PREVALENCE AND DETERMINANTS OF ANTIRETROVIRAL THERAPY ADHERENCE AMONG HIV POSITIVE WOMEN ACCESSING PREVENTION OF MOTHER TO CHILD TRANSMISSION SERVICES IN IBADAN, OYO STATE

BY

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A Dissertation in the Department of Epidemiology and Medical Statistics,

Submitted to the Faculty of Public Health, College of Medicine

in partial fulfillment of the requirements for the Degree of

MASTER OF PUBLIC HEALTH (MPH Field Epidemiology)

of the

UNIVERSITY OF IBADAN

FEBRUARY, 2016

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CERTIFICATION

I hereby certify that this research work was carried out by Aregbesola Oluwabusayo Hannah in the Department of Epidemiology and Medical Statistics, University of Ibadan

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DEDICATION

To all women of reproductive age living with the Human Immunodeficiency Virus

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ACKNOWLEDGEMENTS

I sincerely appreciate my supervisor, Dr. (Mrs) Ikeola A. Adeoye, for her unflinching support, guidance and tutelage throughout the execution of this research work.

I am very grateful to the academic and non-academic staff of the Department for their unquantifiable effort in impacting knowledge and providing support throughout the course of my training.

I deeply appreciate my parents, Mr and Mrs Rotimi Aregbesola, for their immeasurable moral, material and financial contributions towards my MPH program and to my brothers, Mr. Mayowa Aregbesola and Mr Feyi Aregbesola and wife, Mrs Seno Aregbesola and my fiancé, Mr. Kingsley Manuel, for their support and encouragement.

Many thanks to my friends and colleagues – Titilope, Tomiwa, Abimbola, Suliat, Omodele and other persons, who willingly helped me out with their abilities.

I am thankful to all the study participants for their cooperation in providing information relevant to this research.

Finally, I am grateful to God for the grace to commence and complete this research in sound health and mind.

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TABLE OF CONTENTS

		Page
Title page		i
Certification		ii
Dedication		iii
Acknowledgement		iv
Table of Contents		v
List of Tables		ix
List of Figures		x
List of Acronyms		xi
Abstract		xii
CHAPTER ONE		
1.0	**INTRODUCTION**	
1.1	Background	1
1.2	Problem Statement	3
1.3	Justification	5
1.4	Research Questions	6
1.5	Objectives of the Study	7
1.5.1	General Objective	7
1.5.2	Specific Objectives	7
CHAPTER TWO		
2.0	**LITERATURE REVIEW**	
2.1	An Overview of HIV and AIDS	8
2.2	Epidemiology of HIV/AIDS in Nigeria	9
2.3	The Prevention of Mother to Child Transmission (PMTCT) of HIV in Nigeria	10
2.3.1	Factors associated with Increased Risk of MTCT	11
2.4	Knowledge of HIV, PMTCT and ART in HIV Positive Pregnant Women	12

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AFRICAN DIGITAL HEALTH REPOSITORY PROJECT

2.5	Importance of Adherence to Antiretroviral Therapy (ART)	14
2.6	Measurement of Adherence	14
2.6.1	Self-reports	15
2.6.2	Pill Counts	15
2.6.3	Pharmacy Refill Tracking	15
2.6.4	Medication Event Monitoring System (MEMS)	16
2.6.5	Biological Makers	16
2.6.6	Center for Adherence Support Evaluation (CASE) Adherence Index Tool	16
2.7	ART Treatment Adherence Self-Efficacy	17
2.8	ART Adherence in Pregnancy	18
2.9	Factors Responsible for Adherence to ART in Pregnancy	20
2.9.1	Socio demographic and economic factors	20
2.9.2	Level of Education	20
2.9.3	Cultural Beliefs	21
2.9.4	Patient Factors	22
2.9.5	Spousal and Family Influences	22
2.9.6	Health Service Factors	23
2.9.7	Health Service Providers	23
2.9.8	Conceptual Framework	23

CHAPTER THREE

3.0	**METHODOLOGY**	
3.1	Study Area	25
3.2	Study Design	26
3.3	Study Population	26
3.3.1	Inclusion Criteria	26
3.3.2	Exclusion Criteria	26
3.4	Sample Size	27
3.5	Sampling Technique	27
3.5.1	Quantitative Data	27
3.5.2	Qualitative Data	28

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AFRICAN DIGITAL HEALTH REPOSITORY PROJECT

2.5	Importance of Adherence to Antiretroviral Therapy (ART)	14
2.6	Measurement of Adherence	14
2.6.1	Self-reports	15
2.6.2	Pill Counts	15
2.6.3	Pharmacy Refill Tracking	15
2.6.4	Medication Event Monitoring System (MEMS)	16
2.6.5	Biological Makers	16
2.6.6	Center for Adherence Support Evaluation (CASE) Adherence Index Tool	16
2.7	ART Treatment Adherence Self-Efficacy	17
2.8	ART Adherence in Pregnancy	18
2.9	Factors Responsible for Adherence to ART in Pregnancy	20
2.9.1	Socio demographic and economic factors	20
2.9.2	Level of Education	20
2.9.3	Cultural Beliefs	21
2.9.4	Patient Factors	22
2.9.5	Spousal and Family Influences	22
2.9.6	Health Service Factors	23
2.9.7	Health Service Providers	23
2.9.8	Conceptual Framework	23

CHAPTER THREE

3.0	**METHODOLOGY**	
3.1	Study Area	25
3.2	Study Design	26
3.3	Study Population	26
3.3.1	Inclusion Criteria	26
3.3.2	Exclusion Criteria	26
3.4	Sample Size	27
3.5	Sampling Technique	27
3.5.1	Quantitative Data	27
3.5.2	Qualitative Data	28

UNIVERSITY OF IBADAN LIBRARY

AFRICAN DIGITAL HEALTH REPOSITORY PROJECT

3.6	Data Collection Technique	28
3.6.1	Quantitative Data	28
3.6.2	Qualitative Data	29
3.7	Data Analysis	29
3.7.1	Quantitative Data	29
3.7.2	Qualitative Data	30
3.8	Variables	30
3.8.1	Dependent Variable	30
3.8.2	Independent Variables	31
3.9	Ethical Considerations	31

CHAPTER FOUR

4.0	**RESULTS**	
4.1	Socio-Demographic Characteristics of the Respondents	32
4.2	Pregnancy and HIV-Related Characteristics of Respondents	34
4.3	Knowledge of PMTCT, HIV and ART by the Respondents	36
4.4	Measures of HIV Treatment Adherence Self-efficacy (HIV-ASES)	39
4.5	Prevalence of ART Adherence in Pregnancy	41
4.6	Reasons for and Barriers to ART Adherence	43
4.7	Factors associated with ART Adherence	46
4.7.1	Association between Socio-Demographic Variables and ART Adherence	46
4.7.2	Association between Knowledge and ART Adherence	48
4.7.3	Association between HIV Treatment Adherence Self-Efficacy and ART Adherence	50
4.7.4	Association between Obstetric History and ART Adherence	52
4.8	Binary Logistic Regression Analysis of Factors Associated with Adherence During Pregnancy	54
4.9	Qualitative Analysis	56
4.9.1	Socio-demographic Characteristics of the Focus Group Discussion (FGD) Participants	56

UNIVERSITY OF IBADAN LIBRARY

AFRICAN DIGITAL HEALTH REPOSITORY PROJECT

4.9.2 Knowledge about HIV/AIDS, PMTCT and ART 58
4.9.3 ART Adherence and factors associated with ART Adherence 60
4.9.4 Recommended Steps by the Participants to Promote ART Adherence 62
4.9.5 Key Informants' Information on ART Adherence in Pregnancy 63

CHAPTER FIVE

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion 67
5.1.1 Knowledge of the Modes of HIV Transmission, MTCT and ARV Drugs 67
5.1.2 HIV Treatment Adherence Self-Efficacy 69
5.1.3 ART Adherence in Pregnancy 70
5.1.4 Factors Responsible for ART Adherence in Pregnancy 72
5.1.5 Limitations 74
5.2 Conclusion 74
5.3 Recommendations 77

REFERENCES 79

APPENDICES

APPENDIX I: English Questionnaire 83
APPENDIX II: Yoruba Questionnaire 87
APPENDIX III: Focus Group Discussion Guide (English) 91
APPENDIX IV: Focus Group Discussion Guide (Yoruba) 92
APPENDIX V: Key Informant Interview Topic Guide 93
APPENDIX VI: Eligibility criteria/options for ARV use in HIV positive Pregnant women 94
APPENDIX VII: Factors associated with increased risk of MTCT 95
APPENDIX VIII: Letter of Introduction to PMTCT Facilities 96
APPENDIX IX: Ethical Approval 97

UNIVERSITY OF IBADAN LIBRARY

AFRICAN DIGITAL HEALTH REPOSITORY PROJECT

LIST OF TABLES

Table 4.1	Socio-Demographic Characteristics of Respondents	33
Table 4.2	Distribution of Pregnancy and HIV-Related Characteristics	35
Table 4.3.1	Knowledge of HIV/AIDS, PMTCT and ART	37
Table 4.3.2	Participants' Knowledge Score on HIV/AIDS, PMTCT and ART	38
Table 4.4	Measures of HIV Treatment Adherence Self-Efficacy	40
Table 4.5	Prevalence of ART Adherence in Pregnancy among Respondents	42
Table 4.6.1	Reasons for Good ART Adherence among the Respondents	44
Table 4.6.2	Barriers to Taking the ARV Drugs among Respondents	45
Table 4.7.1	Association between Socio-Demographic Variables and ART Adherence among Respondents	47
Table 4.7.2	Association between Knowledge and ART Adherence among Respondents	49
Table 4.7.3	Association between HIV Treatment Adherence Self-efficacy and ART Adherence among Respondents	51
Table 4.7.4	Association between Obstetric History and ART Adherence among Respondents	53
Table 4.8	Binary Logistic Regression Analysis of Factors Associated with ART Adherence among Respondents	55
Table 4.9.1	Socio-demographic Characteristics of FGD Participants	57
Table 4.9.2	Knowledge about HIV/AIDS, PMTCT and ART	59
Table 4.9.3	ART Adherence and Factors Associated with Adherence	61
Table 4.9.5	Key Informants' Information on ART Use and ART Adherence in Pregnancy	66

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AFRICAN DIGITAL HEALTH REPOSITORY PROJECT

LIST OF FIGURES

Fig. 2.1 Conceptual Model of ART Adherence for sub-Saharan Africa 24

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LIST OF ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
APIN	AIDS Prevention Initiative in Nigeria
ART	Antiretroviral Therapy
AZT	Zidovudine
BCC	Behaviour Change Communication
cART	Combination Antiretroviral Therapy
CASE	Centre for Adherence Support Evaluation
FGD	Focus Group Discussion
FMOH	Federal Ministry of Health
HIV	Human Immunodeficiency Virus
HIV-ASES	HIV Treatment Adherence Self-Efficacy Scale
KII	Key Informant Interview
LGA	Local Government Area
MDG	Millennium Development Goals
MEMS	Medication Event Monitoring System
MTCT	Mother-to-Child Transmission
NACA	National Agency for the Control of AIDS
NDHS	National Demographic Health Survey
NVP	Nevirapine
OI	Opportunistic Infection
PEPFAR	United States President's Emergency Fund for AIDS Relief
PMTCT	Prevention of Mother-to-Child Transmission of HIV
SPSS	Statistical Package for Social Sciences
UNAIDS	Joint United Nations Programs on AIDS
WHO	World Health Organization
ZVD	Zidovudine
3TC	Lamivudine

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ABSTRACT

Globally, mother-to-child transmission (MTCT) of HIV infection is responsible for over 90% of the more than two million pediatric HIV. Nigeria has the highest number of children acquiring HIV through MTCT with an estimated 60,000 pediatric HIV infections annually. Adherence to Antiretroviral Therapy (ART) in pregnancy is important in the prevention of mother-to-child transmission (PMTCT) of HIV. This study investigated the prevalence and determinants of ART adherence, particularly the effect of HIV treatment adherence self-efficacy, among HIV positive women accessing Prevention of Mother-to-Child Transmission services in Ibadan, Oyo State.

A cross-sectional study was conducted in which one hundred and twenty-six HIV positive pregnant women were recruited from three PMTCT facilities within the Ibadan metropolis. A mixed method study was employed. A pre-tested interviewer-administered questionnaire, two focus-group discussions among respondents and five key-informant interviews among PMTCT service providers were conducted and audio-recorded. Information on socio-demographic characteristics and obstetric characteristics were obtained. Respondents' knowledge on modes of HIV transmission, PMTCT and ART were assessed and a score of <15 out of 20 indicated poor knowledge. HIV treatment adherence self-efficacy was assessed using the 12-item HIV Treatment-Adherence Self-Efficacy Scale (HIV-ASES) with a score of ≤ 15 out of 24 indicating low self-efficacy. Adherence levels were also assessed using the Center for Adherence Support Evaluation (CASE) Index Tool and a CASE score of ≤ 11 out of 16 indicated poor adherence. Quantitative data were analyzed using Descriptive Statistics, Chi-square and Logistic Regression at 5% significance level while thematic content analysis was used to analyze qualitative data.

Mean age of respondents was 32.7 ± 4.58 years and mean gestational age was 24.4 weeks ± 7.41 weeks. Sixty-two (49.2%) women commenced ART treatment before pregnancy and 81 (64.3%) had no previous PMTCT experience. A hundred and three (81.7%) women had a good knowledge of the modes of HIV transmission, 104 (82.5%) had good knowledge of mother-to-child transmission of HIV and 109 (86.5%) had good knowledge on function of ART. Thirty-three (26.2%) women had a low HIV Treatment-Adherence Self-efficacy score. Eighty-nine (70.6%) women had good ART-adherence and 20 (15.9%) reported

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missing at least one dose in the week before the interview. After adjusting for confounders, monthly income (OR=0.3, 95%CI=0.08–0.98, P<0.05), parity (OR=0.2, 95%CI=0.06–0.95, P<0.05), gestational age >20 weeks (OR=0.3, 95%CI=0.07–0.93, P<0.05), knowledge of HIV transmission (OR=4.9, 95%CI=1.29-18.50 , P<0.05), planned pregnancy (OR=4.6, CI=1.36–15.79, P<0.05) and self-efficacy (OR=0.2, 95%CI=0.05– 0.53, P<0.05) remained statistically significantly associated with ART adherence. Qualitative analysis showed that few women reported drug side-effects as barriers to ART adherence during ART initiation and looking healthier and protecting their unborn babies were motivators to adherence. Key informants reported that ART adherence was better in pregnancy compared with other periods because women wanted to prevent HIV-transmission to their unborn child. Stigmatization and negative spousal influences were barriers to ART adherence.

The study identified that low HIV treatment adherence self-efficacy was related to poor ART adherence in pregnancy. Interventions aimed at improving ART adherence in pregnancy should focus on HIV treatment adherence self-efficacy.

Keywords: Pregnancy, Prevention of Mother-to-Child Transmission, Antiretroviral Therapy, Self-Efficacy, Adherence

Word count: 499

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Globally, mother-to-child transmission (MTCT) of the human immunodeficiency virus (HIV) infection is responsible for over 90% of the more than two million pediatric HIV. The risk of transmission ranges from 25% to 48% in resource limited settings (UNAIDS, 2010). These figures indicate not only the magnitude of the problem, but also the worrisome burden of pediatric HIV infection. The National Agency for the Control of AIDS (2010) reported that the estimated number of children under age 14 living with HIV is 360,000, and the estimated number of pregnant women living with HIV is 210,000. Furthermore, only fifty-two percent of women know that the risk of mother-to-child transmission can be reduced by taking special drugs (NPC, 2013).

The prevention of mother-to-child transmission (PMTCT) of HIV is a strategy to reduce the risk of transmission from a mother to her baby by providing drugs, counseling and psychological support (FMOH, 2010a). The MTCT of HIV occurs when the virus passes from a mother to her infant during pregnancy, birth or breastfeeding. The United Nations' four-pronged strategy for PMTCT addresses a broad range of HIV related prevention, care, treatment and support needs of pregnant women, mother, their children and families. The National guidelines for PMTCT of HIV (2010) recommended that ART should be initiated in HIV positive pregnant women based on a CD4 cell count of ≤ 350 irrespective of WHO clinical AIDS stages. ARV prophylaxis are provided for HIV positive pregnant women with CD4 cell count of >350cells/ml. The primary prevention of HIV infection from infected mothers to their unborn babies is an important aspect of the PMTCT services (Oladokun et al, 2013 and Hodgson et al, 2014). However, low and middle income countries have challenges in access to PMTCT services and transmission rates are as high as 25%-48% (Nachega et al, 2012).

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

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The World Health Organization recommends Antiretroviral Therapy (ART) as a key component of all effective PMTCT strategies. The Option A consists of antenatal prophylaxis with zidovudine (ZVD) followed by intrapartum and postpartum prophylaxis with single-dose nevirapine (NVP) and zidovudine plus lamivudine (AZT+3TC). Option B is a triple antiretroviral prophylaxis until after finishing breastfeeding. Standard ART consists of the combination of at least three antiretroviral drugs to maximally suppress the HIV virus and stop the progression of HIV disease, particularly in the early stages of the disease. During and after pregnancy, antiretroviral therapy (ART) is critical both for preserving maternal health and for preventing new infections in infants. Currently, a safe prophylaxis and highly efficacious ART that can reduce MTCT to less than 5% are made available in many resource-poor settings (Ayuo et al, 2013).

Adherence is the extent to which a person uses a medication according to medical recommendations, inclusive of timing, dosing and consistency (Chaiyachati, 2014). Adherence rates exceeding 95% are necessary in order to derive the greatest benefits from ART. Studies have shown that a higher level of drug adherence is associated with improved immunological, virological and clinical outcomes. Conversely, poor adherence to antiretroviral drugs during pregnancy can lead to the development of viral resistance by the mother, a higher risk of MTCT and MTCT of resistant HIV strains. Therefore, the adherence to antiretroviral drugs poses unique challenges to HIV infected, particularly in pregnant women (Boateng et al, 2013; Ekama et al, 2012; Mirkuzie et al, 2011; Ngarina et al, 2013).

Factors that affect ART adherence are known to affect PMTCT service uptake. Challenges remain in the effort to reduce the burden of HIV/AIDS in Nigeria to appreciable levels by ensuring uptake and adherence (Oladokun et al 2013; Hodgson et al, 2014). HIV infected women's adherence to ART may be compromised by socio-economic factors, child care responsibilities and dependency ratios or lack of partner support. The knowledge of HIV, ART and PMTCT could be influenced by interplay of cultural and socioeconomic factors including client's education (Ayuo et al, 2013). In Johannesburg, South Africa for example, less education, living in an informal setting and providing care for at least two children with uncertain partner support, were each associated with reduced adherence to ART (El-Khatib et al, 2011).

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Studies in Nigeria reported that the fear of being identified as HIV positive was the most common reason for non-adherence. Furthermore, limited male involvement, the organization of PMTCT and health workers' inefficiency, marginalized populations unable or unwilling to access orthodox health care providers are contributing factors to non-adherence (Ekama et al, 2012; Okoli and Landsdown, 2014; Oladokun et al, 2013). Therefore, factors of interest include individual, interpersonal, community, and structural influences that contribute to an HIV-infected woman's ability to initiate, adhere to, or be retained in ART care.

