

IDENTIFYING THE FACTORS INFLUENCING THE ADHERENCE TO ANTIRETROVIRAL THERAPY IN NIGERIA

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Identifying the factors influencing the adherence to antiretroviral therapy in Nigeria

A thesis submitted for partial fulfillment of the requirement for the degree of Master in International Health.

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Declaration:

The other people's work has been used (either from internet printed source, or other source) this has been carefully acknowledged and referenced in accordance with departmental requirement.

I undersigned, hereby declare that the thesis "Identifying the factors influencing the adherence to antiretroviral therapy in Nigeria" is my own work.

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.....
March 7, 2016 – September 8, 2017
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Acknowledgement

For the last 15 years I worked in health sector. Through these experiences I had interaction with HIV patients. From which I have found my interest in the adherence of patient with Antiretroviral Treatment.

I came to realize that there is a need to focus on the problems of HIV positive patients related with the adherence to ART. I also want to expand my knowledge and abilities in the field of public health.

I hope this thesis will be a positive contribution and will help in solving the problems of people living with HIV.

Special thanks to my parents, brother and my wife for supporting me to face challenges and to accomplish the Master Degree of International Health.

List of Abbreviations

ADR	Adverse Drug Reactions
AIDS	Acquired Immune Deficiency Syndrome
ART	Anti Retro Viral Treatment
ARV	Anti Retro Viral
AUD	Alcohol Use Disorder
CD4	Cluster of Differentiation
CDC	Center of Disease Control
DOT	Directly Observed Therapy
FCT	Federal Capital Territory
HAART	Highly Active Antiretroviral Therapy
HAART	Highly Active Antiretroviral Treatment
HBC	Home Based Care
HCT	HIV Counseling and Testing
HIV	Human Immunodeficiency Virus
HIVDR	HIV Drug Resistance
IDU	Injection Drug Users
LGA	Local Government Areas
MSM	Male sex with male
NARHS	National HIV and Reproductive Health Survey
NSF	National Strategic Framework
NSF	National Strategy Frame work
PLWHIV	People Living with HIV
UN	United Nations
VMS	Visual Medical Schedules
WHO	World Health Organization

Abstract

Background:

The introduction of ART treatment has reduced the HIV related mortality and morbidity in people living with HIV. Significant adherence (95%) to ART is also required to achieve the viral suppression. Adherence with ART is a key for successful treatment. Failure to achieve the adherence with ART results in poor virological and immunological outcomes.

The study investigates the adherence of the people living with HIV and the factors influence the adherence to Anti Retroviral Therapy (ART). The use of ART raised new issues and challenges, one of which is adherence. Therefore adherence is an essential element for success of ART.

Objective: To identify the factors and measures to improve the adherence to ART in Nigeria.

Method:

Literature review: Publications and scientific articles are collected on adherence barriers and interventions strategies to improve ART adherence.

Results: Factors that are acting as a barriers in ART adherence are mainly the use of traditional medicines, Alcohol/illicit drug use, Stigma and disclosure, pill burden, insufficient treatment monitoring, economic hardship, and sufficient drug supply. The factors that can improve ART adherence are social support, accepting the HIV positive status and disclosure. The key interventions includes HBC, Task shifting, Medication reminders.

Conclusion: The adherence of the HIV Positive patients can be improved using the appropriate interventions.

Recommendations: The Ministry of Health should collaborate with mobile companies to streamline the texting services to solve the problem of forgetfulness and increase social support to PLWHIV.

Ministry of health should also conduct research on the effectiveness and concomitant use of traditional medicines with antiretroviral drugs.

Key words: Adherence, factors, antiretroviral therapy, people living with HIV, Nigeria.

Word count: 10830

INTRODUCTION

CHAPTER ONE: BACKGROUND

1.1 Adherence to ART

Adherence is defined as the “the extent to which the patient follows medical instructions”(1).

Adherence is the capacity of the patient to pursue a treatment plan, take medicines at prescribed times and frequencies, and strictly follow the diet plan and prescribed medicines.

Adherence to HIV treatment gives a chance to prevent HIV multiplication and damage the immune system. HIV treatment helps people to live long and healthier lives. Risk of further transmission of HIV is also reduced by the antiretroviral medicines.

