per cent reported in this study, though comparable to the rate in other Sub-Saharan countries, can be improved with a variety of cost-effective interventions. This survey found that some facilities are carrying out defaulter tracing; however, this process is not well structured and is done more on an ad hoc basis. A structured and systematic defaulter tracing system should be set up for each health facility offering ART and tuberculosis services. The defaulter tracing system would have the following key components:

   - Consent for tracing: At the time of enrolment, patients are asked if they are willing to be traced by health facility staff if they miss a scheduled appointment. Patients who consent to be traced are asked to provide personal contact information (e.g., phone number, physical address). They are also asked to identify and provide contact information of a trusted person (e.g., friend or relative) who can be contacted if the patient cannot be reached.

- Identification of patients to be traced: Patients can easily be identified using the EDT. Patients who missed their appointment are given a three-day grace period to return to the clinic before tracing commences, unless their case is medically urgent.

- Actual tracing: Any health worker could do this, but a social worker would be preferable. The first tracing attempt is made with a phone call. Each ART clinic should have a dedicated (mobile) phone for patient tracing. If the patient cannot be reached by mobile phone (e.g., number no longer active or no answer), the social worker will visit the address provided at enrolment. After three unsuccessful attempts to trace the patient, the social worker should attempt to contact the trusted individual whom the patient identified at enrolment, first by phone and then in person.

- Data collection: The social worker categorises patients into the following possible outcomes: (a) confirmed dead, (b) came back to clinic, (c) admitted to hospital, (d) went to another health facility, (e) refused to come back to clinic, (f) unable to come back to clinic, and (g) not possible to trace.

- The final aspect of this system would be a report that is routinely produced of the defaulter tracing system and results of tracing activities.

4. Existing ART patient information systems at the ART clinics should be strengthened to improve the quality of data and obtain more accurate statistics on patient adherence, medication refill patterns, and retention on therapy. Particular attention should be paid to the health facilities that reported lengthy periods of missing data, such as Walvis Bay, Swakopmund, and Eenhana hospitals. On-going decentralisation of ART services to lower-level facilities should be accompanied by provision of appropriate tools to the staff at these sites to ensure appropriate record keeping and reporting of key parameters to higher levels.

5. Routine analysis of adherence data and quarterly review of adherence patterns at facility, regional, and national levels should be implemented. The MoHSS/DSP should arrange for periodic forums at regional and district levels to discuss ART-related information such as ART data quality, uptake of patients into the ART programme and ART coverage, patient adherence patterns, facility performance on the various HIV drug resistance early warning indicators, and other key ART programme indicators. The need to establish such forums has already been discussed in various forums at the MoHSS, for example, during the quarterly ART data verification meetings conducted by officials from the Response Monitoring and Evaluation sub-division, the Division of Pharmaceutical Services, and the DSP.The facilities with high medicine coverage require further evaluation to determine the factors underlying this very high coverage.

6. In Namibia, it is evident that self-reporting and pill count as measures of adherence tend to overestimate adherence levels. Interestingly, the PIT was the most closely correlated method of measuring adherence when compared to the multi-method tool.

Given the baseline adherence levels reported in Namibia of 7.3 per cent, 84.5 per cent, and 8.2 per cent reporting high, moderate, and low adherence levels (respectively) based on the multi-method approach, regular reviews of adherence rates in selected facilities should be accomplished to determine ART adherence levels across the country and to develop interventions that will increase the proportion of patients with high adherence and reduce the patients in the low adherence category. All facilities with 10 per cent or more of their patients indicating low adherence (according to the multi-method approach) should be focus regions, and facilities should receive support to enhance adherence.

7. Patients' perception of benefits of a specific treatment is well known as a key determinant of adherence to that treatment, and though driven by a low percentage of patients that are highly adherent, this study shows a statistically significant association ($p > 0.0001$) between one's perception of change in health status since start of ART and adherence measured by the multi-method tool. Therefore, patients' perceptions of the impact of ART on their health need to be reviewed so those who feel no difference or minimal impact on their health have occurred can be re-counselled on the need for adherence to ART and evaluated for clinical indicators of immunological and physical improvement in health. This finding however requires further investigation.

8. A variation in adherence rates of patients on specific regimens was reported. Patients on AZT/3TC/NVP had a statistically significant lower average percentage of days covered than those on the ART regimens AZT/3TC/TDF/LPV-r, D4T/3TC/NVP, and D4T/3TC/EFV. Because AZT/3TC/NVP is one of Namibia's first-line regimens, factors associated with this regimen that may be affecting adherence, including side effects, pill burden, taste, and other pill characteristics, will require further investigation.

9. This baseline study shows a wide variation in adherence indicators across the 20 facilities included in this study. Notably, some facilities are performing above average in all indicators and should be emulated. Therefore, factors that enhance service delivery in the best-performing facilities need to be evaluated and considered for implementation in other facilities that are facing challenges in implementing adherence interventions. Performance is not static, and specific factors can greatly affect the performance of a specific facility in either direction. Therefore, regular review of these indicators is recommended.

10. With a significant association between belonging to a support group and better adherence, a deliberate effort should be made to minimise stigma and enhance availability of and participation in support groups in the communities where patients live.

11. Among the patients that reported having missed a dose, the majority of patients (67 per cent) reported the main reason to be "they forgot" to take their medication. A patient reminder system is needed so patients take their pills at specific times and go to health facilities and pick up their refills on time. Other resource settings have varied experiences on the use of radio reminders and SMS to remind patients to take their medication or pick up their refills. Namibia can borrow from these experiences and implement appropriately.

12. The majority (79.8 per cent) of health workers reported workload as the most important barrier to enhancing adherence. Therefore, a review of workload is recommended (especially at facilities with the highest proportion, 10 per cent or more, of their patients with low adherence) so that support can be provided for interventions deemed relevant, such as distribution of workload across the week or month, development of an appointment-keeping system, down-referral, outreach, and task shifting. Namibia, however, continues to experience a shortage of health workers to provide optimal ART and other services at public hospitals. As on-going efforts are made to improve the situation through training of health workers at the University of Namibia, the National Health Training Centre, and other institutions, the following interventions can help mitigate the shortage—

    - Sharing tasks for ART services with lower cadres in the system: This process is already in progress. Efforts should be made to put appropriate data collecting and reporting systems in place to ensure appropriate monitoring of ART patients at the lower levels of care.

    - Providing in-service training of health workers in identified problem areas: The problem areas can be identified during supportive supervision visits or from analysis of routine reports submitted to the regional and national levels.

    - Pre-service training: ART adherence should be integrated in the training curricula of local medical, pharmacy, and nursing schools.

    - Providing guidance to health workers through provision of standard operating procedures, guidelines, and job aides to assist them in providing quality ART services.

13. The HIV counsellors presented a key perspective of 30 per cent of the patients not being as adherent as expected because they do not understand instructions and 26 per cent because of alcohol misuse. Treatment literacy interventions should be developed to educate patients and the public on specific aspects of the importance of taking ARVs and other medications as instructed, side effects, and general guidelines on taking ARVs. Second, patients should be educated and supported on the benefits of not using alcohol while taking ARVs. The inadequacy of communication and treatment literacy materials was also reported as a key limitation in ensuring optimal adherence by 57.6 per cent of the health workers. Additional communication materials that enhance effective communication between the health worker and the patient should be developed, including posters, flip charts, and short videos on specific themes so that the basic information related to ARVs, HIV, and ART is widely available to patients. As a result, patients would present more complex questions for health workers to assist them with.

14. Variability was noticeable in what patients reported as health worker actions to monitor their adherence during clinic appointments. Patients reported different approaches on how health workers have been accomplishing the monitoring of adherence, including health workers counting the pills, patients counting the pills, and patients being asked whether they missed a dose. As recommended by 84.1 per cent of the counsellors and 87.8 per cent of the health workers, a standardised approach of

monitoring adherence, including when, who, how, and which tools to use, should be developed so that adherence results and approaches can be comparable across Namibia to minimise workload and ensure harmonisation. Adherence monitoring and improving practices require appropriately trained human resources to be available at the various levels of the health system as well as suitable standard operating procedures to guide the health workers.