Self-efficacy for treatment adherence has been identified as important in HIV treatment. HIV treatment adherence self-efficacy refers to patients' beliefs about their ability to exercise personal control regarding their HIV treatment. Unfortunately, very few studies have investigated HIV treatment adherence self-efficacy among HIV positive pregnant women. In Ukraine, Bailey and her co-workers (2014) found that low self-efficacy among HIV pregnant women was common among those that experienced side effects from ART. Therefore, this study examined the prevalence and determinants of ART adherence among women assessing PMTCT services in Ibadan, Oyo State.

1.2 Problem Statement

The UNAIDS (2013a) reported that for the year 2012, an estimated 60,000 new HIV infections occurred among infants in Nigeria, making her the country with the largest number of children acquiring HIV through MTCT. Common barriers are cultural norms that limit a woman's health care decisions due to men's influence in family decision making (Aliyu et al, 2013). In ensuring that HIV exposed infants are not infected with the virus, ART initiation and adherence must be optimal. Poor adherence may lead to maternal HIV disease progression and enhancing the virus' ability to develop therapy limiting drug resistance that increases the risk of MTCT (El-Khatib et al, 2011). However, adherence to prescribed ART among HIV infected pregnant women continues to be a major public health concern in both high income and low income countries.

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Paredes et al (2013) reported that the main barriers to adherence included ART dosing frequency, pill burden, physical, economic, and emotional stresses such as depression in postpartum and also drug or alcohol use. A study by Sam-Agudu et al (2014) reported that in northern Nigeria, common barriers to PMTCT success include poor motivation among health workers and their clients, low adherence to medications and appointments and inadequate support systems. Also, the other element of PMTCT programmes showing poor uptake and adherence is the follow up of exposed infants in which only 15% of HIV exposed infants, access early infant diagnosis globally (Mirkuzie et al, 2011). The results from a critical literature review study on Nigeria and Malawi showed that socioeconomic and socio-cultural factors are the second biggest barriers to the success of PMTCT programmes and also other factors such as limited male involvement, flaws in the design of PMTCT and health workers inefficiency (Okoli and Landsdown, 2014). Similarly, a major barrier to effective PMTCT services is the shortage of skilled health care providers who are trained in HIV prevention for rural communities (Aliyu et al, 2013).

Several methods have been used to measure adherence, but no gold standard has been established. Each of these methods has its respective strengths and weaknesses. Available methods include pill counts, self-report, prescription refills, medication event monitoring system (MEMS), biological markers, and assays (Ekama et al, 2012). Patient self-reporting is the most commonly used method for assessing adherence in HIV positive persons. It is clearly a simple and quick tool to use in a clinical or field research setting. Findings indicate that self-reported adherence rates correlated with adherence rates obtained from other measures such as the standard three-day self-reported adherence data and the viral load monitoring. Consequently, the best way to improve the utility of self-reporting is to use a short recall period, and to ask about the entire medication intake rather than for each type of medication (Mannheimer et al, 2006). Although, few studies have evaluated the factors associated with non-adherence to ART in pregnant women assessing PMTCT services (Ekama et al, 2011; Ayuo et al, 2013; Phillips et al, 2014), only few studies have measured adherence among HIV positive pregnant women using the validated self-report Centre for Adherence Support Evaluation (CASE) index tool (Bailey et al, 2014; Mannheimer et al, 2006).

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Since 2010, Nigeria has adopted the World Health Organization (WHO) option 'B'. It requires the administration of triple antiretroviral prophylaxis to all HIV infected pregnant women. Despite a large proportion of mothers initiating medication during pregnancy, the majority of them and their infants did not ingest the drugs according to the recommendations at birth (Mirkuzie et al, 2011). This implies that large missed opportunities occur within the health system despite the PMTCT guidelines. There is a need to explore the adherence to ART and factors responsible for non-adherence using the validated self-report CASE index tool that provides an alternative method for assessing ART adherence in clinical settings. A mixed method approach of data collection will also help to provide further clarity on the variables of interest.

1.3 Justification

Nigeria is contributing 14% of the total African burden of pediatric HIV in which Sub-Saharan Africa has 2.3 million out of the 2.5 million children living with HIV worldwide (WHO, 2010b). Although, ART is available as part of the PMTCT services, a study by Oladokun et al (2013) reported that Nigeria still reports an unacceptably high incidence of HIV in infants. According to UNAIDS (2013a) HIV and AIDS estimates, 3.2 million people are living with HIV in Nigeria of which 1.6 million are women aged 15 and above. This increases the impact of HIV on pregnancy and maternal mortality. According to a report by UNAIDS (2013b), without an urgent action in Nigeria, "the global target of eliminating new HIV infections among children by 2015 is unlikely to be reached". Currently, the likelihood of achieving, by 2015, the "Getting to Zero" target (the three zeros: zero new HIV infections, zero discrimination and zero AIDS-related deaths) seemed highly unlikely (UNAIDS, 2011).

Furthermore, MTCT of HIV is a leading cause of HIV transmission to infants and this is responsible for pregnancy-related deaths and reversed gains in reducing maternal mortality (Hodgson et al, 2014 and Chaiyachati et al, 2014). In the context of HIV treatment adherence, self-efficacy has been reported as a correlate to adherence (Bailey et al, 2014; Johnson et al, 2007) hence, the psychological pathways that determine adherence need to be investigated as individual characteristics and health beliefs may inform actions. Moreover, there have been few studies in resource-poor settings related

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to follow up of exposed infants. Findings suggest that exposed infant follow up is inconsistent and poorly structured; negatively impacting the success of the PMTCT programmes (Mirkuzie et al, 2011).

HIV infected persons in accessing treatment, must be confident in their ability to follow treatment as recommended and this includes commencing and adhering to ART. Studies have shown that HIV treatment adherence self-efficacy is a key characteristic in maintaining optimal medication adherence (Adefolalu et al, 2014; Bailey et al, 2014; Wei-Ti et al, 2013; Johnson et al, 2012; Nokes et al, 2012; Reif et al, 2013). The findings by Adefolalu et al (2014) showed that there is a strong association between adherence self-efficacy and ART adherence which suggests that low adherence self-efficacy is influential in ART non-adherence. Adefolalu et al (2014) also recommended that self-efficacy must be explored in patients who are to be initiated on ART as this cognitive variable is highly predictive of non-adherence to ART. These studies have reported an association between adherence self-efficacy and ART adherence in HIV patients such as teenagers, men and non-pregnant women but very few studies have specifically investigated HIV treatment adherence self-efficacy among pregnant women in Sub-Sahara Africa.

"Key PMTCT practices are not being adequately translated from research into practice. Researchers, policymakers, and clinicians could apply the study findings to address significant knowledge translation gaps in PMTCT" (Ogbolu et al, 2013: p. 1). This shows that appropriate strategies need to be put in place and then followed up with informed actions. Such actions need to be guided by research. Thus, this study investigated the patterns and determinants of ART adherence among the HIV positive pregnant women and the factors responsible for ART non-adherence.

1.4 Research Questions

1. What is the knowledge of HIV/AIDS, PMTCT and ART among HIV positive pregnant women?
2. What is their level of HIV treatment adherence self efficacy?
3. What is their level of ART adherence in pregnancy?
4. What are the factors responsible for ART adherence in pregnancy?

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1.5 Objectives of the Study

1.5.1 General Objective

The general objective of this study was to investigate the prevalence and determinants of antiretroviral therapy adherence among HIV positive women accessing Prevention of Mother to Child Transmission services in Ibadan, Oyo State.

1.5.2 Specific Objectives

1. To determine the knowledge of HIV/AIDS, PMTCT and ART among HIV positive pregnant women.
2. To determine the level of HIV treatment adherence self-efficacy.
3. To determine the level of ART adherence in pregnancy.
4. To identify factors responsible for ART adherence in pregnancy.

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CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 An Overview of HIV and AIDS

The Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) pandemic is one of the most serious health crises the world is facing today. Since it was first recognized in 1981, AIDS has killed more than 25 million people worldwide, making it one of the most destructive pandemics in recorded history(UNAIDS,2013a). AIDS is caused by HIV, which can be transmitted through infected body fluids such as blood, vaginal secretions, sperm and breast milk with the most common route of transmission being unprotected sexual intercourse. However, among certain high risk groups, other modes of transmission may be dominant. For example, among injectable drug users, the use of contaminated needles is a major cause of transmission.

The onset of HIV infection is often characterized by a mild flu-like illness and then an asymptomatic period that lasts for an average of eight years. During this period, an HIV infected person can infect other people through unprotected sexual intercourse, blood donations, sharing of infected sharp instruments and mother-to-child transmission. Once the infection progresses, the immune system of the individual becomes deficient hence, they become vulnerable to several infections known as opportunistic infections. A common opportunistic infection is tuberculosis, often followed by other infections such as pneumonia, meningitis, fungal infections and some cancers. AIDS eventually sets in and kills the infected person due to the inability of the immune system to fight these infections.

The impact of HIV on an individual is often measured by the number of CD4 cell count (a key constituent of the immune system) in the blood stream or the viral load. The normal CD4 count is about 1000. Once the CD4 count falls, the individual often suffers from infections unless they are treated with antiretroviral drugs (ARVs). Antiretroviral treatment is started when the CD4 count falls below 200. A higher

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burden has been placed on women and children who continue to experience higher rates of HIV infection in many settings. The government of Nigeria has committed to increasing coverage of PMTCT services to 90% by the end of 2015. The President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund to Fight AIDS, Tuberculosis and Malaria, and other donors are partnering with Nigeria to reach this goal.

2.2 Epidemiology of HIV/AIDS in Nigeria

Sub-Saharan Africa (SSA) remains the region most affected by the HIV epidemic. The Joint United Nations Programme on HIV and AIDS (UNAIDS) reported in 2013 that 69% of the 23.5 million people infected worldwide live in this region. Sex workers, men who have sex with men and people who inject drugs make up only 1% of the Nigerian population yet, they account for around 23% of new HIV infections with Rivers State having the highest HIV prevalence of 15.2% in the country (NACA, 2014). Women in SSA bear the most burden of the HIV epidemic with Nigeria having an estimated 1.6 million women of reproductive age living with HIV (UNAIDS, 2013a). With transmission primarily through heterosexual sex, women are mostly infected compared to males of which it has been reported that every minute, one young woman becomes infected with HIV (UNAIDS, 2012). The disproportionate impact of the HIV epidemic on women can be attributable to several factors including biological, social, behavioral, cultural, economic and structural. In SSA, a combination of these factors has led to the disparate increase in HIV infection rates among women compared to their male counterparts (Ramjee et al, 2013).

Zechariah et al (2011) reported that the possibility of achieving, by 2015, the United Nations Millennium Development Goal (MDG) targets and the "Getting to Zero" target (zero new HIV infections, zero discrimination and zero AIDS-related deaths) of UNAIDS seem highly unlikely. Nigeria, with an estimated population of 167 million (National Population Commission, 2009), is second to South Africa in the number of people living with HIV/AIDS worldwide, representing nine percent of the global burden of the disease. The World Health Organization introduced the Antenatal Care (ANC) HIV Sero-prevalence survey to monitor the HIV and AIDS epidemics in

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member countries including Nigeria. This 2010 survey is the 9th in the series of National HIV/AIDS Sero-prevalence antenatal surveys designed to track the magnitude and progression of HIV and AIDS in Nigeria since 1991 (Federal Ministry of Health, 2010).

2.3 The Prevention of Mother-to-Child Transmission (PMTCT) of HIV in Nigeria

In Nigeria, PMTCT services are based on the United Nations adopted recommendations on prevention of MTCT of HIV for the implementation of a comprehensive four-pronged strategic approach. This comprises; primary prevention of HIV among women of reproductive age, prevention of unintended pregnancies among women living with HIV, provision of appropriate treatment and care and support to mothers living with HIV and their families (WHO, 2010b). The PMTCT programme in Nigeria commenced in 2002 yet, the rate of new infections in children has remained largely unchanged (UNAIDS, 2013b). In 2012, Nigeria had ARV coverage of 17%, MTCT rate of 30% and nearly 60,000 new HIV infections among children which is the highest incidence in a single country globally (UNAIDS, 2013b). Most children less than 15 years living with HIV acquire the infection through MTCT. In the absence of interventions, the risk of such transmission is 30% to 45% (Federal Ministry of Health, 2010).

A comparative analysis of teenagers and older pregnant women utilizing PMTCT services in Western Nigeria reported that the awareness of mother-to-child transmission (MTCT) and its prevention was still relatively low. Teenagers were reported to be three times less likely to use the PMTCT services when compared to the older women and those from a low socio economic background were six times more likely to utilize PMTCT services when compared with those from high socio economic background (Amoran et al, 2012). The access and use of PMTCT services by those of low socio-economic background may be due to the fact that the ARV drugs are currently free in Nigeria by the President's Emergency Plan for AIDS Relief (PEPFAR), a United States governmental initiative to address the global HIV/AIDS

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epidemic primarily in Africa and also the AIDS Prevention Initiative in Nigeria (APIN).

Several other challenges confront the PMTCT program. Low contraceptive prevalence rate, high fertility rate and a strong culture of breastfeeding with very low rates of exclusive breast feeding before six months have resulted in MTCT. Also contributing to the poor program impact is the non-involvement of most private health sectors though, they serve as a big player in the provision of health services in Nigeria (Agboghoroma et al, 2013).

The National guidelines for the prevention of mother-to-child transmission of HIV (2010) outlines that pregnancy in the HIV positive woman is an indication for ARVs irrespective of CD4 cell count, viral load or clinical stage. Early commencement and ARV choice often depend on the clinical setting with expert consultation where necessary. Use of Antiretroviral drugs for therapy is often initiated in HIV positive pregnant women based on the following criteria:

a. CD4 Count ≤ 350 irrespective of WHO clinical staging

b. WHO AIDS Stages III & IV disease, irrespective of CD4 cell count (as seen in Table 3 below).

ARV prophylaxis is usually provided for HIV positive pregnant women who do not meet the above criteria. They include women with WHO Stages I & II AIDS with CD4 of >350cells/ml.

Table 2.1 and Table 2.2 summarize the eligibility criteria for the use of ARVs in HIV positive pregnant women and the options for PMTCT of HIV respectively (Appendix VI).

2.3.1 Factors associated with Increased Risk of MTCT

An increased risk of MTCT is multi-factorial involving viral, maternal, placental and foetal conditions and as well as the delivery process. The rate of MTCT of HIV is affected by several factors which can be grouped into viral, maternal, obstetric, foetal and breastfeeding factors as seen in Table 2.3.1 (Appendix VII).

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a. **Viral Factors:** the higher the viral load, the higher the risk of transmission • Presence of resistance to anti-retroviral drugs • Transmission rates are higher with HIV 1 than HIV-2 infection.

b. **Maternal Factors:** e.g. low CD4 cell count, symptomatic disease, poor nutritional status, the presence of STIs and other genital ulcers during labour.

c. **Obstetric Factors:** These include vaginal delivery with higher viral load, invasive obstetric procedures, external cephalic version, foetal scalp electrodes and foetal blood sampling, instrumental deliveries like vacuum extraction or forceps, prolonged duration of rupture of foetal membranes (PROM)- 4 hours and above), prolonged labour, episiotomy and genital lacerations, first born of multiple pregnancies.

d. **Foetal Factors:** Prematurity and foetal genetic characteristics.

e. **Placental Factors:** Placental disruption from any cause increases the chance of feto-maternal transfusion thereby increasing the risk of HIV infection, antepartum haemorrhage, intra partum haemorrhage, chorioamnionitis and placental malaria.

2.4 Knowledge of HIV, PMTCT and ART in HIV Positive Pregnant Women

The Nigerian National Demographic Health Survey reported in 2013 that twenty-six percent of women in the general population have comprehensive knowledge about AIDS. Overall, forty-nine percent of these women knew that HIV can be transmitted by breastfeeding and the risk of MTCT can be reduced if the mother takes special drugs during pregnancy. Also, the knowledge regarding PMTCT was higher in urban than in rural areas and increases with increasing education and wealth. In addition, the women in the survey were also aware that the consistent use of condoms during sexual activity and seventy-eight percent of women also knew that limiting sexual intercourse to one uninfected partner who has no other partners can reduce the chances of contracting HIV (NP, 2013).

Among women accessing PMTCT services, HIV positive women's knowledge and practices on HIV/AIDS, PMTCT and ART has been reported to influence their motivation and uptake of ARV drugs in PMTCT (Boateng et al, 2013). Boateng and

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colleagues reported that women on the PMTCT programme with inadequate knowledge were significantly more likely to miss their ART appointments compared to those with adequate knowledge. A similar finding by Ekama et al (2012) also reported that the knowledge level of HIV and ART among HIV positive pregnant women has been thus far very good as a study reported that over 85% of respondents had a very good knowledge.

This is supported by findings in a study by Byamugisha et al (2010) which showed that many antenatal attendees had correct knowledge about MTCT of HIV and its prevention. Furthermore, a study in Ghana among women accessing PMTCT services, Boateng et al (2013) reported that patients had good knowledge on ART and PMTCT partly due to the institution of adherence counseling for new clients as part of the programme, where the benefits of ART adherence, problems associated with defaulting are discussed. However, there was little evidence of the influence of the knowledge and perceptions of ART and PMTCT of HIV positive women on their utilization of PMTCT services in Kumasi Metropolis.

Socio-demographic characteristics such as a higher level of education and gravidity may have an influence on the knowledge level of HIV positive persons. Women with formal education were adequately knowledgeable about ART and PMTCT as compared to those without formal education (Boateng et al, 2013). Supporting this was a research in Uganda by Byamugisha et al (2010) which showed that women who had completed secondary school education were more likely to have good knowledge of breastfeeding practices that prevent vertical transmission of HIV. This study also revealed that pregnant women who had completed secondary education were approximately three times more likely to have good knowledge about exclusive breastfeeding. Women who had three or more pregnancies were three times more likely to have good knowledge about exclusive breastfeeding with can prevent MTCT (Byamugisha et al, 2010). Nevertheless, another study reported that there was no link between levels of education of the mothers and knowledge of PMTCT, which may be due to the generally high and equal level of education in this region (Falnes et al, 2010). Also, a study in the Kilimanjaro region in Tanzania among rural and urban mothers who had recently been through the PMTCT programme, reported an improvement in the testing rate and PMTCT knowledge. In both the quantitative and

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the qualitative data reported, three main areas where the mothers seemed to have insufficient knowledge about PMTCT: (a) the possibility of MTCT during pregnancy; (b) the protective effect of condom use during pregnancy and the breastfeeding period; and (b) the infant feeding method that is recommended for an HIV-infected mother. Good counselling takes time, and a shortage of staff is a major barrier affecting mothers' PMTCT knowledge (Falnes et al, 2010).