Poor adherence to Human Immunodeficiency Virus (HIV) destroys the immune system, decreases the immunity and makes it difficult to fight against the infections. Drug resistance is another implication of the poor adherence to HIV treatment. Poor or non adherence to Antiretroviral Therapy (ART) eventually promotes the immunodeficiency in the individuals with marked decrease in CD4 T lymphocytes with significant symptoms of AIDS and finally premature death (2).

A higher level of adherence with ART (>95%) is required for effective treatment of HIV (3).

Adherence with the treatment is an important factor in achieving the optimal outcomes in disease states. Poor adherence with HIV has potential harms to patient’s health at many levels. Less viral suppression is an immediate risk for patient’s health as well as the permanent resistance to the particular Anti Retro Viral (ARV) drug. To overcome this problem combination therapy is the required option but it may increase the cost of the treatment. Poor adherence to ART amplifies by diverse options including complex therapeutic regimens (Dose frequency, pill burden, Pill fatigue), treatment side effects, knowledge of treatment, poor patient physician relationships, limited access to ART services and cost of treatment (4).

In early ART initiation the major challenge is to link the patient from testing site to HIV care facility and then retain the patient in the care until they are eligible for ART, is a major barrier. Pre antiretroviral therapy (pre-ART) care starts with the testing of the patients who are HIV positive and continued till the administration of first antiretroviral drug to the patient. Poor retention in

pre ART care is also a problem in the patients who are well aware about their HIV status and visits health facility only when they are seriously ill. In Nigeria Pre antiretroviral therapy starts with early diagnoses, counseling and estimation of CD4 count in the HIV positive patients (5).

1.2 Global Epidemiology of HIV AIDS

Since the beginning of the pandemic, more than 70 million people have been infected with HIV and about 35 million people have died. Globally 36.7 million people were living with HIV at the end of 2015. An estimated 0.8% of adults aged 15-49 years worldwide are living with HIV. The burden of epidemic varies from countries and regions.

The most affected region is Sub Saharan Africa, nearly 1 in every 25 adults are living with HIV and accounts nearly 70 % of the people living with HIV worldwide (6). The major reason for the transmission of HIV in Sub Saharan Africa is unprotected heterosexual intercourse (7).

A large HIV population is attributed to live a long term heterosexual relationships. In Sub Sahara Africa mostly couples are in discordant relationship. Man is traditionally viewed as a main infected partner in discordant relationship (8). Most of the regions in the Sub Sahara Africa has decreased prevalence of new HIV infection due to the initiation of ART programs (7).

1.3 Country Profile of Nigeria

Nigeria is located at the cost of West Africa. This is the most populated country of Africa. The population of Nigeria is 152 million. The Niger River is the third longest river in Africa that enters from northwest side of the country and flows toward southern coast, where it empties into gulf through a vast delta region.

Nigeria shares borders with four countries. On west side Benin, north side Niger and Chad is locate at northeast and Cameroon to the east. Gulf of Guinea is located at south side, part of the South Atlantic Ocean surrounding area is approximately over 923,000 sq km of total area.

Topography The landscape has plains and plateaus, with mountain ranges and occasional granitic mountains rising from the surface.

Geographic Divisions There are four geographical regions based on vegetation and climate.

Climate The climate is tropical with regional variations according to latitude. In general there is increasing trend of precipitation moving from north to south

The overall temperature of Nigeria is high, during the rainy season the temperature is moderated by the southwest monsoon.

Abuja is the capital of Nigeria that is known as the Federal Capital Territory (FCT). In late 1970s, the capital was moved away from Lagos. Abuja has been selected for various reasons of accessibility and low population density. Abuja was declared as a capital of Nigeria in 1991. Major cities of Nigeria are Lagos, Ibadan, Kano and Port Harcourt (9).

Figure 1: Map of Nigeria (10)



1.4 Epidemiology of HIV/Aids in Nigeria

According to the 2014 statistics approximately 36.9 million is the total HIV population. Sub Saharan Africa is the most affected region and the HIV population is 25.8 million. Approximately 66% HIV population is living in this region (Joint United Nations Global Fact Sheet, 2015). Of all HIV population total 9 % are living in Nigeria. Most recent survey is carried out in 2014 in Nigeria by National Aids and STI program (11).