BIBLIOGRAPHY

Brown, S., G. H. Friedland, and U. Bodasing. 2004. "Assessment of Adherence to Antiretroviral Therapy in HIV-Infected South African Adults." The XV International AIDS Conference: Abstract no. B12223.

CDC (Centers for Disease Control and Prevention). 2012. "CDC in Namibia Factsheet." CDC-Atlanta, GA. http://www.cdc.gov/globalhealth/countries/namibia/pdf/namibia.pdf.

CIA (Central Intelligence Agency). 2012. "Namibia." In *The World Factbook*. Wshington, DC: CIA. https://www.cia.gov/library/publications/the-world-factbook/geos/wa.html (accessed 1 November 2012).

Chalker, John. 2009. "Adherence Rates in Africa: How are we doing?" PowerPoint presentation to the Global Health Council, Washington, DC, 27 May.

Feinstein, Alvan. 1990. On white-coat effects and the electronic monitoring of compliance. *Archives of Internal Medicine* 150(7):1377–78.

Hirschhorn, L., R. Mukherjee, S. Manheimer, et al. 2002. "A Multi-Method Approach to Measuring Antiretroviral Therapy (ART) Adherence from the Cross-Site SPNS Adherence Collaboration." Poster exhibition: The XIV International AIDS Conference: Abstract no. WePeB5819.

Hong, Steven, Jean B. Nachega, Logan Jerger, et al. 2012. "Medication Possession Ratio Predictive of Short-term Virologic Response in Individuals Initiating Antiretroviral Therapy in Namibia." Presentation to 19th Conference on Retroviruses and Opportunistic Infections (CROI), Seattle, WA, 5–8 March.

INRUD–IAA (International Network for the Rational Use of Drugs Initiative on Adherence to Antiretroviral Therapy). 2009. Developing standard methods to monitor adherence to antiretroviral medicines and treatment defaulting in resource-poor settings. *Essential Medicines Monitor* 1: 4–8.

Kranzer, Katharina, and Nathan Ford. 2011. Unstructured treatment interruption of antiretroviral therapy in clinical practice: A systematic review. *Tropical Medicine and International Health* 16 (10): 1297–1331.

Kroenke, Kurt, Robert Spitzer, and Janet Williams. 2001. Validity of a brief depression severity measure. *Journal of General Internal Medicine* 16(9):606–13.

Kunutsor, Setor, Morgan Evans, Janine Thoulass, et al. 2010. "Ascertaining baseline levels of antiretroviral therapy adherence in Uganda: A multimethod approach." *Journal of Acquired Immune Deficiency Syndromes* 55(2): 221–24.

MoHSS (Ministry of Health and Social Services, Namibia). 2007. "Mid-Term Review of the Third Medium-Term Plan for HIV/AIDS in Namibia."

———. 2008a. *Estimates and Projections of the Impact of HIV/AIDS in Namibia*. Windhoek: MoHSS, Directorate of Special Programmes, Response Monitoring and Evaluation Sub-division.

———. 2008b. *Health and Social Services Review, 2008*. Windhoek: MoHSS.

———. 2010. "Namibia ART Adherence Assessment and Improvement Initiative: Proposal for the Survey and Activity Plan." MoHSS, Windhoek, Namibia.

———. 2012. *Global AIDS Response Progress Reporting 2012: Monitoring the 2011 Political Declaration on HIV/AIDS.* Windhoek: MoHSS, Directorate of Special Programmes.

National Planning Commission. 2012. *Namibia 2011 Population and Housing Census Preliminary Results*. Windhoek: National Planning Commission.

Republic of Namibia and the Health Systems 20/20 Project. 2008. *Namibia National Health Accounts 2001/02–2006/07*. Bethesda, MD: Health Systems 20/20 project, Abt Associates Inc.

Rosen, Sydney, Matthew Fox, and Christopher Gill. 2010. Patient retention in antiretroviral therapy programs up to three years on treatment in sub-Saharan Africa, 2007–2009: Systematic review. *Tropical Medicine and International Health* 15 (Suppl. 1):1–15.

Seppa, Kaija, Jaana Lepisto, and Pekka Sillanaukee. 1998. Five-shot questionnaire on heavy drinking. *Alcoholism: Clinical and Experimental Research* 22(8):1788–91.

Sow, P. G., M. Coume, A. Gaye, et al. 2012. Determinants of medication adherence among people living with HIV/AIDS in Senegal. *Universal Journal of Education and General Studies* 1(6):174–79.

Steel, Gavin, Jude Nwokike, and Mohan Joshi. 2007. *Development of a Multi-Method Tool to Measure ART Adherence in Resource-Constrained Settings: The South Africa Experience.* Submitted to the US Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health.

Steyn, H. S. 1999. Practical significance: The use of effect sizes. Scientific Contribution, Series B: *Natural Sciences* 117.

Synergos, McKinsey & Company. 2009. "Consumer Exit Interview Review Tool as quoted in Strengthening Public Health through Leadership Development and Health Systems Innovation." Synergos, McKinsey & Company, and the Presencing Institute.

WHO (World Health Organization). 2003. *Adherence to Long-Term Therapies: Evidence for Action*. Geneva: WHO.

———. 2010a. *WHO Country Cooperation Strategy 2010–2015: Namibia*. Windhoek: WHO Regional Office for Africa.

———. 2010b. “WHO framework for global monitoring and reporting.” WHO, Geneva. http://www.who.int/hiv/pub/me/framework/en/index.html.

APPENDIX 1: ART HEALTH FACILITIES REPORTING THROUGH THE EDT – 30 JUNE 2011

Health	Name of facility	Number of patients per clinic		Number of patients per region
		n	Percent	
Caprivi	Katima Mulilo	4,733	100.0	4,733
	Omaruru	623	9.1	
	Swakopmund	2,089	30.6	
	Usakos	387	5.7	
Erongo	Walvis Bay	3,736	54.7	6,835
	Aranos	185	9.7	
	Mariental	928	48.8	
Hardap	Rehoboth	787	41.4	1,900
	Karasburg	711	22.3	
	Keetmanshoop	1,103	34.7	
Karas	Lüderitz	1,369	43.0	3,183
	Andara	1,002	12.3	
	Nankudu	1,455	17.8	
	Nyangana	1,130	13.8	
Kavango	Rundu	4,581	56.1	8,168
	KHC	5,236	39.4	
	KIH	5,017	37.7	
	Khomasdal	558	4.2	
	Otjomuise	168	1.3	
	Robert Mugabe	489	3.7	
Khomas	Windhoek CH	1,836	13.8	13,304
	Khorixas	364	20.8	
	Opuwo	790	45.2	
Kunene	Outjo	595	34.0	1,749
	Eenhana	2,588	26.1	
	Engela	3,886	39.1	
	Odibo	885	8.9	
	Okongo	1,465	14.8	
Ohangwena	Ongha	1,107	11.2	9,931
Omaheke	Gobabis	1,544	100.0	1,544
	Okahao	2,350	19.3	
	Okalongo	921	7.6	
	Onesi	233	1.9	
	Oshikuku	3,233	26.6	
	Outapi	4,886	40.1	
Omusati	Tsandi	552	4.5	12,175
	Ongwediva	1,308	12.1	
Oshana	Oshakati	9,499	87.9	10,807
	Onandjokwe	8,931	84.0	
	Oshivelo	403	3.8	
Oshikoto	Tsumeb	1,297	12.2	10,631
	Grootfontein	1,215	24.2	
	Okahandja	1,181	23.5	
	Okakarara	320	6.4	
	Otjiwarongo	2,314	46.0	5,032
Otjozondjupa	Osire	2	0.0	
Total		89,992		89,992

APPENDIX 2: PATIENT INTERVIEW SCHEDULE

Republic of Namibia

Ministry of Health and Social Services

The Namibia Baseline ART adherence Survey
October to December 2009

Patient Consent Form
Introduction and Consent

Hello, my name is _____. I am working with the Ministry of Health and Social Services. We are conducting a survey on adherence of patients to antiretroviral therapy (ART). We would very much appreciate your participation in this survey. The survey usually takes between 45 and 60 minutes to complete.

Your medical records were reviewed before this survey started and these were used to identify you as a participant in the survey.