2.5 Importance of Adherence to Antiretroviral Therapy (ART)

The introduction of antiretroviral drugs for the treatment of HIV brought new hope for persons living with the virus. Since 1996, several evidences from clinical trials have been published, validating the use of ART for the treatment of AIDS. Adherence to an ART regimen is the extent to which a person uses a medication according to medical recommendations, inclusive of timing, dosing and consistency (Chaiyachati et al, 2014) hence, close adherence to antiretroviral regimen is important in maximizing viral suppression and minimizing the risk of resistance (El-Khatib et al, 2011). The PMTCT programme has a great potential to achieve virtual elimination of MTCT provided that the recommended interventions are properly followed however, adherence rates exceeding 95% are necessary in order to derive the greatest benefits from ART. Nevertheless, many people do not maintain such high level of adherence. An analysis by Phillips et al (2014) suggests that by six months postpartum, about half of the women had either missed at least one scheduled visit or had stopped accessing care after initiating ART during pregnancy. Thus, both disengagement and missed visits appear to be more common in postpartum compared to before delivery.

2.6 Measurement of Adherence

The measurement of adherence is problematic. There is currently no widely accepted gold standard for measuring adherence. Several methods for measuring adherence have been utilized with varying success in both clinical trials and clinical practice involving both indirect measures (e.g. self-reports, pill counts, electronic monitoring devices, medication refill rate and monitoring for an expected therapeutic outcome) and direct measures (e.g. direct observation, therapeutic drug monitoring and biologic markers

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(Mannheimer et al, 2006). Although, some of these measures have been useful in adherence research, many are quite complicated for application in clinical settings.

2.6.1 Self Reports

Patient self-reporting is the most frequently used method for assessing adherence in people living with HIV/AIDS. It involves asking patients a series of questions in order to access their individual adherence. The recall period used could be four days, a week, a month or the most recent recall of missing a prescribed dose (Wekesa et al, 2007). The method of self-report offers the advantages of being quick and inexpensive and has been reported to be sufficient in assessing adherence when pill count is not possible and electronic devices and ARV blood measurement are not feasible (Ekama et al, 2012). Therefore, the best way to improve the effectiveness of self-reporting is to use a short recall period, and to ask about the entire medication intake rather than for each type of medication used.

2.6.2 Pill Counts

Pill counts can be employed by health care providers to measure adherence. Here, the patients are told to bring their pills to clinical visits to be counted by the health care provider. This is a simple, cheap, and objective method of assessing adherence but it is prone to limitations. First, it depends on the patients to bring all their pills but it has been reported that some phenomena of pill dumping or pill sharing exist on the part of the patients before their scheduled clinical visits thus, adherence may be over-estimated (Wekesa et al, 2007). An option could be to carry out unannounced pill counts visit which can be expensive to implement and could undermine patients' confidentiality. A feasible approach would be to analyze drug dispensing records to determine non-adherence (Wekesa et al, 2007).

2.6.3 Pharmacy Refill Tracking

This is an objective method that uses pharmacy refill data to estimate drug adherence. An effective record keeping system is put in place at the pharmacy and it is assumed that patients who collect their drugs as scheduled are adhering to the treatment (Wekesa et al, 2007). However, the assumption that collecting drugs as scheduled means good adherence is subjective as patients may not actually be taking them, could

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be sharing them with infected partner/family member or friend, or simply dumping them. Also, this method relies on accurate records, which is hardly the case in sub-Saharan Africa, where electronic monitoring systems such as the computer and optimum power supply are limited in health care facilities. Lastly, this method requires that patients use the same pharmacy for all refills (Wekesa et al, 2007).

2.6.4 Medication Event Monitoring System (MEMS)

The MEMS is a method that uses an electronic device that is fitted on the lid of the pill container. This device records the date and time of opening and closing of the lid, assumed to coincide with drug intake. A computer software downloads this information and gives a written report. This allows for the monitoring of drug intake and the intervals between doses however, there are limitations. First, it may under-estimate adherence because some patients take out multiple doses at once to be used at later times. For example, if they have to travel and do not want to go with the pill container. Secondly, the method is ineffective if patients lose the lid or leave it off for a period of time. Lastly, it is expensive and its use is not feasible in resource constrained settings. However, it may be effective if patients are trained on its use and advised to open the lid only to take out the dose needed at that time (Wekesa et al, 2007).

2.6.5 Biological Makers

Biological markers assess drug adherence by monitoring the level of the viral load in a patient's blood stream. Since ART treatment is to suppress the multiplication of the virus, low levels of viral load indicates adherence to the treatment regimen. However, limitations exist. First, viral loads could still remain high even when the patient is adhering perfectly. This could be due to reasons such as treatment failure, poor drug absorption or ART drug resistance (Wekesa et al, 2007). Furthermore, viral load monitoring is very expensive to implement and may not be available in resource constrained settings (Wekesa et al, 2007).

2.6.6 Center for Adherence Support Evaluation (CASE) Adherence Index Tool

The CASE Adherence Index validated by Mannheimer et al (2006) is a simple composite measure of self-reported antiretroviral therapy (ART) that uses three

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standard measures of self-reported adherence and is found to be simple to apply hence, it can be employed by both researchers and clinicians in the field.

The CASE Adherence Index was developed as a composite (sum) of three self-reported measures of adherence:

Q1 - Self-reported frequency of 'difficulty taking HIV medications on time (no more than two hours before or two hours after the time your doctor told you to take it)'. Responses include: never, rarely, most of the time or all of the time.

Q2 - Self-reported 'average number of days per week at least one dose of HIV medications was missed'. Responses include: everyday, 4–6 days per week, 2–3 days per week, once a week, less than once a week or never.

Q3 - Self-reported 'last time missed at least one dose of HIV medications'. Responses include: within the past week, 1–2 weeks ago, 3–4 weeks ago, between one and three months ago, more than three months ago or never.

Two steps were taken to assess the CASE Adherence Index's reliability and validity. Firstly, the CASE Adherence Index's degree of sensitivity and specificity to changes in the three-day self-report across four cross-sectional time periods was estimated. Secondly, the CASE Adherence Index and the three-day self-report's sensitivity to changes in HIV virologic outcomes and CD4 counts across time were compared (Mannheimer et al, 2006). A cutoff score of ten on the CASE Adherence Index was used by the authors to dichotomize the CASE Adherence Index in analyses to maximize the sensitivity and specificity of the index with respect to the three-day self-report set at 95% adherence.

2.7 ART Treatment Adherence Self-Efficacy

High levels of adherence to ART are critical for treatment success. In some classes of ART medications, low adherence levels are linked to development of resistant virus. In the context of HIV treatment adherence, self-efficacy has been reported as a correlate to adherence (Johnson et al, 2007). Looking at self-efficacy with respect to ART, a study by Adefolalu et al (2014) and Johnson et al (2007) showed that patients who had sound confidence adhered well to ART treatment and those with low confidence were

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non-adherent to treatment. Thus, this suggests that patients with good ART adherence held positive beliefs about their medications for chronic medical conditions. Also, findings from a study by Nokes et al (2012) emphasized the centrality of self-efficacy in treatment adherence. As a single predictor, adherence self-efficacy yielded a moderately strong relationship with adherence to ART. When compared with socio-demographic characteristics such as educational level, higher self-efficacy was significantly associated with greater adherence to HIV medication and a combined HIV self-efficacy was significantly associated with greater adherence to HIV medication (Reif et al, 2013).

Furthermore, in a study to determine the association between an engagement with health care providers and Self- Efficacy in People Living with HIV, Wei-Ti et al (2013), reported that adherence self-efficacy and self-esteem were correlated and study participants were confident in keeping up with their medication adherence. Patients often need support and encouragement from their health care providers to maintain the medication adherence self-efficacy. This was supported by findings in this study as patients who were engaged with their health care providers missed fewer medications and had fewer self-reported symptoms. In addition, the area in which pregnant women most commonly lacked confidence was in their ability to keep taking medication if experiencing side effects and fewer were able to ask someone for support with taking their medication (Bailey et al, 2014). This highlights women with unmet needs and those at risk of poor ART adherence that must be investigated in order to carry out appropriate interventions.

2.8 ART Adherence in Pregnancy

In 2011, 90% of pregnant women with HIV reside in sub-Saharan Africa and current estimates suggest that a quarter of deaths during pregnancy and the six week postpartum period in the region are attributable to HIV (Kendall et al, 2014). Adherence rates exceeding 95% are essential in order to take full advantage of the benefits of ART. In a rapid systematic review by Chaiyachati et al (2014), it was reported that recently published reviews concluded that single-tablet regimens improve adherence especially approaches to optimize ART regimens. Findings have shown an

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overall strong evidence base to support the claim that five interventions; treatment supporters, education, Cognitive Behavioural Therapy, Directly Observed Treatment Short Course (DOTS) for Tuberculosis care and active reminder devices can improve ART adherence in some resource constrained settings. In a cross-sectional study of ART adherence among childbearing women in Ukraine, poor ART adherence during pregnancy was reported and few women also had poor adherence in their first year postpartum (Bailey et al, 2014). This was supported by Kuonza et al (2010) in which adherence level to ART is found to be high among HIV infected pregnant women compared to non-pregnant women. Also, a meta-analysis by Nachega et al (2012) showed that ART adherence during pregnancy is significantly below that recommended for sufficient virologic suppression. In addition, a progressive and marked decline in medication adherence has been observed across the perinatal period. A study reported a higher proportion of non-adherence among HIV infected pregnant women who attended facilities that experienced staff turnover than those who did not attend these facilities (Mirkuzie et al, 2011). This is different from a finding by Ayuo et al (2013) in which women receiving PMTCT services at a district hospital were associated with lower levels of reported adherence than care elsewhere.

Additionally, women's socio-demographic status and obstetric history tend to be a factor associated with adherence in HIV positive women. A study in Zimbabwe has shown that maternal non-adherence to Nevirapine was almost three times higher in multi-parous mothers and more than twice higher among mothers who had no secondary education (Kuonza et al, 2010). This was supported by findings in a study in South Africa that women with less education were at higher risk for incomplete adherence (El-Khatib et al, 2011). Also reported was a high level of ART adherence regardless of the economic and social challenges faced by women, many of whom were single mothers living in underprivileged economic conditions. Furthermore, findings showed that patients with poor socio-economic status such as a poor living condition, the absence of a television or lack of potable water at home were each associated with incomplete adherence although not statistically significant. It is important to note that mother-to-child transmission could be underestimated mostly due to the varying proportions of potential non-adherence to medication among groups.

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Other factors associated with adherence have been reported. A study in China by Wei-Ti et al (2013) found factors associated with non-adherence behaviors to include having a higher viral load, having insufficient HIV, knowledge, forgetting to take pills, using alcohol, being away from home, sleeping, being busy, having a change in routine, being too sick to take the pills, not being able to tolerate the side effects of the ART, or being depressed. Also, participants who engaged more with their health care providers presented with higher adherence rates compared to those who had less engagement (Wei-Ti et al, 2013).

2.9 Factors Responsible for Adherence to ART in Pregnancy

Adherence to ART is a critical issue, and evidences from literature has shown that the factors that influence a patient's ability to adhere are multiple and complex. Nigeria is one of the beneficiaries of free ARV drugs through PEPFAR however, a systematic review and meta-analysis of adherence to ART during and after pregnancy in low, middle, and high income countries reported that pregnant women achieved ART adherence >80% with only 53% of women achieving this during the postpartum period (Nachega et al, 2012).

2.9.1 Socio-Demographic and Economic Factors

Important socio-economic nurturing factors for ART adherence were reported by a study in South Africa to include urban area of residence, adequate physical environment including transport and access to health services (Peltzer et al, 2010). Women initiating ART at later gestational ages have less time in HIV care and possibly less counseling than women who start ART earlier in pregnancy therefore, this suggests that women who seek antenatal care (ANC) and/or initiate ART late in pregnancy are a high-risk population that requires special attention throughout the postpartum period of breastfeeding (Phillips et al, 2014).

2.9.2 Level of Education

Education empowers women to have autonomy in making important health decisions without relying on other people. Attending more antenatal care (ANC) sessions offers more opportunities for health care providers to reinforce issues such as the importance

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of ART adherence. In Zimbabwe, Kuonza et al (2010) reported that poor adherence to the maternal dose of Nevirapine (NVP) was more than twice higher among mothers who had no secondary education, four times higher among mothers who attended less than three antenatal sessions during pregnancy and almost three times higher in multi-parous mothers due to complications arising.

A study in Ghana found that many study participants had a high level of essential HIV knowledge (e.g. routes of transmission; the role of ARVs in prolonging life), but women with inadequate knowledge of PMTCT and ART were significantly more likely to be lost to follow-up (Hodgson et al, 2014). In South Africa, the drug adherence of women was compromised as a result of the inability to read Westernized drug labels despite the presence of trained Zulu counselors (Mepham et al, 2011). Furthermore, a review of three other studies in Kenya, Ghana, and South Africa found that sufficient knowledge of PMTCT facilitated ART initiation, adherence and/or retention during and after pregnancy (Hodgson et al, 2014). Also, there is a positive and significant impact of health education on awareness and strategies of PMTCT (Iwelunmor et al, 2014).

2.9.3 Cultural Beliefs

Local health beliefs may result in decisions to stop ART in favour of traditional medicine. Experiences from a two-year Mitra-Plus Study in Tanzania suggests that despite the provision of free ART drugs in an ideal setting and as well as free medical services, bus fares, and treatment of opportunistic infections, it was still a challenge for the women to adhere adequately during the period. In addition, HIV related stigma and poverty combined with cultural norms and traditions, significantly reduces women's power to make decisions regarding their own health (Ngarina et al, 2013). That is probably quite generalizable to many other urban sub-Saharan Africa setting. It has also been reported that pregnancy related factors are not the reasons for missing antiretroviral drugs during pregnancy, but as a result of other personal and socio-cultural factors. Stigma and discrimination remain an important factor against quality HIV care, as 63.6% of women in a study expressed the reason for missing their drugs as afraid of being identified as HIV positive (Ekama et al, (2012).

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2.9.4 Patient Factors

In a study by El-Khatib et al (2011), HIV positive pregnant women reported three main reasons for missing their medication: being away from home, being busy with other things and simply forgetting. In a Nigerian study, an active desire to remain healthy and/or to protect one's child was an enabler of ART initiation and adherence (Ekama et al, 2012). Nevertheless, women have also reported non-adherence arising due to the absence of food with which to take tablets, or having to fetch water for the family despite being aware of the benefits of adherence (Mepham et al, 2011). The greatest loss in the PMTCT care cascade occurs prior to infant follow up, with one-third of women being lost to follow up after receiving delivery care (Paredes et al, 2013).

2.9.5 Spousal and Family Influences

Bailey et al (2014) reported that women living with their extended families, a factor correlated with youth and unplanned pregnancy, were more likely to report poor adherence (defined as a score of ≤11 on the CASE adherence index scale), particularly if they had not disclosed their HIV status to a family member. This is also in line with existing literature which has reported that the disclosure to other HIV-infected family members resulted in the loss of their tablets as a result of suspected theft by an HIV infected family member, an issue which prior to the time, had not been reported (Mepham et al, 2011).

In Johannesburg, providing care for at least two children with uncertain partner support, living in an informal setting and less education were each associated with reduced ART adherence and an increased need for support (El-Khatib et al, 2011). A randomized controlled trial was conducted to determine whether male participation in the medical adherence intervention would significantly impact the uptake of PMTCT treatment by pregnant women. The results showed that women in the intervention condition had significantly greater adherence to PMTCT medications for both themselves and subsequently their new borns than those in the control condition (Weiss et al, 2014) thus, suggesting that male involvement and their participation in the intervention resulted in active participation.

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2.9.6 Health Service Factors

Certain factors related to health care services have been identified as having an impact on PMTCT uptake and retention in care. Such reminders include the availability of ART services, easier access to drugs and services and benefits, psychosocial support, and a friendly care (Sam-Agudu et al, 2014). Enablers refer to the ability, accessibility, acceptability and affordability of resources that either facilitate or hinder decisions and actions towards PMTCT. Across the studies reviewed by Iwelunmor et al (2014), inadequate and inaccessible voluntary counseling centres, and long waiting lines, further financial difficulties and costs associated with childbirth were barriers to PMTCT service uptake.

2.9.7 Health Service Providers

Due to the centralization of HIV care in tertiary centers in Nigeria, some health care providers do not have the opportunity to see some services in their institutions which may have outweighed the benefit and advantages. Ogbolu et al (2013) reported that nurses in primary and secondary care have had limited opportunities to observe the practice of caring for HIV mothers due to the fact that under the centralized model, once pregnant women were identified as HIV positive, they were referred to a tertiary setting. Currently HIV and PMTCT care and treatment are being decentralized into primary settings. Based on the findings in a study, increased training in PMTCT is needed in order for nurses in these settings to perform the appropriate nursing practices to prevent mother-to-child transmission of HIV (Ogbolu et al, 2013).

2.9.8 Conceptual Framework

The conceptual framework of ART Adherence in Pregnant women (Fig 2.1) identifies the barriers to ART adherence and also motivating factors leading directly and indirectly to ART adherence. It was adapted from the Model of ART Adherence for sub-Saharan Africa by Wekesa et al (2007). This study aimed at investigating the prevalence and determinants of antiretroviral therapy adherence among HIV positive women accessing PMTCT services.