In Nigeria first HIV case was identified and reported in 1986. Since then HIV has increased significantly and its prevalence increased from 1.8% in 1991 to 5.5% in 2005. According to the 2004 statistics 300000 deaths from HIV/AIDS and 2 million orphans reported in Nigeria (12).

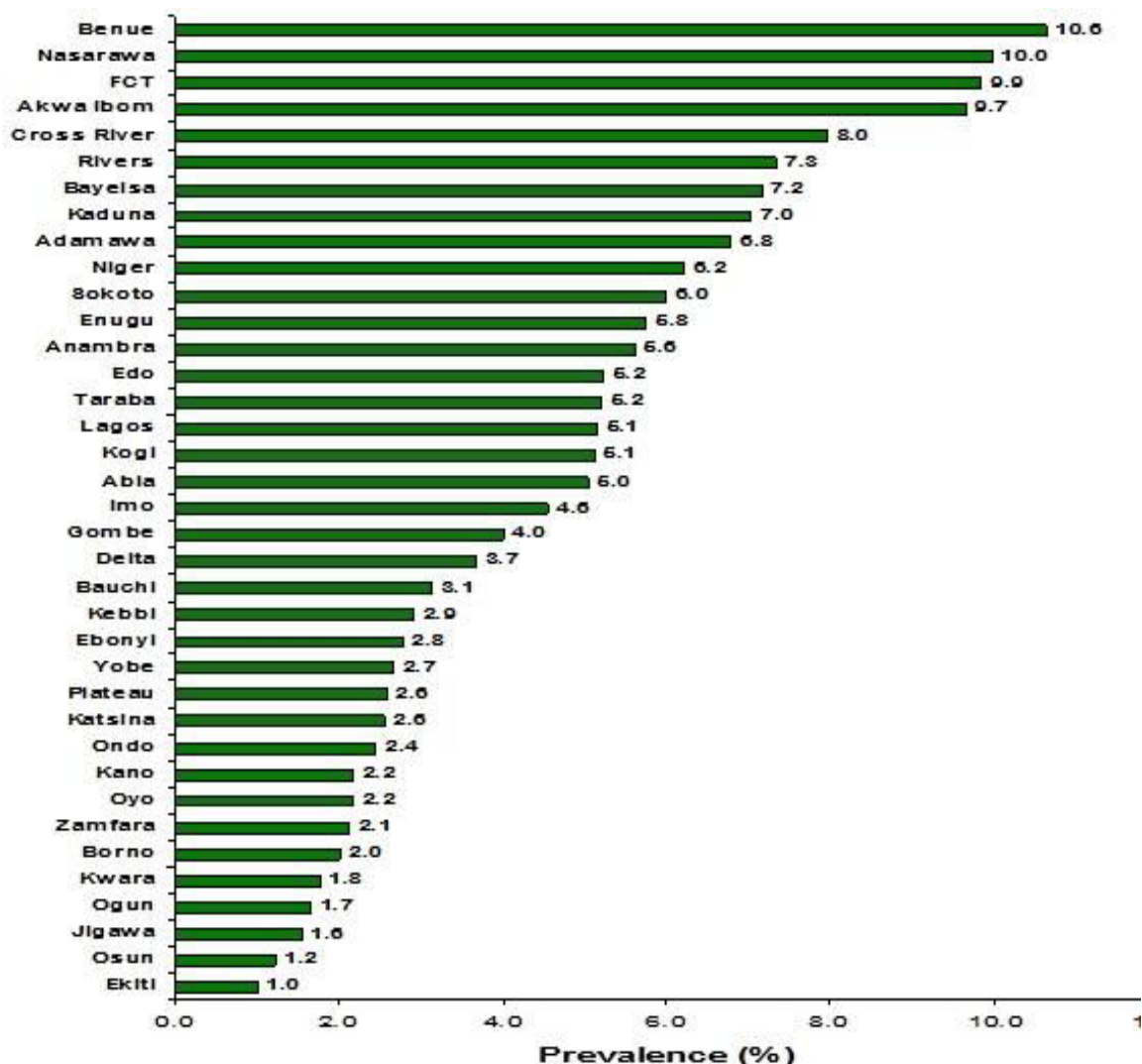
About 80% of HIV infections in Nigeria are due to heterosexual relationship. Several social studies has identifies that truck drivers are important occupational high risk group. Truck drives are constantly away from their home and they are more prone to extra marital sex (13).