As part of this survey we will ask you some questions about yourself, your household and your medicine taking habits. We will also check on issues such as your well-being and alcohol use. All of the answers you give will be confidential. Participation in the survey is completely voluntary. If we should come to any question that you do not want to answer, just let me know and I will go on to the next question. You can also stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Signature of interviewer: _____

Date: _____

RESPONDENT AGREES TO BE INTERVIEWED- 1

RESPONDENT DOES NOT AGREE TO BE INTERVIEWED- 2 (END)

Interview No.: __ __ / __ __ / ___ ___

SECTION 1: Interview Details

Name of Interviewer	
Name of Health Facility	
Interview Number (*Facility Code*/*Interviewer #*/*Sequential Serial #*)	__ __ / __ __ / ___ ___ - ___ ___
Date of Interview (*dd/mm/yyyy*)	__ __ / __ __ / ___ ___
Interview Start Time (*hh:mm*)	

* Obtain Sequential Serial Number from the ART Master Sheet

SECTION 2: Interview Questions

A. Socio-Demographic Details and Disclosure of HIV Status

For the parameters whose response is not included in the options given, enter the actual response in the right-hand column.

Question Reference No.	Interview Questions	Reserved for Data Analysis
a1.	Sex (*m/f*) ……	
a2.	[11]Date of birth (day/month/year *e.g. 17/05/1970)* __ __ / __ __ / ___ ___	
a3.	What is the highest level of formal education you have attained? (1) None (2) Grade 10 (3) Grade 12 (4) College (5) Other (specify……..)	
a4.	What is your religion? …….. (1) Catholic (2) Protestant (3) Muslim (4) Other (specify .....)	
a5.	[12]Marital status ……. (1) Single (2) Cohabiting (3) Married (4) Separated (5) Widowed (6) Divorced (7) Other (specify)	
a6.	In what form of employment are you currently working? ……... (1) Employed full time (2) Employed part time (3) Self-employed (4) Unemployed (5) Other (specify)	
a7.	Do you have a regular source of income? (*Y/N*) If *Yes*, specify here: ……..……..……..……	
a8.	I will now ask you about the household in which you live. How many people do you live with in your household? (*Household is people with whom patient shares meals*) Adults: (≥ 18 years)……. Children: (<18 years)…….	
a9.	Is there a time in the last 12 months when your household had to starve or had little or no food? (1) Yes (2) No ---- **GO TO (a11)**	
a10.	For how long? If several spells, add up total number of days or weeks. __ __ *days*; __ __ *weeks*	
a11.	Have you disclosed your HIV status to your sexual partner (s)? (Y/N) If *No*, reason: ……..……..……..……	
a12.	Who (else) have you disclosed your HIV status to? (*List all, e.g., brother, uncle, pastor, parents etc.*) ……..……..……..……	

[11] Confirm in patient's data collection sheet.
[12] Confirm in patient's data collection sheet.

	……..……..……..……	

a13. Have you ever had any experience of being treated differently specifically because you are HIV positive? (At work, at home, at church, etc.) (*Y/N*)
Explain (*place, person and month/year*):
……..……..……..……
.....

B. Patient's Medical History

b1. When were you diagnosed and informed that you have the HIV disease? (nearest month and year)
(*month/year*) ___ ___ / ___ ___

b2. When did you start ART for the first time? (day/month/year – nearest month and year)
[Confirm from patient's preliminary data collection sheet] __ __ / __ __ / ___ ___

b3. Did you start ART at this facility? (*Y/N*)……

b4. Do you know why you are taking antiretroviral medicines? (*Y/N*)
……

b5. How would you describe your health since you started ART?
.....
(1) your health is *Better* (2) your health is *The same* (3) your health is *Worse*

b6. In the past six (6) months on ARVs, have you ever considered stopping taking your ARVs? (*Y/N*) ……..
Explain why:
……..……..……..……
.....
.....
.....

C. Knowledge about HIV/AIDS

We would like to understand what you know about the illness that you have. We know that many patients may not know a lot about their illness, and you should not feel uneasy if you are not very knowledgeable. Therefore, feel free to take your time and give an honest response, even if you are not sure of the answer; okay?
Could you tell me what you know about HIV/AIDS? (Allow the patient to say what he or she wants, list patient's responses in the space below, then probe on the following and fill in the table below.)
……..……..……..……
……..……..……..……
……..……..……..……

	Question	Patient's response	Correct (Y/N)
c1.	What is the cause of infection?		
c2.	From what you know, can HIV be cured?		
c3.	How long does the HIV infection last?		
c4.	Apart from this, is there anything else you may have heard from your community that explains HIV and AIDS in a different way? (Y/N) If (Y) explain: ……		

Interview No.: __ __ / __ __ / ___ ___

D. Knowledge about ARVs

We would like to understand what you know about ARV medicines. Can you help us by telling me what you know about ARVs? (Allow the patient to say what he or she wants, list patient's responses in the space below, then probe on the following and fill in the table below.)

……..……..……..……
……..……..……..……
……..……..……..……

	(a) Question	(b) Patient's response *(Record response in the exact words of the patient.)*	Correct *(Y/N)*
d1.	What is the goal of ARV therapy? (*Record response in the exact words of the patient.)* YES will be recorded if the patient mentions one or more of the following: prolong life, improve health, reduce viral load, increase CD4)		
d2.	What do you think happens in your body when you skip your ARV medicines? *(Record YES if patient mentions one or more of the following: viral load increases, health worsens, virus becomes resistant.)*		
d3.	How do you know that ARVs are working? *(YES if the patient mentions one or more of the following: improved health, reduced viral load, increased CD4.)*		
d4.	What are some of the side effects a person may experience when taking ARV medicines? (*List all that a patient mentions in column b of this table.*)		

E. Adherence Monitoring and Practices

In this section, we are trying to find out about how patients manage to take their medicines. We understand that many people on anti-HIV medication find it very difficult to take regularly and often miss doses. We won't be surprised if you have missed lots of doses as well. We need to know how many doses you have missed. Please feel free and open about the problems you face with taking ARVs. Everything you say here will remain confidential and will not be shared with anyone at the clinic.

<table>
<tr><td>e1.</td><td>Do you have your ARV medicines with you? May I see them? (Interviewer to check how many of the ARV medicine containers are labelled and fill in as <u>X</u> out of <u>Y</u> medicines in the space to the right below.)</td><td></td></tr>
<tr><td>e2.</td><td>Interviewer to check if the ARV medicine containers have the following details. If one (1) out of five (5) containers has a specific detail, enter <u>1/5</u> next to that detail, if <u>any of them</u> is lacking that detail enter <u>N</u>.
All containers have: (Indicate Y or N as appropriate)
Name of patient: ……. Date of dispensing: …….
Generic name of medicine: ……. Strength of medicine: …….
Quantity dispensed: ……. # of pills to be taken & frequency: …….</td><td></td></tr>
<tr><td>e3.</td><td>Do you understand the instructions written on all your ARV medicine containers? (Y/N)
If No explain: ……</td><td></td></tr>
<tr><td>e4.</td><td>During today's visit to the health facility, how did the health care workers monitor the way you take your medicines?
……
(1) Only gave you your medicines then you left
(2) Counted the pills you had remaining & recorded
(3) Asked you to identify the pills
(4) Asked you if you/how many doses you have missed
(5) Other (specify): ……</td><td></td></tr>
<tr><td>e5.</td><td>SELF-REPORT OF ADHERENCE:
Begin by telling the patient: "Most people with HIV have many pills to take at different times during the day. Many people find it hard to always remember to take their pills. It is important for me to understand how you are really doing with your medicine. Don't worry about telling me if you don't always take all your doses. I need to know what is really happening, not what you think I want to hear."
Please mark the patient's response to the questions.
<table>
<tr><th>Question</th><th>Yes</th><th>No</th></tr>
<tr><td>Do you sometimes find it difficult to remember to take your medicines?</td><td></td><td></td></tr>
<tr><td>When you feel better, do you sometimes stop taking your medicine?</td><td></td><td></td></tr>
<tr><td>Thinking back over the past four days, have you missed any of your doses?</td><td></td><td></td></tr>
<tr><td>Sometimes if you feel worse when you take the medicine, do you stop taking it?</td><td></td><td></td></tr>
</table></td><td>Count the responses:
YES:
…….