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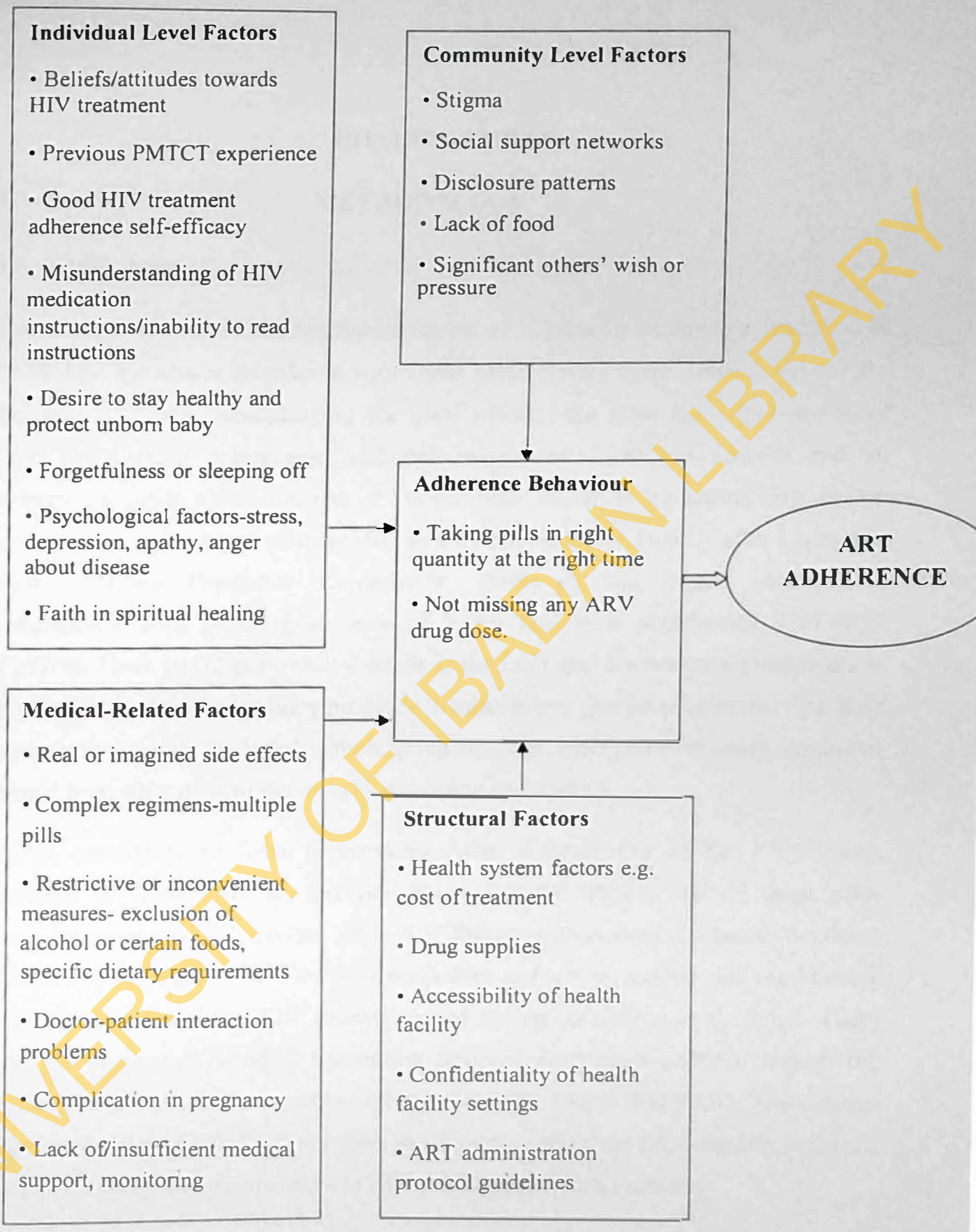

Fig 2.1 An adapted Conceptual Framework of ART Adherence in Pregnant Women by Wakesa et al 2007

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CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Area

Oyo State is located in the Southwest region of Nigeria. It occupies a landmass of 27,249km² and shares boundaries with Ogun State, Kwara State, Osun State and the Republic of Benin. According to the 2006 census, the state has a population of 5,591,589 persons comprising 2,809,840 males and 2,781,749 females and an estimated growing population rate of 3% per year. Ibadan is the capital city of Oyo State and the third largest metropolitan area by population in Nigeria after Lagos and Kano (National Population Commission, 2009). It the largest metropolitan geographical area, covering an area of 3,080 km² with coordinates 7°23′47″N 3°55′0″E. There are 12 geo-political wards in the LGA and the principal inhabitants of the city are the Yoruba speaking people with other ethnic groups as minority. The state comprises of mainly the Yoruba ethnic group although, there is a substantial number of people from other parts of the country who settle and trade.

Ibadan consists of 11 Local Government Areas (LGAs). Out of the 1,169 health facilities of which 667 are primary health centres (PHCs), 10 of them offer comprehensive PMTCT services while 5 of these are private-owned health facilities. All the PMTCT centres are located in secondary and tertiary centres and the Primary Health Centres carry out HIV counseling and testing (Oladokun et al, 2013). These sites are supported by AIDS Prevention Initiative in Nigeria (APIN) through the United States President's Emergency Fund for AIDS Relief (PEPFAR). The Centres provide an outpatient PMTCT services, in addition to adult and pediatric HIV services. Pregnant women who test positive to HIV are referred to these centres.

The study setting was multi-centered, consisting of three facilities namely Adeoyo Maternity Hospital, Adeoyo, Our Lady of Apostles Catholic Hospital, Oluyoro, Oke-Ofa and Saint Mary's Catholic General Hospital, Eleta. Adeoyo Maternity Hospital is a secondary health facility situated in Ibadan North Local Government. It runs its

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PMTCT clinic every Tuesday. It is an AIDS Prevention Initiative in Nigeria (APIN) supported site with 150 women in the PMTCT programme. Saint Mary's Catholic General Hospital, Eleta is also situated in Ibadan North Local Government and runs its PMTCT clinic on Mondays, Tuesdays and Thursdays reserving Wednesdays for booking. It is also an APIN supported site with only 10 women assessing PMTCT services. Our Lady of Apostles Catholic Hospital, Oluyoro, Oke-Ofa is situated at Ibadan North East Local Government area and runs its PMTCT clinic on Wednesdays and Fridays. The PMTCT programme is supported by National Agency for the Control of AIDS (NACA with 24 women assessing PMTCT services. Health providers in the PMTCT programme in these facilities include the HIV counselling and testing personnel, adherence counselors, ward assistants, nurses, doctors, Pharmacists and monitoring and evaluation officers.

3.2 Study Design

A descriptive cross-sectional study employing mixed methods (quantitative and qualitative) of data collection was used.

3.3 Study Population

The study population was pregnant women registered at the PMTCT centre in the three selected secondary health facilities in Ibadan, Oyo State.

3.3.1 Inclusion Criteria

HIV positive pregnant women with known gestational age who have commenced ART for at least eight weeks.

3.3.2 Exclusion Criteria

HIV positive pregnant women who presented with any form of acute emergency.

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3.4 Sample Size

Using the sample size for prevalence study and prevalence of ART adherence of 93% (Holstad et al, 2012), the minimum sample size was 100.

$$\text{Sample size (n)} = \frac{Z\alpha^2 P (1 - P)}{d^2}$$

Where: n = Sample size

Zα = Z statistic for the level of confidence of 95% (1.96)

P = Expected prevalence or proportion (93% = 0.93)

(1-P) = q = (0.194)

d = Precision of 5% (0.05)

$$n = \frac{(1.96)^2 \times 0.93 \times 0.07}{(0.05)^2} = 100$$

After adjusting for non-response rate of 10% (using $N \div 1 - n_r$), a minimum sample size of 111 participants was obtained.

3.5 Sampling Technique

A non-probability sampling technique was used to purposively select three secondary facilities, which are major providers of PMTCT services within Ibadan metropolis. These PMTCT sites were (i) Adeoyo Maternity Hospital, Yemetu, (ii) St Mary's Catholic Hospital, Eleta and (iii) Our Lady of Apostles Catholic Hospital, Oluyoro. HIV positive women constitute a hard to reach group therefore, all eligible and consenting women in these facilities were enrolled into the study on clinic days.

3.5.1 Quantitative Data

One hundred and twenty six consenting pregnant women accessing PMTCT services and who met the inclusion criteria were enrolled into the study. Respondents were consecutively selected on clinic days between September 2015 and January 2016 till the required number needed was reached.

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3.5.2 Qualitative Data

A total of eighteen consenting HIV positive pregnant women were selected from a PMTCT facility using convenient sampling technique due to the limited number of HIV positive pregnant women assessing PMTCT services in each health facility. Nine participants were selected for each focus group discussion.

3.6 Data Collection Technique

3.6.1 Quantitative Data

An interviewer-administered questionnaire was used (Appendix I). The questionnaire contained Socio-demographic characteristics section, knowledge questions on HIV, PMTCT and ART, the Center for Adherence Support Evaluation (CASE) Index Tool and questions adapted from the HIV Treatment Adherence Self-Efficacy Scale (HIV-ASES). The questionnaire was pre-tested at the State Hospital, Abeokuta, Ogun State among 10 HIV positive pregnant women. The result of the pre-test was used to revise ambiguous questions. The questionnaire was administered to the main study participants attending the PMTCT clinic in the health facilities by the principal investigator and three trained research assistants with Bachelor of Science degree qualification. The questionnaire was translated into the Yoruba Language (Appendix II) and back translated to English Language to ensure correctness. Both versions of the questionnaire were available for the participants. The nature of the study including consent forms and the questionnaire was communicated to the participants with the interview conducted in the language of their choice. Date was collected on:

- Socio-demographic information
- Knowledge of HIV/AIDS, PMTCT and ART
- HIV treatment adherence Self-efficacy
- Adherence to ART
- Factors responsible for adherence and non-adherence

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3.6.2 Qualitative Data

Qualitative method of data collection was also employed. The FGD was adopted due to its usefulness in enhancing social interaction different from other qualitative methods, high face validity and relevance in providing opportunity to interview several participants systematically and simultaneously (Nyogea et al, 2015). A FGD guide with specific themes drawn from relevant literature was used. Two FGD sessions were carried out in one of the health facilities due to an easier access to participants within a given time. There were nine participants in each group that comprised of the HIV positive pregnant women assessing PMTCT services. An FGD guide, note pad and a digital audio recorder were used during the session. The session was carried out in a quiet and discreet location within the hospital ART clinic. Each discussion lasted for about 45 minutes and was recorded in the Yoruba language following informed consent. The following thematic areas were explored:

- Knowledge and perception on HIV/AIDS
- HIV treatment adherence Self-efficacy
- Perceived barriers to ART adherence in pregnancy

The FGD was carried out by a trained facilitator using the FGD guide (Appendix IV) containing probes based on the objectives of the study. The principal investigator served as the note taker. The session was audio recorded and later transcribed for analysis. To have a better understanding of issues emanating from the FGDs, five key informant interviews were conducted with health care providers (two ward assistants, a nurse, a monitoring and evaluation officer and a Pharmacist focal person) in these facilities using an interview topic guide. Areas explored included Information about Antiretroviral Therapy (ART) in the PMTCT programme and ART Adherence in pregnancy including barriers and motivating factors to adherence.

3.7 Data Analysis

3.7.1 Quantitative Data

The Statistical Package for Social Sciences (SPSS) version 16 was used to enter and analyze the quantitative data. The knowledge section included twenty questions with 0 and 20 as the attainable lowest and highest scores respectively. The HIV-ASES is a 12-

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item scale in which participants indicated their level of confidence from 'Cannot do at all' (0 point), 'Moderately certain can do' (1 point) and 'Completely certain can do' (2 points). The CASE index tool is a 3-item scale with 16 and 3 as the highest and lowest scores that can be achieved respectively.

Descriptive statistics was used to summarize the socio-demographic characteristics and knowledge score was computed to determine good knowledge of HIV, PMTCT and ART, ART adherence. A score of one mark was assigned to each correct answer and a score of < 15 indicated poor knowledge. A score of ≤ 15 indicated low HIV treatment adherence Self-Efficacy. A score of ≤ 11 in the CASE index tool was the cutoff for defining poor ART adherence as this showed the greatest association with viral load measures in validation analyses (Bailey et al, 2014). Bivariate analysis was used to determine the factors associated with adherence during pregnancy. Chi square test was used to summarize differences in proportion (prevalence of risk factors by socio-demographic variables). Binary logistic regression was used to adjust for confounding and determine factors statistically significantly associated with adherence. A P-value of less than 0.05 was used to indicate statistical significance.

3.7.2 Qualitative Data

Data obtained from the FGDs were transcribed verbatim. The transcripts were reviewed using the side note and ideas noted. Thematic content analysis was used to categorize participants' responses into domains that represent common themes. Similarities and differences among data sets was identified and noted. Presentation of the qualitative result was narrative with supporting quotations from the categorized responses.

3.8 Variables

3.8.1 Dependent Variable

Antiretroviral Therapy adherence

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3.8.2 Independent Variables

Maternal age, gestational age, level of education, monthly income, obstetric history, previous PMTCT experience, spousal support, HIV support group membership and HIV treatment adherence self-efficacy.

3.9 Ethical Considerations

Ethical approval was obtained from the Ethics Review Committee of the Oyo Ministry of Health and informed consent was sought from all participants.

- **Translation of Instrument to Local Language for Easy Communication**
  The questionnaire was translated into the Yoruba language, the major local language of the study area.

- **Confidentiality of Data**
  All data acquired during the course of the research was kept confidential and anonymity assured. The questionnaire did not bear any incriminating information or identity of the participants. Confidentiality of data was maintained through coding, storage and archiving.

- **Beneficence to Participants**
  The results of the study would be communicated to the hospitals for counseling and other rehabilitative measures.

- **Non-Maleficence to Participants**
  No harm was done to the participants as a result of the research. Also, efforts were made to ensure that questionnaire administration and Focus Group Discussions did not interfere with the routine clinical visit of the participants.

- **Right to Decline / Withdrawal from Study**
  Participants were informed about the nature of the study and consent forms were signed. The participants had the right to withdraw from the study with no consequences of doing so.

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CHAPTER FOUR

4.0 RESULTS

4.1 Socio-Demographic Characteristics of the Respondents

A total of one hundred and twenty six HIV positive pregnant women assessing the PMTCT services were interviewed from three different facilities. The respondents were females with a mean age of 32.7 ± 4.58 years and mean gestational age of 24.4 weeks ± 7.41 weeks. One hundred and sixteen (92.1%) of the women were married, with more than half of them (62.1%) being Christians. One hundred and two (81.0%) of the respondents were of the Yoruba ethnic group followed by the Igbos who were 13 (10.3%). Twenty (15.9%) had no formal education and 62 (49.2%) of these women were traders with 29 (23.0%) earning ₦20,000 or more monthly. Most of the women numbering 87 (69.0%) had husbands or partners who are self-employed with 38 (30.6%) of the respondents having more than 2 living children (Table 4.1).

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Table 4.1 Socio-Demographic Characteristics of Respondents

Characteristics	N = 126 Frequency (n)	Percentage (%)
AGE GROUP (Years)		
20 – 29	31	24.6
30 – 39	83	65.9
40 and above	12	9.5
MARITAL STATUS		
Never married	6	4.8
Married	116	92.1
Separated/Divorced	4	3.2
RELIGION		
Christianity	82	65.1
Islam	43	34.1
Others*	1	0.8
ETHNICITY		
Yoruba	102	81.0
Igbo	13	10.3
Hausa	2	1.6
Others#	9	7.1
LEVEL OF EDUCATION		
No Formal education	20	15.9
Primary School	15	11.9
Secondary School	63	50.0
Tertiary Institution	28	22.2
OCCUPATION		
Unemployed	32	25.4
Employed	94	74.6
SPOUSAL OCCUPATION		
Self-employed	87	69.0
Employed	39	31.0
NUMBER OF LIVING CHILDREN		
0	24	19.0
1 – 2	64	50.8
Greater than 2	38	30.2
MONTHLY INCOME		
< ₦5,000	36	28.6
₦ 5,000 - ₦ 9,000	30	23.8
₦ 10,000 - ₦19,000	31	24.6
≥ ₦20,000	29	23.0

* Chrislam

Delta Ibo, Cotonou, Ishan, Efik, Urhobo

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4.2 Pregnancy and HIV-Related Characteristics of Respondents

Pregnancy and HIV-related characteristics are summarized in Table 4.2 below. Of the 126 respondents, 85 (67.5%) have gestational ages between 13 to 28 weeks at the time of the interview. A total of 95 (75.4%) women have had more than one previous pregnancy with 76 (60.3%) who have had more than one previous delivery. Twenty-eight (22.2%) have had a complication in a previous pregnancy. All the women (100%) in the study were on the Triple ARV drug (Option B+) with 62 (49.2%) women commencing treatment before pregnancy and 81 (64.3%) having no previous PMTCT experience. Seventeen (13.5%) have never disclosed their HIV status to anybody with 67 (53.2%) indicating HIV discordance. Only 17 (13.5%) women are members of an HIV/AIDS support group and 118 (95.2%) had spousal support.

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Table 4.2 Distribution of Pregnancy and HIV-Related Characteristics

Characteristics	N = 126 Frequency (n)	Percentage (%)
Gravidity		
Primigravida	31	24.6
Multigravida	95	75.4
Parity		
Nulliparous	18	14.3
Primiparous	32	25.4
Multiparous	76	60.3
Complications in Previous Pregnancies		
Yes	28	22.2
No	98	77.8
Gestational Age (in weeks)		
Less than 13	11	8.7
13 – 28	85	67.5
Greater or equal to 29	30	23.8
HIV Status Disclosure*		
Nobody	17	13.5
Husband/Partner	88	69.8
Family member(s)	47	37.3
Friend(s)	7	5.6
Previous PMTCT Experience		
Yes	45	35.7
No	81	64.3
HIV/AIDS Support Group		
Yes	17	13.5
No	109	86.5
HIV Status of Husband/Partner		
HIV Negative	67	53.2
HIV Positive	16	12.7
Unknown	43	34.1
Time of ART Initiation		
Before Pregnancy	62	49.2
1st Trimester	22	17.5
2nd Trimester	32	25.4
3rd Trimester	10	7.9
Antenatal ARV Regimen		
Triple ARV (Option B+)	126	100.0
Spousal Support		
Yes	118	95.2
No	6	4.8

*Number of respondents greater than 126 due to multiple responses

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4.3 Knowledge of PMTCT, HIV and ART by the Respondents

Almost all the respondents knew the modes of HIV transmission. One hundred and twelve (88.9%) knew it can be through sexual intercourse with 67 (53.2%) still believing it can be by spiritual means. One hundred and thirteen (89.7%) knew that MTCT of HIV was possible and as high as 116 (92.1%) knew that this can be prevented. One hundred and seventeen (92.9%) believe that the risk of MTCT can be prevented by ARV drugs (Table 4.3.1). Respondents' knowledge score was very high with a mean knowledge score of 15.6 ± 2.94 out of a total of 20. One hundred and four (82.5%) women had a good knowledge on the modes of HIV transmission and 103 (81.7%) had a good knowledge of mother-to-child transmission of HIV. On the knowledge of the function of ARV drugs, 109 (86.5%) had a good knowledge (Table 4.3.2).

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Table 4.3.1 Knowledge of HIV/AIDS, PMTCT and ART

Variable	N = 126 Frequency (n)	Percentage (%)
Mode of HIV Transmission		
Blood transfusion	112	88.9
Sexual intercourse	117	92.9
Hugging an infected person	103	81.7
Sharing toilets	86	68.3
Infected sharp instruments	116	92.1
Kissing	70	55.6
Mother-to-Child Transmission	102	81.0
Spiritual means	67	53.2
Possibility of MTCT		
Yes	113	89.7
No	11	8.7
Do not Know	2	1.6
Can MTCT be prevented?		
Yes	116	92.1
No	7	5.6
Do not Know	3	1.6
Means of MTCT*		
During Pregnancy	91	72.2
During Labour	94	74.6
During Breastfeeding	91	72.2
MTCT Risk reduction*		
Taking antiretroviral drug	117	92.9
Avoiding breastfeeding	66	52.4
Caesarean section delivery	67	53.2
Antiretroviral Drug*		
Drug to treat HIV	101	80.2
Drug to prevent HIV transmission to baby	117	92.9
Drug to prevent death from HIV/AIDS	106	84.1
Drug to prolong lives of people living with HIV	115	91.3

*Only correct responses are given

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Table 4.3.2 Participants' Knowledge Score on HIV/AIDS, PMTCT and ART

Variable	N = 126 Frequency (n)	Percentage (%)
Knowledge of the Modes of HIV Transmission		
Poor	22	17.5
Good	104	82.5
Knowledge of Mother-to-Child Transmission		
Poor	23	18.3
Good	103	81.7
Knowledge of Antiretroviral Drugs		
Poor	17	13.5
Good	109	86.5

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4.4 Measures of HIV Treatment Adherence Self-efficacy (HIV-ASES)

The mean HIV Adherence Self-Efficacy score was 18.8 ± 6.26 out of a total of 24. Fifty-four (42.9%) reported that the area in which they most commonly lacked confidence was in integrating the treatment into their daily routine even if it means taking medication or doing other things in front of people who do not know they are HIV-infected (Table 4.4). Thirty-three (26.2%) had a low HIV treatment adherence self-efficacy score.