In Nigeria the high risk groups of HIV playing a major role in the prevalence of new infections. Female sex workers, IDU and MSMs alone constitute about 1% of adult population and their contribution is approximately 23% in new HIV infections. High risk population with their partners contributes 40% of new infections, this is the population that constitute only 3.4% of the adult population.

There are wide variations in the prevalence of HIV in Nigeria According to the National HIV/Aids and Reproductive Health Survey (NARHS) prevalence data in South zone (5.5%) the prevalence varies amongst the 6 regions of the country and the lowest prevalence is (1.8%) in South east zone, Prevalence figures also differs in urban and rural areas 3% and 4% (14).

The HIV prevalence is mixed in different regions, Rivers 15.2%, Taraba 10.5%, Kaduna 9.2%, Nasarawa 8.1%, Federal Capital Territory 7.5%. Akwa Ibom 6.5%, Sokoto 6.4%. Oyo 5.6%, Benue 5.6%, Yobe 5.3%, Cross river 4.4%, Ondo 4.3%, Gombe 3.4%, Abia 3.3%, Bayelsa 2.7%, Osun 2.6%, Imo 2.5%, Borno 2.4%, Plateau 2.3%, Lagos 2.2%, Jigawa 2.1%, Adamawa 1.9%, Kogi 1.4%, Kano 1.3%, Enugu 1.3%, Niger 1.2%, Anambra 1.2%, Ebonyi 0.9%, Edo 0.8%, Kebbi 0.8%, Delta 0.7%, Bauch 0.6%, Ogun 0.6%, Zamfara 0.4%, Ekiti 0.2%. The National prevalence rate is 3.4% (15).

Figure 2: HIV Prevalence by states (NARHS 2012)



1.5 Health System in Nigeria

The healthcare system in Nigeria is organized into primary, secondary and tertiary healthcare levels. The local government areas (LGA) are responsible for primary health care and the state government responsible for providing secondary care. The federal Government is responsible for developing policy and regulations and overall providing tertiary. The LGA is the organized level of government the LGA level is the least funded level of the government and has not been funded properly and this situation is responsible for developing a weak Healthcare system (16).

1.6 Response of Government against HIV/Aids

In Nigeria a series of development plans for the control of HIV has been launched since independence in 1960 (17).

The first plan was launched in 2001. This was the first national HIV strategic plan and was focusing on behavior change and knowledge of the public. A new strategic plan of action was launched 2005-2009. In this plan all stakeholders were involved.

Members included representative from Ministry non-governmental organizations networks of people living with HIV. The implementation of National Strategic Framework (NSF) 2005-9 was reviewed for its effectiveness. After the expiry of NSF another opportunity arise to develop new strategies. Consequently in National HIV/AIDS action plan 2010-15 includes changes in behavior. Also the plan focused on Gender inequity and knowledge management and interventions (18).

Nigeria is the country that is second in the world for its HIV/AIDS burden in the world. An Estimated 3391546 are living with HIV/AIDS. According to the surveys it is estimated that new infections has decreased from an estimated 316733 in 2003 to 239155 after a decade. A total of 174253 died from AIDS related cases in 2014 which is lower than 210031 people died in 2013. The eligibility criteria in 2014 for HIV people who need ART was $350/\text{mm}^3$ CD4 count and the number of people were 1665403 (1454565 adult and 210838 children).

The HIV counseling and testing services has increased eight folds to increase access to (HCT) and multiple strategies were used and as a result total of 6716428 patients age 15 years were counseled and tested compared to 4077668 in 2013 (14).

According to the National ART guidelines (2016) patient are giving immediately ART after positive diagnosis of HIV rather than CD4 count (19).