NO:
…….</td></tr>
</table>

Interview No.: __ __ / __ __ / ___ ___

e6. VISUAL ANALOGUE SCALE (VAS)

Ask the client to think back over the past four days and identify the times when he or she either missed a dose or took it at the wrong time. Show the client a copy of this visual analogue scale, or an unmarked enlarged version. While placing your finger on the appropriate place, tell the client that if he or she had taken all medicine doses to point to 10. If the client missed all the doses, he or she would point to 0—in the meantime, you move your finger to 0. Now give the client an opportunity to point out his or her level of adherence. The health care worker then marks the visual analogue scale. If the scale is marked off at 4, then the percentage adherence would be 40 per cent.

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Score:

…… %

e7. PILL IDENTIFICATION TEST (PIT)

Familiarise yourself with the last prescription that was dispensed (*check in the Master Sheet provided before the interviews commence*). Show the client a physical example or photograph of the same brand of the tablet, capsule, or bottle for liquid preparations that the client had been given in the preceding month: this is key.

Ask the patient to inspect each container and its contents. He or she should then tell you the name of the medication, the number of pills to take per dose, the times he or she takes the medication, and whether there are any additional instructions.

Medication	**Knows the name (Y/N)**	**Knows the # of pills per dose (Y/N)**	**Time the medication is taken**			**Knows any additional instruction**
			Morning (hour)	**Evening (hour)**	**Judged correct (Y/N)**	

e8. PILL COUNT DATA

Is pill count data for the patient available from the EDT? (*Check in the **Master Sheet***)

(1) *Yes* (2) *No*

If a patient is on more than one solid ARV medicine, then the calculation should be done for all the ARV medicines and the medicine providing the least % adherence level should be used.

Name of ARV medicine				
% adherence level				

e9. **1. Adherence Assessment** (*May be filled out after the interview*)

	1	2	3
Self-reporting	NO to all questions	YES to 1 question	YES to 2 or more questions
VAS	95% or more	75–94%	Less than 75%
PIT- Patient knows the.....	Dose, time, and instructions	Dose and time	Dose only or confused
Pill Count	95% or more	75-94%	Less than 75%
Overall adherence	HIGH	MODERATE	LOW

Instructions for completing the overall adherence:

1. If all the results appear in the same column, e.g., Column 1, then the overall adherence is "High".
2. When the results do not line up in a single vertical column:
   - if they are spread over 2 columns, take the adherence level to the **right-hand** column as the estimated adherence;
   - if they are spread over 3 columns, use the **middle column** as the estimated adherence.

The tool can be used even when one of the methods of measures of adherence cannot be used, e.g., in the absence of pill count data. The same instructions as in (1) and (2) above are used.

e10. As mentioned earlier, I appreciate how difficult it can be to take pills on a daily basis. If you sometimes miss a dose, please can you tell me what causes this to happen? Can you give a few examples? (*Allow the patient time to think of all possible reasons for forgetting and tick next to the corresponding cell. List additional reasons under "OTHER".*)

e11. On the other hand, what is it that helps you to take your ARV medicines regularly and on time?

…….

(1) Reminders (alarm clocks, cell phone, etc.) (2) Treatment buddy (3) Relatives (4) Family

(5) *Other* (*specify*) …….

Interview No.: __ __ / __ __ / ___ ___

<table>
<tr><td>e12.</td><td>Please tell me what encourages you to take your ARV medicines. (Record the patient's response below in the patient's words)
……
……</td><td></td></tr>
<tr><td>e13.</td><td>What are the main challenges that you face in taking your ARV medicines?
<table>
<tr><td>Patient-related factors</td><td></td><td>Didn't need ARVs anymore</td><td></td><td>Medication-related factors</td><td></td><td>Insufficient counselling by health workers</td><td></td></tr>
<tr><td>Forgetfulness</td><td></td><td>Stigma</td><td></td><td>Side effects</td><td></td><td>Herbal medicines</td><td></td></tr>
<tr><td>Travel away from home</td><td></td><td>Financial factors</td><td></td><td>Regimen too complex</td><td></td><td>OTHERS</td><td></td></tr>
<tr><td>No family/community support</td><td></td><td>Cost of transport</td><td></td><td>Health-system related factors</td><td></td><td></td><td></td></tr>
<tr><td>Didn't understand instructions on the ARVs</td><td></td><td>Lack of food</td><td></td><td>Long waiting times</td><td></td><td></td><td></td></tr>
<tr><td>No transport to clinic/hospital</td><td></td><td>Distance to health facility</td><td></td><td>Bad attitude of health workers</td><td></td><td></td><td></td></tr>
<tr><td>Alcohol</td><td></td><td>Frequent clinic or pharmacy appointments</td><td></td><td>Not being attended to on days that are not my appointment days</td><td></td><td></td><td></td></tr>
<tr><td>Feel unwell after taking ARVs</td><td></td><td>Inconvenient appointment dates/days</td><td></td><td>Stock-out of ARV medicines</td><td></td><td></td><td></td></tr>
<tr><td>Tired of taking ARVs</td><td></td><td>Employer refusing to give permission to go to clinic</td><td></td><td>No confidentiality at the pharmacy</td><td></td><td></td><td></td></tr>
</table></td><td></td></tr>
<tr><td>e14.</td><td>Have you ever thought about stopping your ARV medicines? (Y/N)
If Y, please tell me why: ……..……..……..……..……..</td><td></td></tr>
<tr><td>e15.</td><td>Do you have someone who supports you in taking your ARV medicine? (Y/N) ……..</td><td></td></tr>
<tr><td>e16.</td><td>What is your relationship with this person who helps you take your medicines?.....
(1) Spouse (2) Relative (specify: ……..……..) (3) Other (specify: ……..……)</td><td></td></tr>
<tr><td>e17.</td><td>In the last month, how many times did you meet with the person who helps you with your treatment (treatment supporter) to discuss your ARV treatment? ……..</td><td></td></tr>
<tr><td>e18.</td><td>What is the name of your support group?
(1) I don't belong to any (2) Name of group: ……..……..……..</td><td></td></tr>
<tr><td>e19.</td><td>Have you ever shared your medicines with anybody else? (Y/N) If Y, specify: ……..……..</td><td></td></tr>
</table>

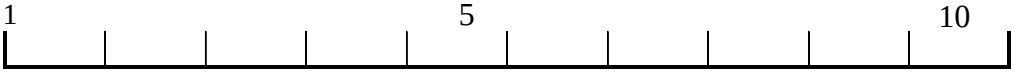
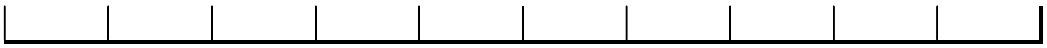
F. Side Effects, Pill Burden, and Other Issues Related to Medicines

f1.	In the past year, have you ever experienced side effects related to taking your ARV medicines? (*Y/N*) Please list the side effects you have experienced: ……..……..……..……..……..…… ……..... ……..……..……..……..……..…… …….....	
f2.	What did you do when you experienced the side effects? ……..……..……..……..……..…… ……..…… (1) Stopped taking all the ARV medicines (2) Stopped taking some of the ARVs (3) Other (*specify below*) ……..……..……..……..……..…… ……..……	
f3.	Has your health care worker ever changed the type of ARV medicines that you were taking? (by type of ARV I am not referring to change in colour, number, shape of the same type of medicine) (*Y/N*)……	
f4.	Did the health care worker tell you why they changed your ARV medicines? (*Y/N*) If YES, indicate reason: ……..……..……..……..……..……	
f5.	Please tell me what other medicines, including traditional medicines, you are taking apart from your ARVs? (*Check in patient's health passport and list below*) (1) ……..…… (2) ……..…… (3) ……..…… (4) ……..…… (5) ……..…… (6) ……..…… (7) ……..……	
f6.	Are you having any problems taking all the medicines together with the ARV medicines (*Y/N*)?	
f7.	If so what have you done about this?..... (1) stopped taking the ARV medicines (2) stopped taking the other medicines (3) continued taking them all (4) have gone to report at the ART clinic (5)Other (*specify*) ……..……..	
f8.	Are you currently taking any herbal or traditional medicines in addition to your ARVs? (*Y/N*) …… If you are taking herbal or traditional medicines, what disease or condition are you treating? *List diseases or conditions, e.g., headache or malaria (in the patient's words)* …… ……	
f9.	Are there any reasons to be concerned about taking ARVs and herbal or traditional medicines together? (*Y/N*) Explain your answer: ……	

G. Health Facility–Related Facilitators or Barriers to Adherence

We are also trying to find out about the quality of health care services that you receive at this clinic. All your responses will be kept confidential and will not be revealed to the facility staff. Feel free to give your sincere and honest views whether they are positive or negative.