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Table 4.4 Measures of HIV Treatment Adherence Self-Efficacy

HIV-ASES	N = 126 Cannot do at all n (%)	Moderately Certain can do n (%)	Completel certain ca do n (%)
Stick to treatment even with side effects interfering	8 (6.3)	15 (11.9)	103(81.7)
Integrate treatment into daily routine	7 (5.6)	14 (11.1)	105(83.3)
Take medication in front of people unaware of your status	54 (42.9)	8 (6.3)	64 (50.8)
Stick to treatment even when daily routine is disrupted	10 (7.9)	34 (27.0)	82 (65.1)
Stick to treatment even when you are not feeling well	9 (7.1)	29 (23.0)	88 (69.8)
Stick to treatment even if it means changing eating habits	8 (6.3)	38 (30.2)	80 (63.5)
Continue treatment even if it interferes with daily activities	8 (6.3)	34 (27.0)	84 (66.7)
Continue treatment plan by physician even if T-cells drops	8 (6.3)	42 (33.3)	76 (60.3)
Continue treatment even when discouraged about health	6 (4.8)	28 (22.2)	92 (73.0)
Continue treatment even when getting to clinic is a hassle	7 (5.6)	29 (23.0)	90 (71.4)
Continue treatment if close people say it's not doing good	10 (7.9)	30 (23.8)	86 (68.3)
Positive about treatment even without health improvement	10 (7.9)	34 (27.0)	82 (65.1)

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4.5 Prevalence of ART Adherence in Pregnancy

Mean CASE score was 12.9 ± 3.42 out of a total of 16. The proportion with a CASE score of ≤ 11, defined as poor ART adherence is 37 (29.4%). Seventeen (13.5%) women reported difficulty taking their HIV medications as scheduled most of the time. On how many days per week at least one dose of HIV medication was missed, 71 (56.3%) reported never missing it with 20 (15.9%) reporting missing at least one dose in the week before the interview (Table 4.5).

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Table 4.5 Prevalence of ART Adherence in Pregnancy among Respondents

CASE Index Tool	N =126 Frequency (n)	Percentage (%)
Difficulty taking HIV medications on time		
Never	70	55.6
Rarely	33	26.2
Most of the time	17	13.5
All of the time	6	4.8
Average number of days in previous week that at least one dose of HIV medication was missed		
Everyday	7	5.6
4–6 days/week	-	-
2-3 days/week	5	4.0
Once a week	14	11.1
Less than once a week	29	23.0
Never	71	56.3
Last time at least one dose of HIV medications was missed		
Within the past week	20	15.9
1-2 weeks ago	6	4.8
3-4 weeks ago	6	4.8
Between 1 and 3 months ago	18	14.3
More than 3 months ago	18	14.3
Never	58	46.0

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4.6 Reasons for and Barriers to ART Adherence

Table 4.6.1 shows the desire to stay healthy and alive was the greatest motivation as reported by 107 (84.9%) of the women. Ninety-seven (76.9%) reported the desire to protect the unborn child from getting infected with HIV as another motivator to ARV drug adherence. Table 4.6.2 shows the reasons given as barriers to taking ARV drugs. Forty-seven (37.3%) reported sleeping off, 24 (19.0%) reported forgetfulness and 21 (16.7%) women reported faith in spiritual healing, which were the common reasons for missing drugs among the non-adherent women.

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Table 4.6.1 Reasons for Good ART Adherence among the Respondents

Reasons for Adherence*	Frequency (n)	Percentage (%)
To protect my unborn child	97	76.9
Assistance from support group	15	11.9
Advise from counselors	71	56.3
To stay healthy and alive	107	84.9
Informed by previous PMTCT experience	26	20.6

*Number of respondents greater than 126 due to multiple responses

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Table 4.6.2 Barriers to Taking the ARV Drugs among Respondents

Barriers to adherence*	Frequency (n)	Percentage (%)
Religious barriers		
Faith in spiritual healing	21	16.7
Vigil/fasting	3	2.4
Individual based barriers		
Slept off	47	37.3
Forgetfulness	24	19.0
Illness	3	2.4
Travelled	6	4.8
Do not want someone to know my drugs are ARVs	15	11.9
ARV related barriers		
Pill burden/big size of drug	3	2.4
Food requirement of the drug	1	0.8
My drug with me was almost finished	1	0.8
Environmental barriers		
Work schedule	2	1.6
Care giving to ill child	2	1.6

*Number of respondents greater than 126 due to multiple responses

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4.7 Factors associated with ART Adherence

4.7.1 Association between Socio-Demographic Variables and ART Adherence

The association between ARV drug adherence and selected socio demographic variables is shown in Table 4.7.1. The association between monthly income and ART adherence was statistically significant (P = 0.021). There is an association between HIV status disclosure to husband/partner and ART adherence (P = 0.039).

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Table 4.7.1 Association between Socio-Demographic Variables and ART Adherence among Respondents

Variables	ART Adherence			X^2	P-value
	CASE Score ≤11 Points n (%)	CASE Score >11 points n (%)	Total		
AGE (Years)					
Less than 35	20 (25.3)	59 (74.7)	79	1.67	0.196
35 and above	17 (36.2)	30 (63.8)	47		
ETHNICITY					
Yoruba	29 (28.4)	73 (71.6)	102	0.23	0.635
Others	8 (33.3)	16 (66.7)	24		
RELIGION					
Christianity	25 (30.5)	57 (69.5)	82	0.09	0.764
Islam	12 (27.9)	31 (72.1)	43		0.838
MONTHLY INCOME					
< ₦5,000	7 (19.4)	29 (80.6)	36	7.73	0.021*
₦5,000- ₦19,000	25 (41.0)	36 (59.0)	61		
₦20,000 or greater	5 (17.2)	24 (82.5)	29		
OCCUPATION					
Unemployed	9 (28.1)	23 (71.9)	32	0.03	0.858
Employed	28 (29.8)	66 (70.2)	94		
LEVEL OF EDUCATION					
None / Primary Education	8 (22.9)	27 (77.1)	35	1.20	0.548
Secondary Education	21 (33.3)	42 (66.7)	63		
Tertiary Education	8 (28.6)	20 (71.4)	28		
HIV STATUS DISCLOSURE TO HUSBAND/PARTNER					
Yes	21 (23.9)	67 (76.1)	88	4.26	0.039*
No	16 (42.1)	22 (57.9)	38		

*Statistically significant at P<0.05

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4.7.2 Association between Knowledge and ART Adherence

Table 4.7.2 shows the association between knowledge and ART adherence among the respondents. There was a statistically significant association between ART adherence and the modes of HIV transmission (P = 0.001).

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Table 4.7.2 Association between Knowledge and ART Adherence among Respondents

Variables	ART Adherence			X^2	P-value
	CASE Score ≤11 Points	CASE Score >11 points	Total		
Knowledge of the Modes of HIV Transmission					
Poor	13 (59.1)	9 (40.9)	22	11.36	0.001*
Good	24 (23.1)	80 (76.9)	104		
Knowledge of Mother-to-Child Transmission					
Poor	8 (34.8)	15 (65.2)	23	0.39	0.528
Good	29 (28.2)	74 (71.8)	103		
Knowledge of Antiretroviral Drugs					
Poor	4 (23.5)	13 (76.5)	17	0.32	0.570
Good	33 (30.3)	76 (69.7)	109		

*Statistically significant at P<0.05

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4.7.3 Association between HIV Treatment Adherence Self-Efficacy and ART Adherence

The result in Table 4.7.3 shows that there is a statistically significantly higher ART adherence among those with higher HIV Treatment adherence self-efficacy compared to those with low self-efficacy (P=0.001).

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Table 4.7.3 Association between HIV Treatment Adherence Self-efficacy and ART Adherence among Respondents

Variables	ART Adherence			X^2	P-value
	CASE Score ≤11 Points	CASE Score >11 points	Total		
Self-Efficacy Score					
≤ 15 (low self-efficacy)	19 (57.6)	14 (42.4)	33	17.15	0.001*
> 15 (high self-efficacy)	18 (19.4)	75 (80.6)	93		

*Statistically significant at P<0.05

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4.7.4 Association between Obstetric History and ART Adherence

Current gestational age and unplanned pregnancy were found to be statistically significant. Table 4.7.4 shows that there is a statistically significant association between women of current gestational age and ART adherence ($P < 0.05$). Also, there is a statistically significant association between planned pregnancy and ART adherence ($P < 0.05$).

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4.7.4 Association between Obstetric History and ART Adherence among Respondents

Variables	ART Adherence			X^2	P-value
	CASE Score ≤11 Points	CASE Score >11 points	Total		
Current Gestational Age					
≤20 weeks	5 (15.2)	8 (84.8)	33	4.36	0.037*
>20 weeks	32 (34.4)	61 (65.6)	93		
Gravidity					
One	9 (29.0)	22 (71.0)	31	0.00	0.963
Two and above	28 (29.5)	67 (70.5)	95		
Parity					
0 - 1	10 (20.0)	40 (80.0)	50	3.51	0.061
2 and above	27 (35.5)	49 (64.5)	76		
Number of Living Children					
< 2	13 (23.6)	42 (76.4)	55	1.54	0.214
≥ 2	24 (33.8)	47 (66.2)	71		
Pregnancy Planned					
No	12 (50.0)	12 (50.0)	24	6.09	0.014*
Yes	25 (24.5)	77 (75.5)	102		

*Statistically significant at P<0.05

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4.8 Binary Logistic Regression Analysis of Factors Associated with ART Adherence during Pregnancy

After adjusting for confounding, monthly income, parity, current gestational age, knowledge of the modes of HIV transmission, planned pregnancy and HIV treatment adherence self-efficacy remained significantly associated with ART adherence (Table 4.8). Women who earned between ₦5,000 and ₦19,000 monthly are three times less likely to adhere to ART than those who earn less than ₦5,000 monthly and this is statistically significant (OR=0.3, 95%CI=0.08 – 0.98, P < 0.05). Multi-parous women are five times less likely to adhere to ART in pregnancy than primi-parous women and the association is statistically significant (OR=0.2, 95%CI =0.06 – 0.95, P < 0.05). Women with current gestational age above 20 weeks are three times less likely to adhere to ART than women with gestational age of 20 weeks or lower and this is statistically significant (OR=0.3, 95%CI =0.07 – 0.93, P < 0.05). Women with good knowledge of the modes of HIV transmission are about five times more likely to adhere to ART than women with poor knowledge and the association is statistically significant (OR=4.9, 95%CI=1.29-18.50 , P < 0.05). Pregnant women who planned their current pregnancy were about five times more likely to adhere to ART in pregnancy than women who did not plan their pregnancy and this is statistically significant (OR=4.6, CI=1.36 – 15.79, P < 0.05). Lastly, women with low HIV treatment adherence self-efficacy were five times less likely to adhere to ART than women with high HIV treatment adherence self-efficacy and this was statistically significantly (OR=0.2, 95%CI=0.05 – 0.53, P < 0.05).

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Table 4.8 Binary Logistic Regression Analysis of Factors Associated with ART Adherence among Respondents

Variables	OR	95%Confidence Interval Lower	Upper	P- value
Monthly Income				
Less than ₦5,000 (ref)	1			
₦5,000 – ₦19,000	0.3	0.08	0.98	0.047*
₦20,000 or greater	0.8	0.17	3.85	0.780
Parity				
Primi-parous (ref)	1			
Multi-parous	0.2	0.06	0.95	0.043*
Gravidity				
Primi-gravida (ref)	1			
Multi-gravida	4.4	0.94	20.27	0.061
Current Gestational Age				
≤ 20 weeks (ref)	1			
> 20 weeks	0.3	0.07	0.93	0.038*
Knowledge of Modes of Transmission of HIV				
Poor Knowledge (ref)	1			
Good Knowledge	4.9	1.29	18.50	0.019*
Planned Pregnancy				
No (ref)	1			
Yes	4.6	1.36	15.79	0.014*
HIV STATUS DISCLOSURE TO HUSBAND/PARTNER				
No (ref)	1			
Yes	2.3	0.81	6.60	0.120
Self-Efficacy Score				
>15 (high self-efficacy)(ref)	1			
≤15 (low self-efficacy)	0.2	0.05	0.53	0.002*

*Statistically significant at P<0.05

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4.9 Qualitative Analysis

4.9.1 Socio-demographic Characteristics of the Focus Group Discussion (FGD) Participants

The FGD was conducted among eighteen HIV positive pregnant women. Two sessions were held consisting of nine participants each. It was carried out at Adeoyo Maternity Hospital which had the largest number of pregnant women accessing PMTCT services. All the FGD participants were women with mean age of 34.5 ± 5.1 years, currently married, had at least a primary education and had a mean gestational age of 26.9 ± 7.8 weeks (Table 4.9.1).

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Table 4.9.1 Socio-Demographic Characteristics of FGD Participants

Characteristics	N = 18 Frequency (n)	Percentage (%)
Age Group (Years)		
20 - 29	2	11.1
30 – 39	13	72.2
40 and above	3	16.7
Ethnicity		
Yoruba	12	66.7
Hausa	1	5.6
Igbo	3	16.7
Others	2	11.1
Religion		
Christianity	12	66.7
Islam	6	33.3
Level of Education		
Primary	5	29.4
Secondary	9	52.9
Tertiary	3	17.6
Occupation		
House wife	5	27.8
Trader	9	50.0
Artisan	4	22.2
Current Gestational Age		
≤ 12 weeks	2	11.1
13 – 24 weeks	3	16.7
25 – 36 weeks	13	72.2
Gravidity		
1	3	16.7
2 – 4	13	72.2
≥5	2	11.1
Parity		
0	3	16.7
1 – 2	9	50.0
3 – 5	6	33.3

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4.9.2 Knowledge about HIV/AIDS, PMTCT and ART

Table 4.9.2 displays the knowledge level of the FGD participants. Most of the participants had a good knowledge about HIV/AIDS, PMTCT and function of ART. Most participants reported that HIV transmission could be through the use of infected sharp instruments like blade and needles, engaging in unprotected sexual activity and infected blood transfusion in a health facility when one is ill. On the knowledge of ART, participants stated that the drug makes the virus weak so that their immune system is not compromised. The most frequently mentioned claims of the possibility of MTCT included *"I know that I can give my child HIV if I'm not careful"*, *"Yes, it is possible for a mother to infect her child with HIV"*. Importantly, some participants were also able to mention that poor ART adherence in pregnancy increases the risk of MTCT. However, some participants still had poor knowledge about HIV transmission as they believed that HIV infection was due to poor hygiene, bewitchment and wicked people. These are reflected in the following excerpts:

> *"You can have HIV through sex, sharp objects and even mosquitoes and witches because my husband and children don't have it so, how come I'm the only one?"* (31 years old, housewife, primary education).

> *"Someone can have HIV through making of hair in fact, in all the ways by wicked people"* (36 years old, trader, secondary education).

> *"If you have no care, take no drug and you are a dirty woman, your child will be infected with HIV"* (34 years old, trader, primary education).

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Table 4.9.2: Knowledge about HIV/AIDS, PMTCT and ART

Knowledge	HPPW
Knowledge about HIV/AIDS	
Sexual intercourse	++
Blood transfusion	+
Mother-to-child transmission	++
Infected sharp instruments	++
Sharing toilets	-
Kissing	-
Poor personal hygiene	+
Mosquitoes	+
Wickedness/spiritual means	+
Knowledge about the Prevention of Mother-to-Child Transmission of HIV	++
Knowledge about Antiretroviral Therapy	++

Source: Field survey by Author, 2016

Key

HPPW - HIV Positive Pregnant Women

++ - Where most of the participants expressed their opinion

\+ - Where few participants expressed their opinion

\- - Where no opinion was expressed at all

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4.9.3 ART Adherence and Factors Associated with Adherence

Table 4.9.3 shows a range of factors associated with ART adherence in pregnancy. On motivating factors to ART adherence, positive attitude to treatment was reflected by the women's experiences in relation to the perceived benefits of the treatment. The most recurrent themes related to the perceived benefits included *"looking healthier after initiating ARV drug"*, *"protecting the unborn baby"* and *'living longer"*. Adherence counselling and spousal support were motivating factors to ART adherence and a few participants also attributed their ART adherence to previous PMTCT experience. Commonly expressed barriers to ART were body weakness at the commencement of treatment, lack of time and long distances to the venue of HIV support group meetings. Very few mentioned their inability to take their drugs in front of anyone unaware of their HIV status so as to avoid stigma from community members. These are described in the excerpts below:

> *"My house is too far from the meeting place besides, I cannot leave my job during the week on a Monday for that matter, I am a civil servant"* (30 years old, civil servant, tertiary education).

> *"I did not use it at first because I was weak. God is the merciful One, He will help us"* (45, trader, primary education).

> *"You must use it well. I had tuberculosis and treated it first so, the cough stopped. When I took ARV drug for the first five days, it was difficult because it was my first time of using it but I got used to it"* (45, trader, primary education).

> *"I pour my drugs into a plastic bag and burn the container the next day when I cook. Through this, no one will know I have HIV because people are funny, they can start telling other people"* (32 years old, hairdresser, secondary education).

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Table 4.9.3 ART Adherence and Factors Associated with Adherence

Factors associated with ART adherence	HPPW
Motivating Factors	
Looking healthier after initiating ARV drug	++
Protecting the unborn baby	++
Living longer	++
Advice from adherence counsellors	+
Spousal support	+
Previous PMTCT experiences	+
Membership of an HIV support group	-
Barriers to ART adherence	
Side effect of ARV drug	++
Lack of time/distance to HIV support group meetings	++
Sleeping off	-
Forgetfulness	-
Pill burden	-
Faith in spiritual healing	-
Stigma/discrimination	+
Poor HIV treatment adherence Self-Efficacy	+

Source: Field survey by Author, 2016

Key

HPPW - HIV Positive Pregnant Women

++ - Where most of the participants expressed their opinion

+ - Where few participants expressed their opinion

- - Where no opinion was expressed at all

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4.9.4 Recommended Steps by the Participants to Promote ART Adherence

The participants expressed their opinion concerning promoting ARV drug adherence among pregnant women and gave steps that they wish could be taken by the health care providers, community and the government. These are given in the following quotations:

> *"They should give a solution that will bring the total cure. God will help them in research"* (30 years old, artisan, tertiary education).

> *"They are human beings, they can only advice us. The patient must even adhere first and it must be at all the hospitals"* (45, trader, primary education).

> *"My family advised me to hide my drugs so that people will not stigmatize me, this should not continue in other places. People should be more informed so as to accommodate us"* (32 years old, artisan, secondary education).

> *"Although the drug is free, they should provide a cure"* (28 years old, trader, secondary education).

> *"They should pay the salaries of the nurses so that the nurses will not be harsh on us and so that they can be healthy to care for us"* (37 years old, housewife, secondary education).