1.7 ART Services

The ART program started in 2002 across 18 states in 2002 in Nigeria. The Federal Government in 2006 introduced the free ARV treatment policy for eligible persons and since then there is a massive scale up in the number of sites that are providing ART services as well as number of people receiving the treatment. The number of sites delivering the ART services has increased from 25 sites in 18 states in 2002 to 1057 in 2014 and spread in 36 states including FCT. The number of patients receiving the ART services has increased 747382 in 2014. This increased coverage of cost effective ART

services influenced significantly the transmission and life expectancy of PLWHIV.

The scale up strategy of ensured that the ART services has moved from tertiary hospital based to secondary and primary health care level facilitate. Decentralization of ART services to primary level also provided ease to the patients to avail the ART services (14).

CHAPTER TWO: OVERVIEW, PROBLEM STATEMENT AND OBJECTIVES

2.1 Definition of Adherence

According to World Health Organization (WHO) defined adherence as “the extent to which individual’s behavior in terms of taking medications, following a diet and executing lifestyle change following agreed recommendations from a health provider”

Most commonly adherence refers to the fact that the degree to which a patient follows the medical advice. In broad sense adherence also applies in the situations such as self care, self directed exercises or therapy sessions (1).

2.2 Problem Statement

Globally more than 36.7 million people are currently living with HIV/AIDS and almost 35 million people already died of HIV/AIDS. Since the beginning of this epidemic in the region that is most severely affected is Sub-Saharan Africa and still now this region is suffering from HIV epidemic (20).

Nigeria is ranked second after South Africa with an HIV/AIDS population estimate of 3.5 million (14). The adherence with antiretroviral therapy is a problem in Nigeria, despite the increasing strategies to improve ART service in Nigeria, adherence has remained a challenge in ART. Poor adherence leads to drug resistance and limiting the options of treatment and also switching the first line of ART into second and third line of treatment. This situation force the patients to bear increased cost of combined third line of treatment with increased side effects.

The adherence patterns in Nigeria are mixed both high and low. The adherence level is 49.9% in Niger Delta of Nigeria (21). In Keffi 62.8% (22). In south east Nigeria non adherence is 75% (23). In Ife-Ijesa 44% (24). The overall low level of adherence with ART is a problem in Nigeria. High levels of adherence to ART (at least 95%) is needed to ensure optimal benefits (25).

There are a few reasons that responsible for variation and changed pattern in ART adherence in Nigeria. Poverty level, literacy, rural population, weak health system and poor infrastructure are main factors which are contributing in non adherence to the ART.

According to world bank statistics released in 2015, Nigerian 52% population living in rural areas (26). Nigeria adult literacy rate is 59.57% (2015 statistic) (27). Studies from Africa established that high poverty level is linked with literacy of the people. Due to high poverty level people cannot afford basic education that leads to poor health literacy and accessibility to health care issues. In the long run poverty and illiteracy are the primary factors which are working behind the barriers of ART Adherence (28).

Nigeria is one of the unequal countries of the world according to the UN. The poverty level pattern is diverse in the country due to variation in per person income. Poverty is the one of the major contributor that is playing its role in non adherence of ART (29).

In Nigeria people who are living in rural areas including specially women are without any formal education and most of them are illiterates.

Rural infrastructure in Nigeria has long been neglected. Investments in health and education have been focused largely on the cities. As a result, the rural population has extremely limited access to services such as schools and health centers (30).

Adherence with the treatment is a problem in all chronic diseases where self administration of treatment is required. In developed countries adherence to therapy is average 50% and this figure is less in developing nations. In China 43%, in Gambia 27%, similarly for HIV/AIDS low rates of adherence is found (37%-83%) (31).

The cultural belief system in Africa enables the poor and health illiterate population to rely on traditional healers due to their strong beliefs. Most of the poor people who are settled in rural areas are HIV- positive people and they have the tendency to stop their ARVs treatment and take help from traditional healers. The belief in witchcraft in black communities is also linked with HIV infection and non adherence to the treatment. People believe that God is not happy with them and if they will perform rituals they will be cleaned and healed (32).

Research studies from outside of African region have proved that the HIV-positive individuals who face infrastructure barriers are mostly living in rural areas. Rural areas often lack the infrastructure to support the delivery of comprehensive HIV services (33).