Interview No.: __ __ / __ __ / ___ ___

g1.	What do you think of the services you receive at this clinic *(Open-ended, allow patient to air his/her views and record below, then prompt with the questions below)* ……..……..……..…… ……..……..……..…… ……..……..……..……. ……..……..……..……	
g2.	▪ Do you feel that the health workers listen to your views and opinions? (*Y/N*) …… ▪ Are you given a chance to state your problems (*Y/N*) …….. ▪ Are you given a chance to ask questions? (*Y/N*) …….. ▪ Are you treated with respect? …….. ▪ Do you feel you can trust the health workers? (*Y/N*) …….. ▪ Do you have privacy during consultations and counselling? (*Y/N*) …….. ▪ Do you find the clinic o Clean / dirty? …….. o Crowded / not crowded? …….. o Friendly / unfriendly?……..	
g3.	At what time did you arrive at this clinic today? (*e.g., 08h00*) …….....	
g4.	For how long (minutes/hours) did you have to wait before being attended to? (*e.g., 2hrs 30mins*)	
g5.	Time spent altogether at the clinic *(Calculate from Start Time of Interview [Page 1] and the time the patient reports having come to the clinic)* …….	
g6.	How do you rate your satisfaction with the services that you get at this facility? Allow patient to point to any area on the scale of 1–10 below with 1 being the lowest satisfaction while 10 is the highest level of satisfaction. 1 5 10 	
g7.	How do you rate your satisfaction with the way that the health workers communicate with you at this health facility? Allow patient to point to any area on the scale of 1–10 with 1 being the lowest satisfaction while 10 is the highest level of satisfaction. 1 5 10 	
g8.	Tell me the names of the different hospitals, health centres, or clinics where you have collected your ARV medicines from in the past six months? 1..... 2..... 3..... 4..... 5.....	
g9.	How did you get to the clinic today? ..... E.g., (1) *On foot* (2) *By Taxi* (3) *Got a lift* (4) *Other (specify*).....	
g10.	What is the estimated distance (*in km*) from this facility to your home?	
g11.	Roughly how long (*in minutes or hours*) does it take you to get to this ART clinic from your home?	

g12.	We are also trying to understand cost issues related to your coming to the clinic for ART services. Please note that we are not going to refund the costs you incurred therefore answer this question to your level best regarding the cost you have incurred. Please tell me how much you have spent today for transport from your home to this facility N$..... And how much will you spend today for transport back to your home? N$.....	
g13.	Do you lose any income as a result of your coming to the clinic? (*Y/N*) If Yes, explain:	
g14.	What other costs do you incur (*for what and how much*) as a result of your taking ARVs?	
g15.	In the last two weeks, on average how many meals have you had per day?.....	
g16.	In the past three months how many appointments have you had at the clinic (for ARVs refill, doctor/nurse consultation etc.)?	
g17.	How difficult is it for you to come to the health facility for all your appointments? ..... (1) Very difficult (2) Somewhat difficult (3) Not difficult at all	
g18.	What do you do when your ART clinic appointment is due and you are not at your place of residence? (1) Miss the appointment and wait until I'm back at my place of residence (2) Go to the nearest government hospital for my appointment (3) Go to a private doctor (4) Other (*specify):*	
g19.	Does your employer allow you to visit the clinic during normal working hours? (*Skip if patient is not employed; refer to question a6.*) (1) Yes, for all appointments (2) Only sometimes (3) No (4) Other (*specify*) …….……....	
g20.	In the past three months, how many times have you run out of your ARV medicines?	
g21.	Why did you run out of this/these medicine(s)? …… (1) Had been given insufficient supply at my last visit (2) I shared my pills with someone else (3) I lost my pills (4) I missed my clinic appointment (5) Other (*specify):*	
g22.	What did you do when you ran out of your ARV medicines? 1) Went to the pharmacy for refill (2) Waited for my next appointment (3) Borrowed some pills from my spouse/other patient (4) Went to private pharmacy for refill (5) Other (*specify):*	

Interview No.: __ __ / __ __ / ___ ___

H. Screening for Alcohol Problems (Seppa, Lepisto, and Sillanaukee 1998)

I'm now going to ask you a number as questions related to alcohol use. Many people take alcohol during their leisure time and when they are with their friends and it is accepted in many countries as a form of entertainment. We would like to get a clear picture of alcohol use among our patients and your responses will be kept confidential and will not be used against you. Therefore, please answer the questions as truthfully as possible.

h1.	How often do you have a drink containing alcohol? ..... (0.0) Never (0.5) Once a month or less often (1.0) Two to four times a month (1.5) Two to three times a week (2.0) Four or more times a week	
h2.	How many drinks containing alcohol do you have on a typical day when you are drinking? …… (0.0) 1 or 2 (0.5) 3 or 4 (1.0) 5 or 6 (1.5) 7 to 9 (2.0) 10 or more	
h3.	Have people annoyed you by criticising your drinking? ……. (0.0) No (1.0) Yes	
h4.	Have you ever felt bad or guilty about your drinking? …….. (0.0) No (1.0) Yes	
h5.	Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover? …….. (0.0) No (1.0) Yes	
	Scoring (To be done after the interview**)** Score of **2.5 or greater** indicates possible alcohol misuse and the need for further investigation Maximum Score = 7	

I. Screening for Depression (Kroenke, Spitzer, and Williams 2001)

News of a diagnosis with a chronic disease such as HIV/AIDS, diabetes, etc. is sometimes accompanied by some strong emotional feelings by patients, and the responses vary from one person to another. We are trying to establish the emotional welfare of our patients,, and to this end I will ask you a number of questions. There are four possible responses to each of the statements. Please pick the one that best describes your situation.

(0) Not at all (1) Several days (2) More than half the days (3) Nearly everyday
Over the last two weeks, how often have you been bothered by any of the following problems?

i1.	Little interest or pleasure in doing things?	
i2.	Feeling down, depressed, or hopeless?	
i3.	Trouble falling or staying asleep, or sleeping too much?	
i4.	Feeling tired or having little energy?	
i5.	Poor appetite or overeating?	

i6.	Feeling bad about yourself or that you are a failure or have let yourself or your family down?	
i7.	Trouble concentrating on things, such as reading the newspaper or watching television?	
i8.	Moving or speaking so slowly that other people could have noticed? Or the opposite: being so fidgety or restless that you have been moving around a lot more than usual?	
i9.	Thoughts that you would be better off dead, or of hurting yourself in some way?	
i10.	Scoring: Depression severity: **0–4** *None*, **5–9** *Mild*, **10–14** *Moderate*, **15–19** *Moderately severe*, **20–27** S*evere*.	Total= ….. /27
i11.	Are you on any of these medications? (*Check patient's health passport if patient is not sure*.) (1) Amitriptyline (2) Imipramine	

J. Perceived Problems and Possible Solutions

We are now coming to the end of our interview. Please reflect on these last three questions:

j1.	What do you feel is the biggest problem you experience regarding taking ARV treatment?	
j2.	What do you think could be done to improve this?	
j3.	Do you have any questions for me?	

"Thank you for the time you have taken to respond to my questions and for your honest responses. The information you have provided will be very helpful and the MoHSS appreciates your participation in this study and wishes you the best in your efforts to live a healthy and productive life.