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4.9.5 Key Informants' Information on ART Adherence in Pregnancy

This section presents the information by key informants involved in providing PMTCT services to the pregnant women. Information obtained from the interview was to gain a better understanding of the research problem and also to access the level of ART adherence and factors associated with it.

a. Key Informants' Information on ART and Adherence in Pregnancy

Table 4.9.5 shows the key informants' responses. The combined ARV drug that requires a dose per night is given to ensure adherence. Adherence counselling and the simplified drug regimen make ART adherence level as high as 95% with defaulter rate as low as 3% to 5% which was expressed by most key informants. It was also reported that the information of the women on the PMTCT programme are documented for proper monitoring. This is seen in the excerpts below:

> *"If you consider the PMTCT percentage here, they are adhering and it is not less than 95% to 97%. As far as the pharmacy is concerned, you look at the appointment date, check the number of pills left in their pill container and also look at the countenance of the patience and from there, you can infer if the patient is complying or not. The defaulter rate at the end of the day is negligible, not more than 3% to 5%"* (Key Informant, Pharmacist Focal Person).

> *"Adherence among them is good. They are placed on the combined ARV drug (Efavirenz, Lamivudine and Tenofovir tablets) and it is usually a dose per night to ensure adherence. You can also see that all the information of the women on the PMTCT programme* (socio-demographic characteristics, laboratory reports, clinic appointment days, adherence to ARV drugs, possible side effects) *are usually documented" (*Key Informant, Monitoring and Evaluation officer).

b. Factors associated with ART Adherence in Pregnancy

Factors associated with ART adherence in pregnancy are presented in Table 4.9.5. Motivating factors to ART adherence include free treatment, good self-efficacy,

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adequate information from adherence counselors, support from HIV support group meetings and the desire to protect their unborn baby hence, they *'force themselves'* where necessary to comply as expressed by most key informants. A quotation from one of the key informants on the motivating factors to ART adherence is as follows:

> *"The treatment is free so they don't have any problem even though they can decide to give birth in another facility. They usually have their support group meeting every last Friday of the month."* (Key Informant, Monitoring and Evaluation Officer).

Barriers to ART adherence as reported by most key informants were the desire for secrecy, fear of stigmatization, not wanting to be identified in HIV support group meetings and negative influences by husbands or partners. This is seen in the excerpts below:

> *"They cherish their baby so, they want to force themselves to adhere. Like one of the women that had nightmares said, 'these professionals are occultic, they want to initiate me'. So, her husband advised her to stop but because of the baby, she forced herself to take it for another 2 or 3 days and didn't experience the nightmare so, she continued and didn't tell her husband. For the past two years now, she has been doing well"* (Key Informant, Pharmacist Focal Person).

Responses from all key informants show that strategies have been put in place in an effort to ensure adherence in PMTCT. These include the appointment cards with drug pick up date and contact details of healthcare providers on appointment cards in order to make complaints or reschedule where necessary., A key informant said:

> *"When we give them the appointment card, it has the date for visiting and another thing that reminds them is the number of drugs they have left since we don't give them excess drugs, we give them for the month. When it remains one or two, they will look at the card and know that their appointment is close so, they can call me or her* (monitoring and evaluation officer). *Our numbers* (Pharmacist and Monitoring and Evaluation officer) *are on their appointment cards"* (Key Informant, Pharmacist Focal Person).

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Furthermore, information was provided by the key informants regarding adequate information to the general public regarding HIV/AIDS and also to correct misinformation. This is shown in the quotation below:

> *"The first stigmatization in HIV is 'aarun ko gboogun'* (incurable disease). *That means you are telling me that once I have it, it's a death penalty and this is a wrong interpretation. It's only cancer and it is still being managed. I believe people need to be more informed. It's now, people are coming out to say they have been infected for the past six years and doing well or when they see their neighbour taking drugs, they become friends and get encouraged" (*Key Informant, Pharmacist Focal Person).

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Table 4.9.5 Key Informants' Information on ART Use and ART Adherence in Pregnancy

Information on ART Use and Adherence	WA	N	MEO	PFP
ART in PMTCT programme				
Prescription of Septrin for infection control	-	++	+	++
Combined ARV drug given	++	++	++	++
Good adherence achieved by most women	++	+	++	++
Low defaulter rate	-	+	++	++
Motivating Factors for ART Adherence				
Free treatment	+	+	++	++
Desire to protect the unborn baby	-	++	-	++
Information from adherence counselors	-	+	++	++
Attending HIV support group meeting	-	+	++	+
Good HIV treatment adherence Self-Efficacy	+	+	+	++
Barriers to ART Adherence				
Desire for secrecy	-	++	++	++
Negative influences from husband/partner	-	-	-	++
Faith in spiritual healing	-	-	-	-
Ways of measuring ART Adherence				
Number of pills left in pill container	-	+	+	++
Number of missed appointments	-	+	+	++
Countenance of patient on drug pick-up day	-	-	-	++
Measures put in place to ensure ART Adherence				
Phone call to reschedule appointments	-	+	++	++
Contact tracing	-	-	++	-

Source: Field survey by Author, 2016

Key

WA - Ward Attendants

N - Nurse

MEO - Monitoring and Evaluation Officer

PFP - Pharmacist Focal Person

++ - Where most of the key informants expressed their opinion

\+ - Where few key informants expressed their opinion

\- - Where no opinion was expressed at all

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CHAPTER FIVE

5.0 DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 DISCUSSION

This study investigated the prevalence of antiretroviral therapy adherence and factors associated with adherence among HIV positive women accessing PMTCT services at three PMTCT sites in Ibadan, Oyo State using mixed methods for data collection. Specifically, the HIV positive women's knowledge of the modes of HIV transmission, PMTCT and ART and the association between HIV treatment adherence self-efficacy and ART adherence were also explored. The prevalence of good ART adherence in pregnancy (defined as a score of > 11 on the CASE adherence index measure) was reported by seventy percent of the women. The variables significantly associated with good ART adherence include higher monthly income, multiparity, current gestational age greater than 20 weeks, good knowledge of the modes of HIV transmission and planned pregnancy. Also, low HIV treatment adherence self-efficacy was found to be statistically significantly associated with poor ART adherence.

5.1.1 Knowledge of the Modes of HIV Transmission, MTCT and ART

Generally, respondents' knowledge of the modes of HIV transmission was high. Almost all the respondents knew that HIV transmission is by sexual intercourse, blood transmission and use of unsterilized sharp instruments. This indicates a high level of awareness among pregnant women attending the antenatal clinic. Previous studies among women utilizing PMTCT services support this finding (Boateng et al., 2013; Byamugisha et al., 2010). Findings in this study shows that almost all the respondents know that MTCT of HIV was possible through pregnancy and breastfeeding and ART reduces the risk of infection. This is similar to a report by Boateng et al (2013) which pointed out that knowledge on HIV/AIDS among women assessing PMTCT services has been increasing since 2003 were almost all the women were aware of HIV. Although, a fourth of the respondents in this study had no formal education or primary

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education as the highest level of education attained, both the illiterate and literate populations are aware of HIV/AIDS suggesting that national efforts to raise awareness through the media has been effective.

The National Demographic Health Survey (NDHS) report for 2013 stated that half of the women knew that HIV can be transmitted by breastfeeding and the risk of MTCT can be reduced by taking special drugs and also, knowledge regarding PMTCT was high and increased with increasing education and wealth. Respondents in this study similarly reported a good knowledge of how mother-to-child transmission of HIV could occur during pregnancy, labour and through breastfeeding, and ways of preventing it. The NDHS (2013) also reported that breastfeeding doubled the risk of MTCT and the knowledge of breastfeeding as a means of MTCT is necessary to inform women's decision to breastfeed or not. In populations where breastfeeding continues into the second year, the risk of transmission through breastfeeding increases by an additional 15% to 20% (Boateng et al, 2013). The risk of transmission continues as long as breastfeeding continues at the rate of approximately 1% per month of breastfeeding (WHO, 2010b).

Boateng et al (2013) and Byamugisha et al (2010) reported that most respondents knew that it was possible to reduce the risk of transmission during pregnancy and majority also knew vertical transmission is preventable through ART. The good knowledge reported by the respondents could be due to counselling put in place before the commencement of ART in the PMTCT programme where new clients enrolled are informed about HIV/AIDS, the benefits of adhering to ART and the problems associated with poor ART adherence. Majority of the women also knew that vertical transmission of HIV is preventable with at least half of the women being aware that delivering through caesarean section (CS) has the possibility of reducing the risk of vertical transmission of HIV. This is different compared with a study by Boateng et al (2013) that reported a poor knowledge of C/S as a means of preventing MTCT. Although, CS could be recommended as an option for PMTCT in resource limited settings, HIV positive women must be aware of this as elective caesarean delivery before labour and rupture of the membranes reduces the transmission risk by approximately half (Boateng et al, 2013).

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On the knowledge of the function of ARV drugs, a good proportion of the respondents knew that the drug treats HIV, prevents MTCT of HIV, prevents death from AIDS and prolongs the lives of people living with HIV. This has also been reported by previous studies (Bailey et al, 2014; Boateng et al, 2013; Byamugisha et al, 2010; Ekama et al, 2012). Nevertheless, misconceptions were still reported by study participants. Knowledge is an important determinant for behaviour change. Hence, good quality HIV counselling is important for the success of PMTCT efforts (Byamugisha et al, 2010).

5.1.2 HIV Treatment Adherence Self-Efficacy

HIV treatment adherence self-efficacy refers to patients' beliefs about their ability to exercise personal control regarding their HIV treatment. Studies have shown that self-efficacy is a predictor of ART adherence behavior (Adefolalu et al, 2014; Bailey et al, 2014; Johnson et al, 2007; Nokes et al, 2012; Reif et al, 2013). It has also been recommended that adherence self-efficacy must be assessed in patients who are to commence ART because this factor highly predicts adherence to ART (Adefolalu et al, 2014). HIV treatment adherence self-efficacy in these studies was measured using self reports. While studies have investigated self-efficacy among HIV patients, very few have explored HIV treatment adherence self-efficacy among the pregnant population.

In this study, HIV treatment adherence self-efficacy was measured using the 12-item HIV treatment adherence self-efficacy scale. The mean HIV treatment adherence Self-Efficacy score was 18.8 ± 6.26 out of a total of 24. HIV treatment adherence self-efficacy was observed to be a key factor for ART adherence in pregnancy as low HIV treatment adherence self-efficacy was found to be significantly associated with poor ART adherence. This is similar to the finding by Bailey et al (2013) who reported that a lower ART-related self-efficacy was associated with missed ART doses in pregnancy. Also, a study in South Africa on self-efficacy, medication beliefs and adherence to ART, in which seventy percent of the respondents were females, respondents with low self confidence were found to be non-adherent to treatment (Adefolalu et al, 2014).

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HIV treatment adherence self-efficacy could explain the utilization of healthcare services among people living with HIV (Johnson et al, 2007). The most commonly reported form of low HIV treatment adherence self-efficacy was the lack of confidence in taking their drug in front of people unaware of their HIV status. The qualitative findings supported that the desire for secrecy and fear of stigmatization could sometimes prevent women from taking their drugs as they ought to. Adherence self-efficacy goes beyond the ability to follow treatment regimen as prescribed to include appointment attendance, it also involves the capacity to follow treatment regimen in spite of the challenges they face.

The quantitative data also showed that the women did not see the side effects of ART as a major barrier to ART adherence. Despite experiencing side effects, some women still continued to access treatment, indicating a high treatment adherence self-efficacy. Spousal support such as reminding women to take their drug also facilitated ART adherence. This is supports the findings by Johnson et al (2012) which reported that partner's more positive beliefs of treatment efficacy and reduced concern about drug use or harm were associated with patients' better adherence.

Nokes et al (2012) reported that nurses can work with patients in order to improve internal factors, such as self-efficacy which will facilitate ART treatment adherence. To improve ART adherence in pregnant women, it is important that healthcare providers and counselors focus on improving women's self-efficacy.

5.1.3 ART Adherence in Pregnancy

For the PMTCT programme to effectively prevent the vertical transmission of HIV from a mother to her baby, the pregnant woman must successfully follow the PMTCT cascade beginning with an acceptance of HIV counseling and testing to receiving ARV prophylaxis (if HIV positive) and safe infant feeding practices (Anoje et al, 2012). Similarly, Nachega et al (2012) attributed optimum ART adherence in antepartum period to maternal concerns. Effective strategies to reduce mother-to-child transmission of HIV infection include the use of ARV drugs, avoiding unplanned pregnancy, safe delivery and infant feeding options, reduction of unnecessary surgical intervention during pregnancy and labor and prevention of prolonged rupture of

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membrane (Ekama et al, 2012). Today the World Health Organization recommends a once daily fixed dose combination for persons living with HIV beginning ART, regardless of pregnancy or breastfeeding status (WHO 2013a). A 95% level of ART adherence is also required in pregnancy.

All the women in this study were placed on the WHO Option B+ triple combined ART regimen, a lifelong highly active ART (HAART) regimen in which a dose is taken once a day usually at night. The 3-item CASE adherence index tool was used to measure adherence levels, a useful tool for assessing ART adherence as part of routine clinical assessment in standard HIV care (Mannheimer et al, 2006). Findings from this study showed that at least seventy percent of the women had good ART adherence. The finding of better adherence during pregnancy may be attributable to maternal concerns about preventing HIV infection in their unborn child. Previous studies have also reported a significant number of women with good ART adherence (Ayuo et al, 2013; Bailey et al, 2014; Ekama et al, 2012; Kuonza et al, 2011; Mepham et al, 2011). Findings from the qualitative data revealed that the desire to protect their unborn babies from HIV, looking healthier and living longer and previous PMTCT experience were the motivating factors to ART adherence. Similar findings from recent studies also reported high ART adherence by pregnant women in recent years (Ekama et al, 2012; Bailey et al, 2014).

Poor adherence to ART is a major challenge in the PMTCT of HIV. Despite an overall high level of adherence in this study, a quarter reported missing at least one dose in the week preceding the interview. This is similar to the finding among HIV positive pregnant women by Bailey et al (2014) in which a third of women in the survey reported missing at least a dose in pregnancy in the preceding four weeks. This could be as a result of specific barriers also reported by the women such as sleeping off, forgetting to take the drug and faith in spiritual healing that resulted in religious activities (praying and fasting). Poor ART adherence increases the risk of MTCT of HIV. New HIV infection in infants must be prevented therefore, facilities providing PMTCT services much follow the WHO strategies for PMTCT in order to achieve this.

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5.1.4 Factors Responsible for ART Adherence in Pregnancy

Motivating factors and barriers to ART adherence in pregnancy were highlighted in this study. Factors such as maternal characteristics, spousal support and self-efficacy may impact on the sustainability of ART adherence.

a. Motivating factors to ART Adherence

Knowledge on ART and PMTCT among HIV positive individuals has been associated with ART adherence (Boateng et al, 2013; Byamugisha et al, 2010; Falnes et al, 2010). In this study, women with a good knowledge of the modes of HIV transmission were about five times more likely to adhere to ART than those with poor knowledge. This is similar to the finding by Ekama et al (2012). Good knowledge could be due to counselling received before the commencement of ART. It also an indication that knowledge about HIV/AIDS has grown over the years due to awareness campaign in communities.

Women in sub-Saharan Africa are often influenced by their spouses, partners or relatives with most depending on their spouses for financial and emotional support. Women in this study also reported having spousal support in one form or the other. Almost all the women in the study reported that their husbands or partners support them in pregnancy such as following them to the antenatal clinic, providing money, showing affection, reminding or encouraging them to take their drugs, taking care of the children or reminding them of their clinic days.

The women may have reasons for spousal disclosure. A study among postpartum women by Ngarina et al (2013) reported that disclosure of HIV status to partners or relatives who could support them in ART, has been associated with the fear of abandonment and being left alone to care for their health and personal needs. Most of the women in this study reported disclosing their HIV status to spouses, family members or friends. There was an association between HIV status disclosure to husband or partner and ART adherence however, the association was not statistically significant. The qualitative data also showed that the women were motivated to adhere to ART as they were reminded to take their drug or being emotionally supported by their significant other. This is similar to the report by Ekama et al (2012) in which HIV status disclosure was a factor associated with good adherence.

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Staying alive and healthy was the major motivating factor that majority of the women gave for good ART adherence. However, Ekama et al (2012) reported that protecting their unborn child from HIV infection was the major motivating factor to taking ARV drug as prescribed among ART adherent pregnant women. Findings from the study also showed that women who planned their current pregnancy were more likely to have good ART adherence. This is probably due to counselling received before pregnancy that informed their desire to prevent MTCT hence, they adhere to treatment. Reporting the desire to remain alive and healthy is probably due to their perception that their baby's health is dependent on theirs.

b. Barriers to ART Adherence

Poor ART adherence during pregnancy was reported among multi-parous women, women with gestational age greater than twenty weeks and women with low HIV treatment adherence self-efficacy. This is contrary to findings also from South-western Nigeria by Ekama et al (2012) which showed that pregnancy-related factors were not the reason for missing drugs in pregnancy but as a result of other personal and socio-cultural factors among the non-adherent women. Also, multi-parous women were five times less likely to adhere to ART in pregnancy than primi-parous women and the association is statistically significant. Kuonza et al (2010) similarly reported that maternal non-adherence to Nevirapine drug was almost three times higher in multi-parous women.

Furthermore, a systematic review reported that studies in Uganda, Malawi (two studies), South Africa, and Tanzania showed that HIV-related stigma was a barrier to women's ART initiation and retention and refusal to initiate treatment because they feared others would learn of their HIV infection and blame or stigmatize them; some also feared their husbands would divorce them (Hodgson et al, 2014). A key informant also reported that a significant other's pressure or wish could influence ART adherence in pregnancy (an example is a woman who was told by her husband to stop taking her pills because she was having nightmares). This could be a barrier to adherence especially in women with low ART-related self-efficacy.

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5.1.5 Limitations

There are some limitations in this study. First, the knowledge index might not include all the variables or questions necessary to test the knowledge of ART and PMTCT which could affect the classification into poor and good knowledge by the respondents. Also, the women were all on ARV drug hence, would have had prior adherence counseling which might influence the knowledge level of respondents.

Due to self reporting and social desirable response bias, women who knew that good ART adherence in pregnancy is important and recommended may be relatively more likely to falsely report good adherence to ART when they did not. Furthermore, recall bias regarding ARV drug use could also be a limitation thus, adherence may have been over estimated. Importantly, the use of self-report to measure adherence is not a gold standard. However, the CASE adherence index tool has been reported to be sufficient in clinical settings as an alternative method where pill counting and electronic devices for ARV blood measurement are not feasible (Mannheimer et al, 2006). Lastly, a larger sample size was not achieved due to Oyo State's lower HIV incidence rate in recent years hence, fewer HIV positive women were studied.

5.2 CONCLUSION

The prevention of mother-to-child transmission of HIV can be achieved through effective PMTCT interventions, particularly with high ART adherence among pregnant women. In this study, good knowledge was important for ART adherence as the knowledge level of the HIV positive women on the modes of HIV transmission, PMTCT and ART was high. However, there were still some misconceptions meaning that there is the need to continue to educate and improve the understanding of people on HIV/AIDS.