To achieve undetectable viral load and prevent the development of drug resistance patient on ARV drugs need at least 95 % adherence with the treatment (34).

Strict adherence to ART is a key to sustain the suppression of HIV and minimize the risk to drug resistance, improve overall health, and also reduces the risk of transmission of HIV. Conversely the main reason for the

therapeutic failure is the poor adherence. Achieving and maintaining long term adherence is challenging for HIV infected patients. In case of Non adherence to the treatment loss of virological control is the result that may lead to the emergence to drug resistance and narrowing the future treatment options (35).

The consequences of (HIV Drug Resistance) HIVDR include treatment failure and further spread of HIV infection and development of drug resistant. This limits the effectiveness of the therapeutic options and further increase HIV incidence, mortality (36).

There barriers that are influencing the ART adherence are poor social support, stigma wrong beliefs, lack of food, side effects, long waiting time, insufficient counseling, costs of treatment, transport and long distance to the facility (37).

2.3 Study Question

Identify the factors influencing the adherence to antiretroviral therapy in Nigeria.

2.4 Objectives

2.4.1 General Objectives

To explore the factors influencing the adherence and measures to improve ART adherence in Nigeria.

2.4.2 Specific Objectives

Specific Objectives are

- 1 To explore ART protocols, adherence situation and adherence interventions in Nigeria.
- 2 To analyze individual level factors.
- 3 To explore community level factors.
- 4 To analyze medical related factors.
- 5 To identify the structural related factors.
- 6 To formulate the recommendations for improvement in health care services to ministry of Health, Nigeria.

2.5 Methodology

The method of this thesis includes a systematic literature review. This section will also explain the conceptual framework that is used to study the adherence in PLWHIV.

Figure 3: Frame work for Factors leading to sub optimal adherence to ARVs (38).

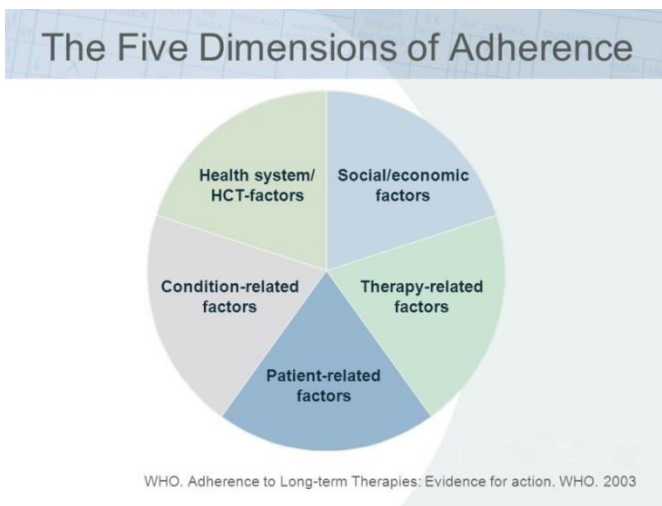
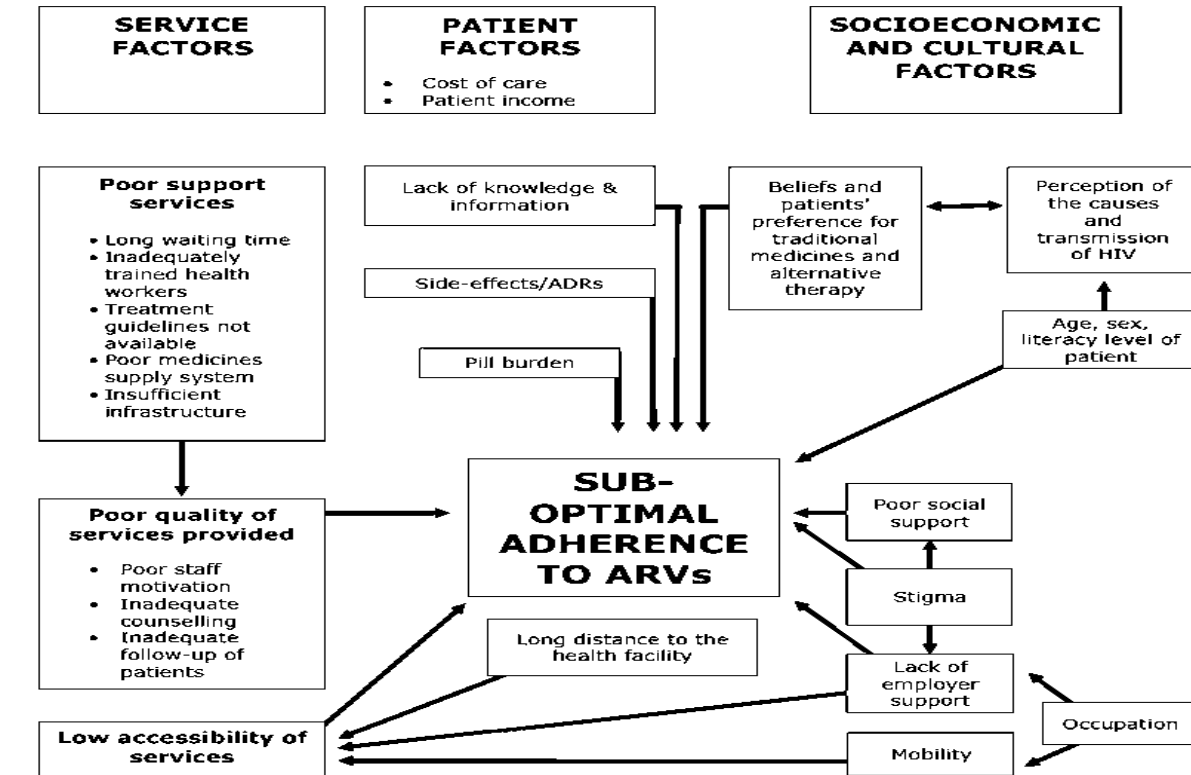