"If after our interview you feel that there are certain issues where you would like further support or consultation please consult Dr./Mr./Ms. _____. He/She will be eager to assist. You can also obtain assistance from this helpline:

Interview No.: __ __ / __ __ / ___ ___

APPENDIX 3: HEALTH WORKER INTERVIEW SCHEDULE

The Namibia Baseline ART Adherence Survey
October to December 2009

Health Worker Consent Form

Hello, my name is _____ and I am working with the Ministry of Health and Social Services. We are conducting a survey on adherence of patients to antiretroviral therapy (ART). We would very much appreciate your participation in this survey. The survey usually takes between 30 and 45 minutes to complete.

As part of this survey, we will ask you some questions about your experiences and views working in the ART programme with a view of identifying factors affecting adherence of patients to ART, current interventions in place to monitor and improve adherence, and possible additional interventions that can be put in place. All of the answers you give will be confidential. Participation in the survey is completely voluntary. If we should come to any question that you do not want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Signature of interviewer: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED- 1	RESPONDENT DOES NOT AGREE TO BE INTERVIEWED- 2 (END)

SECTION 1: Interview Details

Name of Interviewer	
Name of Health Facility	
Interview Number (Facility Code/Interviewer #/Serial #)	__ __ / __ __ / __ __
Date of Interview (*dd/mm/yyyy*)	
Interview Start Time (*hh:mm*)	

SECTION 2: Interview Questions

A. BACKGROUND AND PRACTICE

a1.	What is your profession? (1) Medical Officer (doctor) (2) Nurse (3) Pharmacist (4) Pharmacist's Assistant (5) Social Worker (6) *Other (specify* ……..)	
a2.	How long have you been working at this ART clinic? (*in months*) …….	
a3.	How often do you use the services of a translator? (1) *Always* (2) *Sometimes* (3) *Never* (4) *Other* (*specify* .....)	
a4.	What ART adherence measuring tools do you use? (*list all that respondent mentions*) (1)..... (2)..... (3)..... (4)..... (5)..... (6).....	
a5.	How many patients on ART were lost to follow-up at your facility last month? (1) *Don't know* ..... (2).....	
a6.	In your opinion what is the approximate adherence rate of the majority of patients on ART in your facility? (1) Low, i.e., <75%) (2) Moderate, i.e., 75–95% (3) High, i.e., >95% (4) Don't know	
a7.	Based on your observation, what makes it difficult for your patients to attain high levels of ART adherence? (*Collect verbatim and code later. Probe the respondent using the categories below:* e.g., "**Any financial (or medicine-related, health facility–related) reasons you can think of**?" When respondent finishes, ask "anything else?" Categories: (1) Patient-related (2) Financial factors (3) Medication-related factors (4) Health system–related factors …… …… …… …… …….. …… …….	
a8.	Based on your observation, what is the **single greatest factor** at the ART clinic that makes it difficult for your patients to attain high levels of ART adherence? (*Record verbatim response and code later*.) …….	
a9.	Please tell me any specific activities, programmes, or systems that you use in this clinic to improve patient adherence. (1) …… (2) …… (3) …… (4) ……	

Interview No.: __ __ / __ __ / ___ ___

a10.	Suggest any other ways that you might be able to improve patient adherence in your health facility (1) …… (2) …… (3) …… (4) ……	
a11.	What are some of the challenges you face when your ART patients are lost or lost to follow-up? (1) …… (2) …… (3) …… (4) ……	
a12.	Please tell me any activities, programmes, or systems that you have out in place at this clinic to reduce rates of lost to follow-up. (1) …… (2) …… (3) …… (4) ……	
a13.	Are there any other ways that you could reduce the number of lost to follow-up in your health facility? (1) …… (2) …… (3) …… (4) ……	
a14.	How many times in the last six months have you experienced incidents of a patient being switched or substituted to another medicine/formulation because of a stock-out of the medicine the client was meant to receive? (1) *None* (2).....	

B. Please tell me to what extent you agree or disagree with the following statements.
(1) Strongly agree (2) Agree (3) Disagree (4) Strongly disagree (5) Don't know

b1.	Inadequate communication materials are a significant barrier to adherence counselling and patient information in this facility	
b2.	Staff overloaded with too much work / too many clients is a significant barrier to adherence counselling and monitoring of patients on ART at this facility	
b3.	Health worker–patient communication is a significant barrier to provision of services to patients on ART at this facility	
b4.	Waiting time is a major barrier to patient adherence in this facility	
b5.	This facility can work more efficiently in serving ART patients	

C. Please rate the following measures according to how you think they can improve ART adherence by your patients. You may also suggest other measures (*add in rows **c8** to **c11***) in addition to those listed that you believe would be helpful in improving ART adherence.

(1) Very helpful (2) Somewhat helpful (3) Not helpful at all

c1.	Standardize pre-ART adherence counselling	
c2.	Standardize ART adherence measurement	
c3.	Increase the number of PLWHAs/peer educators providing ART adherence counselling	
c4.	Train PLWHAs/peer educators to provide ART adherence counselling	
c5.	Ensure availability of all relevant medicines at all times for ART patients	
c6.	Decentralize ART services to clinics/health centres	
c7.	Institute more convenient operating times for the ART clinic	
c8.		
c9.		
c10.		
c11.		

"Thank you for the time you have taken to complete this questionnaire and for your candid responses."

Interview No.: __ __ / __ __ / ___ ___

APPENDIX 4: CLINIC HEAD INTERVIEW SCHEDULE

The Namibia Baseline ART adherence Survey
October to December 2009

ART Clinic Head Consent Form

Hello, my name is _____ and I am working with the Ministry of Health and Social Services. We are conducting a survey on adherence of patients to antiretroviral therapy (ART). We would very much appreciate your participation in this survey. The survey usually takes between 30 and 45 minutes to complete.

As part of this survey, we will ask you some questions about your experiences and views working in the ART programme with a view of identifying factors affecting adherence of patients to ART, current interventions in place to monitor and improve adherence, and possible additional interventions that can be put in place. Participation in the survey is completely voluntary. If we should come to any question that you do not want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Signature of interviewer: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED- 1

RESPONDENT DOES NOT AGREE TO BE INTERVIEWED- 2 (END)

SECTION 1: Interview Details

Name of Interviewer	
Name of Health Facility	
Interview Number (Facility Code/Interviewer #/Serial #)	__ __ / __ __ / __ __
Date of Interview (*dd/mm/yyyy*)	
Interview Start Time (*hh:mm*)	

SECTION 2: Interview Questions

A. HUMAN RESOURCES AND WORKLOAD

a1. What is the total number of registered patients on ART at the ART clinic?

a2. What is the number of patients seen per day at your clinic?
Pre-ART: .....
On ART: .....

a3. Which year did your facility start providing ART services? .....

a4. Please provide details for IMAI and outreach sites if any in the following table:

	Name of site	**Type: Outreach or IMAI**	**If outreach, # of outreach visits/month**	**# of patients at site**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

a5. What are the normal working hours for the ART clinic and pharmacy?

Service Point	**Weekdays**		**Weekends**	
	From (*hh:mm*)	**To (*hh:mm*)**	**From (*hh:mm*)**	**To (*hh:mm*)**
ART clinic				
ART pharmacy				

a6. How often are the following services provided?

	Service	**Name the days of the week when it's done**	**No. of clients served last month**
1	Pre-ART adherence counselling		
2	On-going ART adherence counselling for patients on ART		
3	Follow-up visits for lost/lost to follow-up patients		

Interview No.: __ __ / __ __ / ___ ___

a7. What is the composition of your multidisciplinary ART team?

No.	Profession	Total number	Number trained in ART adherence
1	Doctors		
2	Nurses		
3	Pharmacists		
4	Pharmacist's assistants		
5	Outreach workers		
6	Peer educators		
7	Social workers		
8	Community counsellors		
9	Others (*specify* ……..)		

a8. How often does the multidisciplinary ART team hold meetings?
(1) Never holds meetings (2) Weekly (3) Monthly (4) Quarterly (5) Other (*specify* ……..)

a9. If unable to meet regularly, what are the reasons for this?
(1) …….
(2) …….

a10. Are minutes of the multidisciplinary ART team meetings available? (*Y/N*)
If (Y) obtain copy of the last meeting's minutes
Date of meeting: .....
List attendees of the last meeting by profession:
(1)..... (2)..... (3).....
(4)..... (5)..... (6).....
(7)..... (8)..... (9).....
(10)..... (11).....