In addition, HIV treatment adherence self-efficacy was generally high among the women. However, a quarter of the women who had low HIV treatment adherence self-efficacy were women who expressed that they lacked confidence in taking their drug in front of people unaware of their HIV status. HIV treatment adherence self-efficacy was associated with ART adherence. This study shows that self-efficacy is crucial for adherence-related behaviour. Therefore, programs to improve ART adherence in

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pregnancy should address self-efficacy issues and incorporate them into behaviour change communication (BCC) in women assessing treatment and care.

Antiretroviral therapy adherence was high in pregnancy, similar to findings from other studies. This was attributed to the desire to stay alive and healthy and importantly, to protect their unborn child. The key informants reported that good ART adherence in the women was attributable to the simplified drug regimen obtained at no cost and the desire to ensure that the virus is not transmitted to their unborn child. These women may benefit from interventions that promote ART adherence in pregnancy in order to achieve a 95% adherence rate even in resource constrained settings.

Finally, this study showed that a good knowledge of the modes of HIV transmission facilitated good ART adherence. HIV treatment adherence self-efficacy was an important factor associated with ART adherence. The key informants reported that the women desired secrecy and had a fear of stigmatization hence, do not want to be identified with HIV. Hence, ART scale-up efforts should go beyond provision of free drugs to include the correction of misconceptions, addressing stigmatization and HIV treatment adherence self-efficacy. Translating these evidences into practice is important for ensuring pregnant women and mothers are alive and preventing new HIV infections among their children. This will go a long way in achieving the global goals of an AIDS-free generation and reducing the high preventable child and maternal deaths in sub-Saharan Africa.

5.3 RECOMMENDATIONS

Based on the findings from this study, the following recommendations are made to enhance ART adherence in pregnancy:

1. Health care providers and adherence counselors should give adequate information and treatment support on ARV drug use and timing, as well as correcting common misconceptions. This is to improve the knowledge and understanding on ART and thereby, improve adherence and prevent mother-to-child transmission of HIV.
2. Women with low self-efficacy are at greater risk of poor adherence. These women could be identified before ART initiation and efforts should be made to

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improve self-efficacy. This would improve ART adherence. HIV treatment adherence self-efficacy was found to be the main emerging theme in the qualitative data. Further studies are needed to explore this variable in greater depths.

3. HIV treatment adherence self-efficacy has to be addressed and incorporated into counselling in order to enhance women's adherence to ART.
4. Health promotion messages that sustain community mobilization should be tailored to specific groups such as spouses/partners of clients and also community members so as to reduce stigma and discrimination and create an environment in which the women can disclose and take their ARV drug without fear of discovery.

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APPENDIX I

Consent Form

PREVALENCE AND DETERMINANTS OF ANTIRETROVIRAL THERAPY ADHERENCE AMONG HIV POSITIVE WOMEN ACCESSING PREVENTION OF MOTHER TO CHILD TRANSMISSION SERVICES IN IBADAN, OYO STATE

Dear Respondent,

I am a Postgraduate student of the Master of Public Health (Field Epidemiology) in the University of Ibadan, Oyo State. This questionnaire is an attempt to gather important information about the prevalence and determinants of antiretroviral therapy (ART) adherence among HIV positive women accessing the prevention of mother to child transmission (PMTCT) services. The main intention in this survey is group responses hence, DO NOT WRITE YOUR NAME ON THE QUESTIONNAIRE. Please note that the completion of the questionnaire is entirely voluntary and all information gathered will be treated with utmost confidentiality. Thanks for taking your time to complete this questionnaire. Your truthful responses will contribute important information to improve the health and related conditions of HIV positive pregnant women. As part of my responsibilities, only the researcher, members of the researcher's staff and representatives from the **Oyo State Ethical Review Committee** may have access to these records.

Detailed Contact Information

This research has been approved by the Oyo State Ethical Review Committee of the State Ministry of Health. In addition, if you have any questions about your participation in this research, you can contact the principal investigator, AREGBESOLA OLUWABUSAYO at the Department of Epidemiology and Medical Statistics, Faculty of Public Health, University College Hospital, Ibadan. The phone and email are; **0803 522 6229** and oluwabusayoaregbesola@gmail.com. You can also contact the supervisor of this project at the Department of Epidemiology and Medical Statistics on **08094988108** and adeoyeikeola@yahoo.com

Statement of STUDY PARTICIPANT giving informed consent:

Now that the study has been well explained to me and I fully understand the content of the study, I hereby agree to participate in the study.

Signature/Thumb Print: _____ **Date:** ___/___/_____

Statement of research assistant obtaining informed consent

I have fully explained this research to the respondent and have given sufficient information including about risk and benefits to make an informed decision.

Signature: _____ **Date:** ___/___/___

Name: _____

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Questionnaire No: _____ **Facility/PMTCT centre:** _____

SECTION A: Socio Demographic Characteristics ***(Kindly circle your answers to the following questions)***

1. Age (at last birthday):	
2. Marital Status	1.Never married 2.Married 3.Single Parent 4.Cohabiting 5.Separated 6.Divorced 7.Widowed
3. Religion	1.Christianity 2. Islam 3.Traditional 4.Others? Specify:
4. Ethnicity	1. Yoruba 2. Hausa 3. Igbo 4. Others? Specify:
5. Monthly Income	1. < ₦5,000 2.₦5,000 - ₦9,000 3.₦10,000 - ₦14,000 4.₦15,000- ₦19,000 5. ≥₦20,000
6. Level of Education	1. No Formal Education 2. Primary School 3. Secondary School 4.Tertiary Institution
7.Occupation	1.Unemployed 2.House wife 3.Student 4.Trader 5.Professional 6.Other specify:
8.Spousal Occupation	1.Unemployed 2. Self Employed 3. Employed 4. Others? Specify

Obstetric Information

Previous pregnancies	9. Gravidity (number of pregnancies):_____ 10. Parity (number of live births):_____ 11. Number of still births:_____ 12. Number of induced abortion(s):_____ 13. Number of living children: _____ 14. Any complication(s) experienced in previous pregnancies? 1. Yes 2. No 15. If yes, what were the complications: 1.Febrile illness 2. Smelly vaginal discharge 3. Painful urination 4.Vaginal bleeding 5.Yellowness of the eyes 6. Anaemia 7. Others? specify:
Current Pregnancy	16. Date of last menstrual period: __/__/_____ (dd/mm/yyyy) 17. Gestational age & date at first antenatal visit (current pregnancy):__(weeks) Date:__/__/__ 18. Current gestational age (weeks):_____ Date:___/___/_____ (dd/mm/yyyy) 19. Was this pregnancy planned? 1. Yes 2.No 20. Did you use any method to delay/avoid this pregnancy? 1. Yes 2. No 21. If yes, state the method:_____ 22. Expected date of delivery: ___/___/_____ (dd/mm/yyyy) 23. Actual date of delivery: ___/___/_____ (dd/mm/yyyy) 24. What service(s) have you received during the antenatal period? 1. Antimalarial (Doses of IPT:___) 2. Tetanus toxoid 3. Antiretroviral 4. Haematinics 5. Antibiotics 6. Others? specify:
Spousal support	25. Did your husband support you during pregnancy? 1. Yes 2. No 26. If yes, in what ways did he support you? (Tick all that applies) 1. Followed you to the antenatal clinic 2. Provided money 3. Showed affection 4 Encouraged you to take your drugs 5. Took care of the child/children 6. Reminded you of your clinic days 6. Others? specify:

Medical history	
27. Disease(s) you have (Tick all that applies)	1. None 2.Asthma 3.Diabetes 4. Sickle cell anaemia 5. Cancer 6. Hypertension 7. Peptic Ulcer 8. Others? specify:
28. Genotype	1. AA 2. AS 3. SS 4.SC 5. CC 6.AC
29/30. Booking Height/Weight	Height: _____cm Weight: _____kg
HIV/AIDS information	
31. Date of HIV Diagnosis	Date: __/__/_____ (dd/mm/yyyy)
32. Time of ART initiation	1. Before pregnancy 2. 1st Trimester 3. 2nd Trimester 4. 3 Trimester
33. Disclosure of HIV status	1. Nobody 2.Husband/Partner 3.Family 4.Friend 5. Others

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34. HIV Status of Husband/Partner	1. HIV Negative 2. HIV Positive 3. Unknown
35. Any previous ARV use?	1. Yes 2.No
36. Previous PMTCT experience?	1. Yes 2.No
37. Referred to PMTCT by	1.DOTS Centre 2.Community HCT 3.ANC clinic 4.Others specify:
38. Antenatal ARV Regimen	1. Mono 2.Dual 3.cART Others? specify:
39. CD4 cell count	_____ cells/mm³ Date: / / (dd mm yyyy)
40. HIV/AIDS support group	1. Yes 2. No If yes, for how long have you been a member:

SECTION B: KNOWLEDGE OF HIV/AIDS, PMTCT AND ART *(Kindly circle your responses to the following questions in the appropriate column)*		YES	NO	I DO NOT KNO
41. What are the mode(s) of HIV transmission?	1. Blood transfusion			
	2. Sexual intercourse			
	3. Hugging an infected person			
	4. Sharing toilets			
	5. Infected sharp instruments			
	6. kissing			
	7. Mother to Child Transmission			
	8. Spiritual means			
42. Is Mother to Child Transmission of HIV possible?				
43. Can Mother to Child Transmission of HIV be prevented?				
44. When can HIV be passed from a mother to her child?	1. During pregnancy			
	2. During labour			
	3. During breastfeeding			
45. What can a mother do to reduce the risk of HIV transmission to her child during pregnancy?	1. Taking antiretroviral drugs			
	2. Avoiding breastfeeding			
	3. Caesarean section delivery			
46. What are antiretroviral drugs?	1. Drug to treat HIV			
	2. Drug to prevent HIV transmission to baby			
	3. Drug to prevent death from HIV/AIDS			
	4. Drug to prolong lives of people living with HIV			
47. What are your intended infant feeding options?	1. Exclusive breastfeeding 2. Infant formula feeding only 3. Mixed feeding			

SECTION C: CASE ADHERENCE INDEX TOOL *(Please number circle the next to the answer of your choice)*	
48. How often do you feel that you have difficulty taking your HIV medications on time? By 'on time' we mean no more than two hours before or two hours after the time your doctor told you to take it.	4 Never 3 Rarely 2 Most of the time 1 All of the time
49. On average, how many days per week would you say that you missed at least one dose of your HIV medications?	1 Everyday 2 4–6 days/week 3 2-3 days/week 4 Once a week 5 Less than once a week 6 Never
50. When was the last time you missed at least one dose of your HIV medications?	1 Within the past week 4Between 1&3 months ago 2 1-2 weeks ago 5 More than 3 months ago 3 3-4 weeks ago 6 Never

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SECTION D: HIV TREATMENT ADHERENCE SELF EFFICACY SCALE ***(Use the scale to ti your responses)***

	In the past month, how confident have you been that you can:	0 Cannot Do At All	1 Moderately Certain Can Do	2 Comple ly certa can do
51	Stick to your treatment plan even when side effects begin to interfere with daily activities			
52	Integrate your treatment into your daily routine?			
53	Integrate your treatment into your daily routine even if it means taking medication or doing other things in front of people who don't know you are HIV-infected?			
54	Stick to your treatment schedule even when your daily routine is disrupted?			
55	Stick to your treatment schedule when you aren't feeling well?			
56	Stick to your treatment schedule when it means changing your eating habits?			
57	Continue with your treatment even if doing so interferes with your daily activities?			
58	Continue with the treatment plan your physician prescribed even if your T-cells drop significantly in the next three months?			
59	Continue with your treatment even when you are feeling discouraged about your health?			
60	Continue with your treatment even when getting to your clinic appointments is a major hassle?			
61	Continue with your treatment even when people close to you tell you that they don't think that it is doing any good?			
62	Get something positive out of your participation in treatment, even if the medication you are taking does not improve your health?			

SECTION E: FACTORS RESPONSIBLE FOR ADHERENCE ***(Please circle the reason (s) where necessary)***

63. What are the barriers to taking your ARV Drug?

1. Work schedule 2. Food requirement of the drug 3. I forgot 4. I slept off
5. Faith in spiritual healing 6. Lack of support/care 7. Pill burden
8. I do not want someone to know my drugs are HIV drugs
9. Others? specify: _____

64. What motivates you to take your ARV Drugs?

1. To protect my unborn child 2. Assistance from support group(s)
3. I was advised by counselors 4. To stay healthy and alive
5. I am informed by my previous PMTCT experience
6. Others? specify: _____

65. How do you assess your compliance to your ARV drug?

1. Very Good 2. Good 3. Poor 4. Very Poor

Thank you for your time....

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APPENDIX II

LẸTA IGBA IYONDA

IWOPO ATI AWON OKUNFA BI ASE LO OOGUN IDABOBO SI LAARIN AWON ALABOYUN TO NI KOKORO HIV TO WA FUN ETO BI ASE LE DENA KOKORO LA TI ARA IYA SI OMO NI ILU IBADAN, IPINLE OYO

Olukopa mi ọwọn,

Akẹẹko agba ni Public Health (Field Epidemiology) ni mi ni ile ẹko giga ti ilu Ibadan ni ipinle Oyo. Iwe ibeere yi wa fun lati ni imọ lori iwopo ati okunfa bi a se lo oogun idabobo si laarin awon alaboyun to ni kokoro HIV to wa fun eto bi a se le dena kokoro lati ara iya si omo. Erongba iwaadi yi ni lati ni akojopo idahun wa, nitori naa, EMA SE KO ORUKO YIN SI ORI IWE IWAADI YII. E jowo, e fi si okan pe ikopa ninu iwaadi ko pon dandan ati wi pe, gbogbo ohun ti a ko si le ni a o fi pamo bo ti to ati bo se ye. A dupe pupo pe egba lati ko pa. Awon idahun yin yoo fun wa ni imo lori bi itesiwaju lati ri wipe ilera ati ipo awon aloboyun to ni kokoro HIV pe ye. Gege bi oluwaadi, awon oluranlowo, oluwaadi ati awon igbimo to se akoso bi iwaadi yo se gba ina to to lo yio ni anfaani lati wo idahun wa.

Adiresi Oluwaadi

Igbimo ti o se ayewo tito iwaadi ni ile ijoba to se amojuto eleto ilera ti fowo si iwaadi yii,ti eba ni ibeere nipa kikopa ninu iwadi yi, ele kan si oluwaadi ,AREGBESOLA OLUWABUSAYO ni Department of Epidemiology and Medical Statistics.Awọn foonu ati imeeli ni o wa; 0803 522 6229 ati oluwabusayoaregbesola@gmail.com. Atun le kan si alamojuto iwaadi yii ni the Department of Epidemiology and Medical Statistics on **08094988108** and **adeoyeikeola@yahoo.com**

Oro ti OLUKOPA to n fun iyonda

Won ti se alaye iwaadi yi fun mi, o ye mi, mo si ti gba lati kopa ni iwaadi yi.

Ate: _____ **Ojo:** ___/___/_____

Oro lati iranlọwọ oluwadi to n gba iyonda

Mo ti se alaye iwaadi yi fun olukopa, mo si ti se alaye anfaani ati ewu to pelu la ti le gbe igbese to peye.

Ate: _____ **Ojo:** ___/___/____

Oruko: _____

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Nomba iwé ibéèrè yi:_____ **Ile eto ilera:** _____

IPIN A: IBEERE LORI AYE OLUKOPA ***(Ejowo e mu eyi to jo mo eesi yin)***	
1. Ojo ori (ni ojo ibi to kehin):	
2. Ipo gbeyawo	1. Apon 2.Mo ti se igbeyawo 3. Dalemosu 4. Mo n ba ololufe mi gbe 5. Mo ti pin ya pelu oko mi 6. Igbeyawo mi ti tuka 7. Opo
3. Esin	1. Kiristeni 2. Musulumi 3. Esin adayeba 4. Imii? E daruko:
4. Eya	1. Yoruba 2. Hawusa 3. I bo 4. Imii? E daruko:
5. Owo osun	1. < ₦5,000 2.₦5,000 - ₦9,000 3.₦ 10,000 - ₦ 14,000 4.₦ 15,000- ₦ 19,000 5. ≥₦20,000
6. Iwe ti e ka ju lo	1. Mi o ka we 2. Iwe mefa 3. Iwe mewa 4. Ile eko giga
7.I seti e n se	1. Mi o sise 2.I yawoile 3. Omo ile iwe 4.Onisowo 5. A ko se mo 'se 6. Imii? E daruko:
8.Ise oko yin	1.Won o sise 2.Won sisefun ara won 3.Won sise fun yan 4.Imii? E daruko:
Imo lori ilera obinrin	
Oyun isaju	9. Iye oyun ti e ti ni:_____ 10. Iye omo ti e bi ye:_____ 11. Iye abiku:_____ 12. Iye oyun ti e se:_____ 13. Iye ti o wa laye: _____ 14. Nje e ni wahala ninu oyun isaaju? 1. Beeni 2. Beeko 15. Te ba ti ni, kini awon wahala won yen?: 1. Ara gbigbona 2.Dida to n ru la ti oju ara 3. Ini ilera ninu igbose 4. Yiyo eje lati ara obirin 5.Oju pi pon 6. Aarun ailejeto lara 7. Imii? E daruko:
Oyun yi	16. Ojo wo le ri nkan osu yin gbeyin: ___/___/_____(dd/mm/yyyy) 17. Osu wo le koko lo fun antenatal (ti oyun yi):____(ose) Ojo:__/__/____ 18. Iye osu ti oyun yin je bayi (ose):_____ Ojo:___/___/_____ (dd/mm/yyyy) 19. Se e didi ni oyun yi? 1. Beeni 2. Beeko 20. Nje e gbiyanju lati dena oyun yii? 1. Beeni 2. Beeko 21. Ti e ba gbiyanju, e daruko nkan ti e se tabi ti e lo:_____ 22. Igbawo lo ye ki e bi omo: ___/___/_____ (dd/mm/yyyy) 23. Ojo wo le bi mo: ___/___/_____ (dd/mm/yyyy) 24. Awon eto wo ni e ni anfaani si ninu oyun? 1. Oogun iba (melo:___) 2. TT 3. Oogun HIV 4. Oogun eje 5. Oogun eyawuuru 6. Imii? E daruko:
Ifowosowopo oko	25. Se oko yi ran yin lowo ninu oyun? 1. Beeni 2. Beeko 26. Ona wo lo n fi ran yin lowo? (E mu gbogbo eyi to ba je mo ti yin) 1.Won tele mi lo ile iwosan 2.Won fun mi lowo 3.Won fi ife han mi 4. Won ro mi leti lati lo oogun 5. Won toju awon omo mi 6. Won ranmi leti ojo iwosan mi 7. Imii? E daruko:
Ilera yin lati cyin wa	
27. Ewo ninu awon aisan yi le ni?	1. Ko si 2. Iko efe 3. Ito suga 4.Aarun fofniku fo la dide 5.Aarun jejere 6.Eje riru 7.Ogbe inu 8.Imii? E daruko:
28. Ki ni irujini re?	1. AA 2. AS 3. SS 4.SC 5. CC 6.AC
29/30. Iwon nigba ti e de	Iwon bata: ____cm Iwon: ____kg
Oro lori aarun ko gboogun	
31. Ojo ti e se ayewo eje	Ojo: __/__/____ (dd/mm/yyyy)
32. Igba wo le ko ko lo oogun HIV	1.Ki e to loyun 2.Ipele olosun meta meta kiini 3. Ipele olosun meta meta ikeji 4.Ipele olosun meta meta Iketa
33. Ta le so fun pe eni kokoro HIV?	1.Mi o so fun yan 2.Oko 3.Molebi 4.Ore 5. Imii? E daruko:
34. Se oko yin ni kokoro HIV?	1. Ko ni kokoro HIV 2.O ni kokoro HIV 3.Mi o mo