Figure 4: Frame work, the Five Dimensions of Adherence (39).

Framework for suboptimal adherence to ART: was developed to identify the service factor, patient factors and socioeconomic and cultural factors involved in the adherence with ARV. This frame work was used in Uganda to analyze the barriers to ART. This frame work is not focusing on Structure related barriers of adherence.

Frame work of Five Dimensions of Adherence was developed by WHO and includes the social/economic factors, therapy related factors, medical condition related factors, health system factors, Therapy related factors. The focus of this model is on providers role in ART adherence.

The above two mentioned frame works are not exploring all dimensions of adherence. Frame wok for suboptimal adherence is missing the structure related barriers and Five dimension frame work is only provider focused model therefore they are not selected for the study of factors influencing the ART in Nigeria.

Another model frame work by Wekesa was used which thoroughly describes all four aspects of ART barriers in Sub Saharan region. The frame work focus on Individual level, Community level, Treatment factors and structure related factors.

Conceptual Frame work for analysis of factors influencing

Adherence to ART is adapted from Wekesa's (2007) approach to studying antiretroviral therapy in resource-poor settings in Sub-Saharan Africa. This model has been used to study factors that influence adherence to ART among PLWHIV on ART.

Individual factors: These include attitudes and beliefs about the effectiveness of treatment, difficulties to understand prescribed instructions or inability to read instructions (education/literacy level), personal lifestyle/behaviors (alcohol/substance use). Others are forgetfulness, psychological factors (stress, depression and anger about disease), Use of traditional medicines and acceptance of HIV positive status.

Community-level factors: These include the stigma, disclosure pattern, social support, food insecurity, economic hardship.