B. Data Management

b1. Does your ART clinic have a daily appointment book showing the number of patients due for ART clinic attendance?
(Y/N) (*ask to see the book*).....

b2. Does your ART clinic have a daily register (manual or electronic) showing the patients who visit on a particular day? (Y/N) (*ask to see the register*).....

b3. What type of ART patient data capturing system does the pharmacy have? (*mark all that apply*)
(1) Paper based (Y/N) .....
(2) Computerized (Y/N): Name of system:
.....

b4. Is the pharmacy data capturing system useful in identifying patients who are late/ lost/lost to follow-up? (*Y/N*)
If (Y) explain how:
.....
If (N) explain why not:
.....

b5. What other system (paper tools, electronic system) do you use to identify patients who are lost or have not come on time for their appointments?
.....

C. ARV Medicine Supply

c1.	How many occasions in the last six months have patients been sent home without medication because of a stock-out of ARVs?	
c2.	In circumstances where a patient's ARV medicines are out of stock, what does your facility do? …… ……	

D. ART Adherence and Counselling

d1.	Is there a dedicated private space or room for ART adherence counselling? (*Y/N*).....	
d2.	Who provides pre-ART counselling sessions in this health facility (*List all*) (1)..... (2)..... (3)..... (4)..... (5)..... (6).....	
d3.	How many pre-ART counselling sessions do patients go through?	
d4.	How are pre-ART adherence counselling sessions provided in the ART clinic? (*mark all that apply*) (1) Face-to-face (one-on-one) (2) Group counselling (3) Other (*specify*)…….....	
d5.	What ART adherence measuring tools does the ART clinic use? (*list all*) (1) …… (2) …… (3) …… (4) ……	
d6.	Based on your observation, what makes it difficult for your patients to attain high levels of ART adherence? *(Collect verbatim and code later. Probe the respondent using the following categories:* e.g., "**Any financial (or medicine-related, health facility–related) reasons you can think of**?" When respondent finishes, ask "anything else?") Categories: (1) Patient-related (2) Financial factors (3) Medication-related factors (4) Health system–related factors …… …… …… …… …… …… ……..	
d7.	Based on your observation, what is the single greatest factor at the ART clinic that makes it difficult for your patients to attain high levels of ART adherence? ……	
d8.	What do you recommend as possible additional effective methods that can enhance adherence in your health facility? (1) …… (2) …… (3) …… (4) ……	

Interview No.: __ __ / __ __ / ___ ___

d9.	What system is in place to trace lost/lost to follow-up patients?	
d10.	What challenges do you face with regard to tracing lost/lost to follow-up patients? (1) …… (2) …… (3) …… (4) ……	
d11.	List the HIV support groups that work closely with your ART clinic. (1)..... (2)..... (3)..... (4).....	
d12.	Does your clinic have a written referral system for your patients to support groups? (*Y/N*) (*Ask to see register if one is kept*) ……	

E. Please tell me to what extent you agree or disagree with the following statements.
(1) Strongly agree (2) Agree (3) Disagree (4) Strongly disagree (5) Don't know

e1.	Inadequate communication materials are a significant barrier to adherence counselling and patient information in this facility	
e2.	Staff overloaded with too much work / too many clients is a significant barrier to adherence counselling and monitoring of patients on ART at this facility	
e3.	Health worker–patient communication is a significant barrier to provision of services to patients on ART at this facility	
e4.	Waiting time is a major barrier to patients' adherence in this facility	
e5.	This health facility can work more efficiently in serving ART patients	

F. Please rate the following measures according to how you think they can improve ART adherence by your patients. You may also suggest other measures (*add in rows **f8** to **f11***) in addition to those listed that you believe would be helpful in improving ART adherence.
(1) Very helpful (2) Somewhat helpful (3) Not helpful at all

f1.	Standardize pre-ART adherence counselling	
f2.	Standardize ART adherence measurement	
f3.	Increase the number of PLWHA/peer educators providing adherence counselling	
f4.	Train PLWHA/peer educators to provide ART adherence counselling	
f5.	Ensure availability of all relevant medicines at all times for ART patients	
f6.	Decentralize ART services to clinics	
f7.	Institute convenient dispensing services (flexible times and one-stop shop)	
f8.		
f9.		
f10.		
f11.		

"Thank you for the time you have taken to complete this questionnaire and for your candid responses."

APPENDIX 5: ADHERENCE COUNSELLOR INTERVIEW SCHEDULE

The Namibia Baseline ART adherence Survey
October to December 2009

ART Adherence Counsellor Consent Form

Hello, my name is _____ and I am working with the Ministry of Health and Social Services. We are conducting a survey on adherence of patients to antiretroviral therapy (ART). We would very much appreciate your participation in this survey. The survey usually takes between 30 and 45 minutes to complete.

As part of this survey we will ask you some questions about your experiences and views working in the ART program with a view of identifying factors affecting adherence of patients to ART, current interventions in place to monitor and improve adherence and possible additional interventions that can be put in place. All of the answers you give will be confidential. Participation in the survey is completely voluntary. If we should come to any question that you do not want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are important.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Signature of interviewer: _____ Date: _____

RESPONDENT AGREES TO BE INTERVIEWED- 1	RESPONDENT DOES NOT AGREE TO BE INTERVIEWED- 2 (END)

Interview No.: __ __ / __ __ / ___ ___

SECTION 1: Interview Details

Name of Interviewer	
Name of Health Facility	
Interview Number (Facility Code/Interviewer #/Serial #)	__ __ / __ __ / __ __
Date of Interview (*dd/mm/yyyy*)	
Interview Start Time (*hh:mm*)	

SECTION 1: Interview Questions

A. BACKGROUND AND PRACTICE

B.

a1. What is your professional background?
(1) Nurse (2) Social worker (3) Community counsellor
(4) *Other (specify* ……..…..)

a2. What is your highest level of education?
(1) Grade 10 (2) Grade 12 (3) College (4) Other (specify
…….)

a3. Have you been trained in ART adherence counselling? (*Y/N*)
If (N), go (a6)

a4. When were you trained? mmm/yyyy .....

a5. How long was the training?
(1) One week (2) Two weeks (3) One month (4) Other (*specify*
.....)

a6. Complete the table below together with the adherence counsellor. Ask to see the adherence register to confirm the information provided.
Please assist me to complete a table detailing your ART adherence counselling activities in the past one month.

ART adherence counselling	**No. of sessions per week**	**Duration per session (*minutes*)**	**Time per session sufficient (*Y/N*)**	**Reason for (Y/N) in previous column**
Face-to-face (*one-on-one*)				
Group				
Other				

a7. How often do you use the services of a translator?
(1) Always (2) Sometimes (3) Never (4) Other (*specify*
.....)

a8. Which audio-visual aids do you use in your ART adherence counselling sessions?
(1) None (2) Counselling manuals (3) Counselling checklist (4) Flow-charts (algorithms)
(5) *Other* (*specify*:
.....)

a9. What major challenges do you face in conducting ART adherence counselling?
(1) …….
(2) …….
(3) …….
(4) …….

a10.	What do you recommend to your patients when they experience side effects from their ARV medicines? (1) ……. (2) ……. (3) ……. (4) …….	
a11.	In your opinion what is the approximate adherence rate of the majority of patients on ART in your facility? (1) Low, i.e., <75) (2) Moderate, i.e., 75– 95% (3) High, i.e., >95% (4) Don't know	
a12.	Based on your observation, what makes it difficult for your patients to attain high levels of ART adherence? (*Collect verbatim and code later. Probe the respondent using the following categories*, e.g., "**Any financial (or medicine-related, health-facility related) reasons you can think of**?" When respondent finishes, ask "anything else?") Categories: (1) Patient-related (2) Financial factors (3) Medication-related factors (4) Health system–related factors …… ……..… ……..… ……..…. ……..… ……..… ……..….	
a13.	Based on your observation, what is the single greatest factor at the ART clinic that makes it difficult for your patients to attain high levels of ART adherence? ……	
a14.	What do you recommend as possible additional effective methods that can enhance adherence in your health facility? (1) ……. (2) ……. (3) ……. (4) …….	
a15.		