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35. Se e ti lo oogun kokoro HIV ri?	1. Beeni 2.Beeko
36. Se e ti lo fun eto bi ase le dena kokoro la ti ara iya si omo ri?	1. Beeni 2.Beeko
37. Ta lo so pe ke lo fun eto bi ase le dena kokoro la ti ara iya si omo?	1. Ile iwosan fun iko ife 2.HCT ninu Agbeegbe 3. Ile itoju fun awon aboyun 4. Imii? E daruko:
38. Oogun fun kokoro HIVti e n lo	1. Mono 2.Dual 3.cART Imii? E daruko:
39. Osu won ti CD4	_____ cells/mm³ ojo: ___/___/_____ (dd/mm/yyyy)
40. Se wa ninu egbe awon to ni HIV?	1. Beeni 2.Beeko Bi ose melo le ti wa ninu egbe yi:

IPIN B: IMO LORI KOKORO HIV, PMTCT ATI OOGUN FUN KOKORO HIV *(Emu eyi tojemo idahun yin ni abala to to)*		**Beeni**	**Beeko**	**Mo mi**
41. Ona wo ni a le gba ni kokoroHIV	1. Ni pa gbigba eje			
	2. Ibalopo			
	3. Didimo eni ti o ni HIV			
	4. Lilo igbonse kan naa pelu eni ti o ni kokoro HIV			
	5. Lilo awon abere ti kokoro HIV wa lara e			
	6. Fifi enu kan enu eni ti o ni kokoro HIV			
	7. Lati ara iya si omo			
	8. Ki I se oju lasan			
42. Nje o see se ki kokoro HIV gba ara iya si omo?				
43. Nje o see se lati dena aarun lati ara iya si omo?				
44. Ni gba wo ni iya le ko kokoro HIV ran omo re ?	1. Ninu oyun			
	2. Nigba iro bi			
	3. Nigba ti a fun omo oyan			
45. Bawo ni iya se le dena ewu ki ko kokoro HIV ran omo re ninu oyun?	1. Lilo oogun kokoro HIV			
	2. Kiko lati fun omo loyan			
	3. si se ise abe lati gbe omo jade			
46. Ogun wo ni a nlo fun awon ti oni kokoro HIV?	1. Oogun latimu kokoro yi kuro			
	2. Oogunlati dena lilo si ara omo			
	3. Ogun lati dena iku lati ara kokoro HIV			
	4. Ogun lati mu emi awon to ni kokoro HIV gun			
47. Bawo le se fe ma fun omo yin ni ounje te ba ti bi?	1.Oyan lasan 2. Ounje fun omo lasan 3. Oyan ati ounje fun omo			

IPIN C: AWON IBEERE LORI LILO OOGUN IDABOBO SI *(Emu okan ninu numba ti o ba wun yin)*	
48. Bawo ni o se man se yin nigba ti e ba ni isoro lati lo oogun HIV yin ni akoko to ye? Akoko to ye tun mo si pe, wakati meji si akoko to ye ki e lo	4 Rara 3 O san owon 2 O wo po 1 Gbogbo igba
49. Ti e ba wo, ojo melo ninu ose n i e fi maa n gbagbe lati lo oogun HIV yin?	1 Ojojumo 4 Ekan ni ose 2 Emerin si Emefa ni ose ni ose 5 Ko o to ekan 3 Emeji si Emeta ni ose 6 Mi o gbagbe ri
50. Igbawo ni e gbagbe lati lo oogun HIV yin kehin?	1 Laarin ose tokoja 4 Osu kan si meta sehin 2 Ose kan si meji sehin 5 Oju osu meta lo sehin 3 Ose meta si merin sehin 6 Ko se le ri

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IPIN D: RIRO ENI LORI LILO OGUN HIV IDABOBO SI *(E mu e yi to je moidahun yin)*

	Ni osu kan sehin, bawo ni ese ni igboya to pe:	0 Mi o le se rara	1 Mi o le fi be se	2 Daju daju r mo pe mo le
51	Ema ri wi pe e lo oogun yin nigba ti oni ipalara pelu ise ojo?			
52	E ti pa itoju yin po mo ise ojo?			
53	Itoju yin ti di ara ojojumo de ibi wipe e le lo oogun ni iwaaju awon ti ko mo pe eni kookoro HIV?			
54	Ko si ibi ojo naa se le ri, e ma tele ilana oogun yin?			
55	E ma tele liana oogun yin, bi ara yin ko bay a gan?			
56	E ma tele liana oogun yin to ba je mo pe ki paro ounje ti e nje?			
57	E te si waju pelu itoju yin nigba ti ko je e se nkan to ye ke se lojumo?			
58	E te si waju pelu itoju ti dokita so bi o ti le je wi pe T-cells yin wale gan laarin osu meta?			
59	E ko ni dekun itoju yin bi o ti le je pe inu ko dun si ilera yin?			
60	E tesi waju pelu itoju yin bi o tile je wipe ati ri dokita soro?			
61	E tesi waju pelu itoju yin bi o ti le je wipe awon to sun mo yin so wipe ko si se?			
62	Emu nkan to da jade kuro ninu kikopa ninu itoju yin bi o ti le je wipe oogun ti e n lo ko tun ilera yin se?			

IPIN E: AWON OHUN TO SOMO RI RO MO ILANA OOGUN LILO *(Emu idi ti o je mo ti yin)*

63. Mi o le lo oogun mi bi ose ye nitori:
    1. Ise 2.Ounje ti ma lo 3.Mo gba gbe 4.Mo sun lo 5.igba gboninu iwosan lai lo oogu
    6. Ko si iranlowo 7.Wahala lilo oogun 8.Mi o fe ki awon eeyan mo pe oogun HIV ni mo n
    9. Imii? E daruko:_____

64. Idi ti mo fin lo oogun mi:
    1. Lati dabobo omo inu mi 2.Mo ri iranlowo gba lati egbe awon ti o ni HIV
    3. Awon oni moran gba mi ni imoran 4.Lati wa ni ilera to peye ati laaye
    5. Mo ti ni iriri bi asele dena ki ko kokoro lati ara iya si
    6. Imii? E daruko:_____

65. Bawo le se le so pe e lo oogun HIV yin si?
    1.O da gan 2. O da 3. Ko da 4. Ko da rara

A dupe fun asiko yin....

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APPENDIX III

FOCUS GROUP DISCUSSION (FGD) GUIDE

FGD Identification Number: _____

Facility: _____

Date: December 8, 2015

PREVALENCE AND DETERMINANTS OF ANTIRETROVIRAL THERAPY ADHERENCE AMONG HIV POSITIVE WOMEN ACCESSING PREVENTION OF MOTHER TO CHILD TRANSMISSION SERVICES IN IBADAN, OYO STATE

The purpose of this study is to investigate the prevalence and determinants of antiretroviral therapy adherence among HIV positive women accessing Prevention of Mother to Child Transmission services. The information you give is completely confidential and you will not be associated with any information given during the discussion. We would also like to record your responses so that we can correctly capture your thoughts and ideas. You may refuse to respond to any question or withdraw from the discussion at any time. Please sign/thumb print below if you agree to be part of this focus group:

Signature/Thumb Print: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

1	**Conduct a warm up session of the discussion** • Introduction of the facilitator, note taker, recorder and principal investigator • Introduction of FGD by facilitator – objectives, timing, purpose of tape recording, develc rapport and set ground rules agreed by all • Reassurance on confidentiality and obtaining consent from the group
2	**Knowledge about HIV/AIDS** • Do you know about HIV/AIDS? *Probe: Modes of transmission and prevention*
3	**Knowledge about Antiretroviral Therapy (ART)** • What do you know about antiretroviral drugs? *Probe: Uses and importance*
4	**Knowledge about Prevention of Mother to Child Transmission (PMTCT)** • Many people talk about HIV/AIDS today, is mother-to-child transmission of HIV possible? *Probe: Modes of transmission, ways to prevent MTCT*
5	**ART Adherence in pregnancy** • Adherence rates exceeding 95% are necessary in order to derive the greatest benefits, what ar your motivation/challenges to taking your ARV drugs in this PMTCT programme? *Probe: HIV treatment adherence self-efficacy, faith in spiritual healing, spousal suppor influence from support group, forgetfulness, pill burden, stigma/discrimination, advice c counselors*
6	**Interventions have shown some factors to be influential in improving adherence among ART patients (intimate partner support, support groups). Bearing these in mind:** • What steps would you want taken by the health providers to improve adherence? • What steps would you want taken by the community to promote adherence? • What steps would you want taken by the government to promote adherence?

Thank you for your time....

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APPENDIX IV

IWE IWAADI FUN IJIRORO

Nomba iwé ibéèrè yi: _____

Ile eto ilera: _____

Ojo: December 8, 2015

IWOPO ATI AWON OKUNFA BI ASE LO OOGUN IDABOBO SI LAARIN AWON ALABOYUN TO NI KOKORO HIV TO WA FUN ETO BI ASE LE DENA KOKORO LA TI ARA IYA SI OMO NI ILU IBADAN, IPINLE OYO

Asaro funifokansi yi wa fun lati ni imọ lori iwopo ati okunfa bi a se lo oogun idabobo si laarin awon alaboyun to ni kokoro HIV to wa fun eto bi a se le dena kokoro lati ara iya si omo. E jowo, e fi si okan pe ikopa ninu iwaadi ko pon dandan ati wi pe, gbogbo ohun ti a ko si le ni a o fi pamo bo ti to ati bo se ye. A ma ni lati gba ohun idahun yin sile lati le mo idahun ti e fun wa. E le pinu lati ma dahun awon ibeere kan tabi ke do pin ifesi. E jowo, e fo wo siwe ke to dahun awon ibeere yi:

Ate: ☐☐☐☐☐☐☐☐☐☐

1	**Sise gbigbaradi fun iwadi yi** • Ifihan awon to ma se akosile, eni to ma gba ohun lori teepu ati oluwaadi • Ifihan oluwadi – erongba, asiko, idi fun gbigba idahun lori teepu, fifaramo ati ifihan awon of ni iwaadi yi • Gbigba iyonda
2	**Imo lori kokoro HIV** • Nje e mo ni pa kokoro HIV? ***Probe:*** *Awon ona ti eniyan le ko kokoro HIV*
3	**Imo lori oogun fun kokoro HIV** • Ki le mo ni pa oogun fun kokoro HIV? ***Probe:*** *Lilo ati Pataki oogun HIV*
4	**Imo nipa ona la ti le dena kokoro HIV lati ara iya si omo** • Awon eyan ma a n soro nipa kokoro HIV loni, nje o se se lati le dena kokoro HIV lati ara iy si omo? ***Probe:*** *Awon ona ti eni le ni HIV, ona lati le dena kokoro HIV lati ara iya si omo*
5	**Lilo oogun HIV bi o se ye ninu oyun** • O se Pataki ki e ma lo oogun HIV, kini awon iwuri ati ipenija ninu eto lati le dena kokoro HI lati ara iya si omo yi? ***Probe:*** Riro eni lori lilo ogun hiv idabobo si, igba gboninu iwosan lai lo oogun, *iranlowo la oko, iranlowo lati awon to ni kokoro HIV, gbigbagbe,* wahala lilo oogun, *abawon/ikorir imoran lati awon onimoran*
6	**Awon nkan wa to je pe o ma an je ki awon to ni kokoro HIV kan ma lo oogun won (bi iranlow lati oko, egbe awon to ni kokoro HIV). Ninu nkan yi so kan:** • Kini awon ona ti e fe ki awon osisi ile iwosan se lati je ke me lo oogun yin bi o se ye? • Kini awon ona ti e fe ki awon ara ilu se lati je ke me lo oogun yin bi o se ye? • Kini awon ona ti e fe ki ijoba se lati je ke me lo oogun yin bi o se ye?

A dupe fun asiko yin....

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APPENDIX V

KEY INFORMANT INTERVIEW (KII) TOPIC GUIDE

KII Identification Number: _____

Facility: _____

Date: January 8, 2016

PREVALENCE AND DETERMINANTS OF ANTIRETROVIRAL THERAPY ADHERENCE AMONG HIV POSITIVE WOMEN ACCESSING PREVENTION OF MOTHER TO CHILD TRANSMISSION SERVICES IN IBADAN, OYO STATE

The purpose of this study is to investigate the prevalence and determinants of antiretroviral therapy (ART) adherence among HIV positive women accessing Prevention of Mother to Child Transmission (PMTCT) services. The information you give is completely confidential and you will not be associated with any information given during the discussion. We would also like to record your responses so that we can correctly capture your thoughts and ideas. You may refuse to respond to any question or withdraw from the discussion at any time. Please sign/thumb print below if you agree to be part of this focus group:

Signature/Thumb Print: ☐

1	**Conduct a warm up session before the interview** • Introduction of the interviewer, note taker and principal investigator • Introduction by the interviewer – the research and its objectives, purpose of tape recordin etc. • Reassurance on confidentiality and obtaining consent from the interviewee
2	**Information about Antiretroviral Therapy (ART) in the PMTCT programme** • What are the antiretroviral drugs given to women in the PMTCT programme? ***Prompts:*** *Types of ARV drugs given, dosage, cost of treatment*
3	**ART Adherence in pregnancy** • Adherence rates exceeding 95% is important in PMTCT, what are the motivation/challenges reported by the women in this PMTCT programme? ***Prompts:*** *Default rate, HIV treatment adherence self-efficacy, faith in spiritual healing, spousal support, forgetfulness, pill burden, stigma/discrimination, advice of counselors* • Is there any support group in place? If yes, when is the meeting day and how many wome attend? • Does the hospital have a structure in place to ensure women attend e.g. text messages, bringing unused pills back

Thank you for your time....

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Table 2.1 Eligibility criteria for ARV use in HIV positive pregnant women

Facility where CD4 count is available	
CD4 ≤350 cells/mm3	**CD4 >350 cells/mm3**
Start ART regardless of clinical stage	Start ART only if symptomatic (AIDS stage III or IV)
WHO Clinical stage	
Stage I	Offer ARV prophylaxis
Stage II	Offer ARV prophylaxis
Stage III	Commence ART
Stage IV	Commence ART
Facility where CD4 count is not available	
Refer client or send client's specimen to the nearest centre with CD4 capability.	

Source: National Guidelines for Prevention of Mother-to-Child Transmission of HIV (PMTCT).

Table 2.2 Options for PMTCT of HIV

	Woman Receives		Infant Receives
	Treatment (CD 4 counts ≤350 cells/mm3)	**Prophylaxis** (CD4 counts >350 cells/mm3)	
Option A	Triple ARVs starting as soon as diagnosed and continued for life	*Antepartum:* AZT starting as early as 14 weeks gestation Intrapartum: at onset of labour, sdNVP and first dose of AZT/3TC *Postpartum:* daily AZT/3TC until 7 days postpartum	*Mother received prophylaxis* daily NVP from birth until 1 week after cessation of al breast feeding; if no breastfeeding until age 4–6 weeks Mother is on treatment daily NVP until age 4–6 weeks
Option B	Triple ARVs starting as soon as diagnosed and continued for life	Triple ARVs starting as early as 14 weeks gestation and through childbirth if not breastfeeding, or until 1 week after cessation of all if breastfeeding	*Irrespective of mode of infan feeding:* daily NVP or AZT from birth until age 4–6 weeks
Option B+	Same for treatment and prophylaxis Regardless of CD4 count, triple ARVs starting as soon as diagnosed and continued for life		*Irrespective of mode of infan feeding:* daily NVP or AZT from birth until age 4–6 weeks

Triple ARVs means the use of one of the recommended three-drug fully suppressive treatment options.
ARVs = Antiretrovirals; AZT = Zidovudine; sdNVP = single-dose Nevirapine; 3TC = Lamivudine; NVP = Nevirapine.

Source: National Guidelines for Prevention of Mother-to-Child Transmission of HIV (PMTCT)

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APPENDIX VII

Table 2.3.1 Factors associated with increased risk of MTCT

Factors	Strong Evidence	Limited Evidence
Viral	• High maternal viral load • Viral characteristics	• Viral resistance
Maternal	• Advanced disease • Immune deficiency • HIV infections acquired during pregnancy or breastfeeding • Sexually transmitted infections • Malaria	• Vitamin A deficiency • Anaemia • Chorioamnionitis • Frequent unprotected sex • Multiple sexual partners • Smoking • Alcohol • Intravenous drug abuse • Genetic (HLA subtypes, mutations o surface CD4 receptor)
Obstetric	• Vaginal delivery • Rupture of membranes for more than 4 hours • Prolonged labour	• Invasive or traumatic procedures • Instrumental deliveries • Amniocentesis • Episiotomy/genital lacerations • External cephalic version • Ante-partum/intra-partum haemorrhage
Foetal/Infant	• Prematurity • First of multiple deliveries	• Lesions of the skin and/or mucus membrane (e.g. oral thrush) • Genetic
Breastfeeding	• Mixed feeding • Breast disease (abscess/mastitis/cracked nipples) • Prolonged breastfeeding	

Source: National Guidelines for Prevention of Mother-to-Child Transmission of HIV (PMTCT).

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20 August, 2015.

TO WHOM IT MAY CONCERN

LETTER OF INTRODUCTION – AREGBESOLA Oluwabusayo Hannah

I write to introduce to you Aregbesola Oluwabusayo who is an MPH (Field Epidemiology) student with Matric. No. 183192 in this Department.

Oluwabusayo would need to gather some information for her research project titled:

> *"Prevalence and Determinants of Antiretroviral Therapy Adherence Among Women Accessing the Prevention of Mother to Child Transmission Services in Ibadan, Oyo State."*

Kindly give her all necessary assistance.

Thank you.

Dr. Olufunmilayo I. Fawole

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MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/ 479/___

September, 2015

The Principal Investigator,
Department of Epidemiology and Medical Statistic,
Faculty of Public Health,
College of medicine,
University of Ibadan,
Ibadan.

Attention: Aregbesola Oluwabusayo

ETHICAL APPROVAL FOR THE IMPLEMENTATION OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: "Prevalence and Determinants of Antiretroviral Therapy Adherence among HIV Positive Woman Accessing Prevention of Mother to Child Transmission Services in Ibadan, Oyo State." has been reviewed by the Oyo state Review Ethical Committees.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

4. We wish you all the best.

Signature & Date

Sola Akande (Dr)
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee

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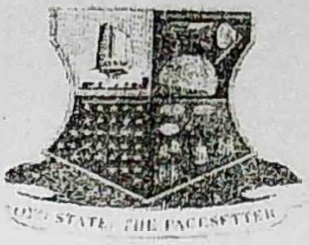

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