C. Please tell me to what extent you agree or disagree with the following statements.
(1) Strongly agree (2) Agree (3) Disagree (4) Strongly disagree (5) Don't know

b1.	Inadequate communication materials are a significant barrier to adherence counselling and patient information in this facility	
b2.	Staff overloaded with too much work / too many clients is a significant barrier to adherence counselling and monitoring of patients on ART at this facility	
b3.	Health worker–patient communication is a significant barrier to provision of services to patients on ART at this facility	
b4.	Waiting time is a major barrier to patients' adherence in this facility	
b5.	This facility can work more efficiently in serving ART patients	

Interview No.: __ __ / __ __ / ___ ___

D. Please rate the following measures according to how you think they can improve ART adherence by your patients. You may also suggest other measures (*add in rows **c8** to **c11***) in addition to those listed that you believe would be helpful in improving ART adherence.

(1) Very helpful (2) Somewhat helpful (3) Not helpful at all

c1.	Standardize pre-ART adherence counselling	
c2.	Standardize ART adherence measurement	
c3.	Increase the number of PLWHA/peer educators providing adherence counselling	
c4.	Train PLWHA/peer educators to provide ART adherence counselling	
c5.	Ensure availability of all relevant medicines at all times for ART patients	
c6.	Decentralize ART services to clinics	
c7.	Institute convenient dispensing services (flexible times and one-stop shop)	
c8.		
c9.		
c10.		
c11.		

"Thank you for the time you have taken to complete this questionnaire and for your candid responses."

APPENDIX 6: GROUP MEETING TOOL

Namibia Baseline ART Adherence Survey
October to December 2009

1. Strengths, Weaknesses, Opportunities, Threats
   - Introduction

Our team is interested in understanding how facilities offer services to patients with HIV/AIDS. In particular, we are looking at barriers and challenges to reach adherence to antiretroviral treatment. We have been here for a couple of days to observe how your clinic operates and we have interviewed some of you and some clients.

   - The SWOT Diagram

Now we want to ask you to take about 15 minutes to write down some personal statements regarding your facility. The procedure is simple—the attached piece of paper is divided into four quadrants—one for each of the SWOT elements: Strengths, Weaknesses, Opportunities, and Threats. In each quadrant, we want you to write what you think is appropriate for your facility with regard to reaching high rates of adherence to treatment.

- What are the strengths?—What attributes does your ART clinic have that helps your clients adhere to their ART?
- What are the weaknesses?—What attributes does your ART clinic have that hinders your clients' adherence to their ART?
- What are the opportunities?—What *external* conditions are helpful to support your clients to adhere to their ART?
- What are the threats?—What *external* conditions exist that could inhibit your clients' adherence to their ART?

It is important to remember that Strengths and Weaknesses are internal issues within your own organisation, whereas Opportunities and Threats relate to external conditions. (Give some examples because some staff in the group will either not have done SWOT before or will need to have their memories refreshed.)

You do not need to write long sentences, it's enough to explain with one or a few words if it captures what you want to express. You can also explain more fully during our follow-up meeting. If the space is not enough, you can continue on the back of the page. When you have finished the task, please give your paper to the team leader.

   - Feedback Discussion

You are also invited to the meeting for feedback and discussion. We will have a meeting after filling out the individual SWOT diagrams to collate the views of all members and come up with one SWOT diagram for the facility. During the meeting, we will share our preliminary comments regarding what we have found during our observations, comment on your SWOT diagrams, and discuss your suggestions. The aim of the discussion is to find ways to improve services, in particular regarding adherence, and to find feasible interventions that could enhance such a process.

Thank you for your contribution!

2. SWOT Diagram

Date _____ Facility _____
Please comment in the respective quadrant on the following question:
"What are the strengths, weaknesses, opportunities, and threats related to our facility to achieve high rates of adherence to treatment?"

	HELPFUL (To achieving the objective)	HARMFUL (To achieving the objective)
INTERNAL ORIGIN (Attributes of the organisation)	STRENGTHS	WEAKNESSES
EXTERNAL ORIGIN (Attributes of the environment)	OPPORTUNITIES	THREATS

3. 3.1 Introduction

Explain procedure and ask consent for participating and recording.
Summarize findings from Phase 1 and preliminary findings from Phase 2 regarding:

- Facility observations;
- Staff and patient interviews.

All staff should have filled out the SWOT diagram and been invited to the feedback meeting and discussion.
Probes: What can be done to overcome these barriers?

3.2 Feedback Discussion

This final meeting for feedback and discussion is very important. If possible, it should be tape-recorded. There should be one chairperson and one note-taker from the team. During the meeting, share your preliminary comments regarding what the data collection team has found from data obtained from the EDT.

After the SWOTs are completed and before the discussion meeting the investigators make a template on a MS Excel Worksheet for ranking the SWOT. The worksheet will have scoring formulas so that '*Strongly Agree'* is given the most weight and '*Strongly Disagree*' is given the least weight. Insert all the Strengths, Weaknesses, Opportunities and Threats described by the participants (some will be very similar and should be merged) and then all members come back and vote if they '*Strongly Agree'*, '*Agree'*, '*Neutral'*, '*Disagree'* or '*Strongly Disagree'* with the statements.

Thereafter, conduct a discussion with all the staff members using the collated SWOT diagram. The aim of the discussion should be to find ways to improve the services, in particular regarding adherence, and to find feasible interventions that could enhance such a process. This part of the research has the potential to be very useful, keeping in mind that we are looking for determinants for good and bad adherence.

APPENDIX 7: ADHERENCE TECHNICAL WORKING GROUP

Name	Organisation	Role
1. Dr David Mabirizi	MSH Nambia	Principal Investigator
2. Ms Francina Tjituka	MoHSS-DSP	Adherence TWG Member
3. Ms Jennie Lates	MoHSS-Division: Ph Ss	Adherence TWG Chairperson
4. Dr Justce Gweshe	MoHSS-DSP	Adherence TWG Alternate Chairperson
5. Mr Victor Sumbi	MSH/SIAPS	Adherence TWG Member
6. Dr Mbayi Kangudie	USAID Namibia	Adherence TWG Member
7. Mr Bayobuya Phulu	MoHSS-Division: Ph Ss	Adherence TWG Member
8. Dr Desta Tiruneh	WHO Namibia	Adherence TWG Member
9. Ms Emmy Hango	Catholic Health Services	Adherence TWG Member
10. Dr Martin Odiit	UNAIDS	Adherence TWG Member
11. Dr Gram Mutandi	CDC	Adherence TWG Member
12. Ms Hilma Nangombe	MoHSS-Research Unit	Adherence TWG Member
13. Dr John Lukwago	Consultant-Study Coordinator	Adherence TWG Member

Data Collection, Entry and Analysis		
1. Prof Martie Lubbe	North West University	Data Analysis
2. Ms Lizl Stoman	The Survey Warehouse	Data Collection and Entry

APPENDIX 8: MINISTRY OF HEALTH APPROVAL FOR BASELINE SURVEY

9 - 0/0021

REPUBLIC OF NAMIBIA

Ministry of Health and Social Services

Private Bag 13198 | Ministerial Building | Tel: (061) 2032562
Windhoek | Harvey Street | Fax: (061) 272286
Namibia | Windhoek | E-mail: hilmanangombe@yahoo.com
Enquiries: Ms. H. Nangombe Ref.: 17/3/3/AP | Date: 29 September 2010

OFFICE OF THE PERMANENT SECRETARY

Ms. P. Nghipandulwa
Acting Director
Tertiary Health Care & CSS
MoHSS

Dear Ms. Nghipandulwa,

RE: Namibia ART Adherence Assessment and Improvement Initiative Proposal for the initial baseline survey

2. Reference is made to your application to conduct the above-mentioned study.

2. The proposal has been evaluated and found to have merit.

3. Kindly be informed that approval has been granted under the following conditions:

3.1 The data collected is only to be used for operational purpose;
3.2 A quarterly progress report is to be submitted to the Ministry's Research Unit;
3.3 Preliminary findings are to be submitted to the Ministry before the final report;
3.4 Final report to be submitted upon completion of the study;
3.5 Separate permission to be sought from the Ministry for the publication of the findings.

Yours sincerely,

MR. K. KAHUURE
PERMANENT SECRETARY

"Health for All"