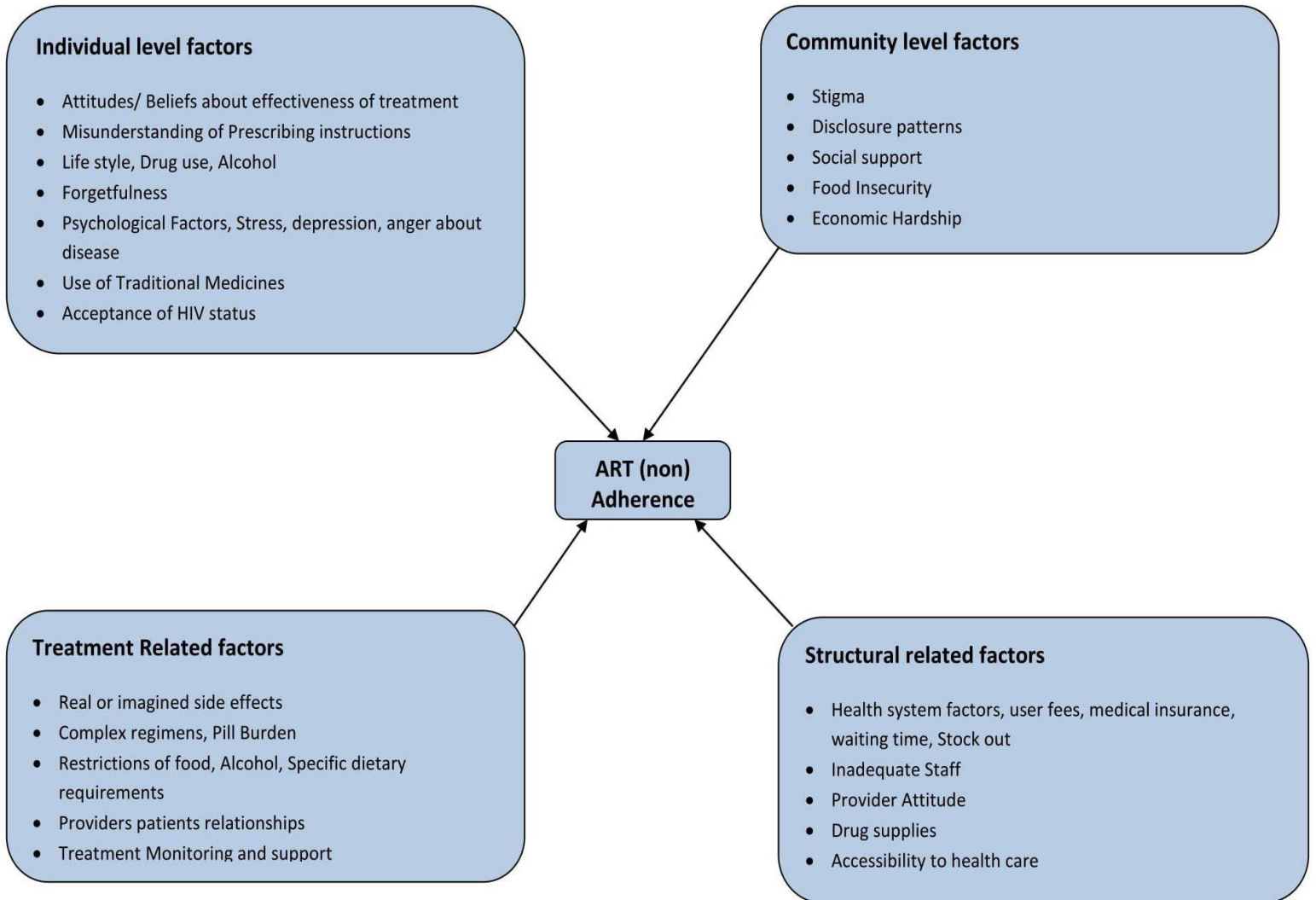
Treatment related factors: These are pill burden and regimen complexity (too many pills, scheduling and frequency per day), unpleasant taste, smell or color, restrictive requirements or inconveniences (exclusion of alcohol or specific dietary requirement); and provider patients relationship/interaction. Others are lack of/insufficient medical monitoring and support.

Structural factors: Health system factors include user fee, drug supplies (stock out), accessibility to health facility (inadequate health facility to provide ART), and attitude of health care providers. Others are inadequate staffs which lead to high workloads and long waiting times.

Note: Figure below represents these factors in more visualized form.

Figure 5: Conceptual Frame work for analysis of factors influencing Adherence to ART

CONCEPTUAL FRAME WORK FOR ANALYSIS OF FACTORS INFLUENCING ADHERENCE TO ART



Source: Adapted from Wekesa, 2007 by Author

Source: Adapted from Wekesa, 2007 by author (40)

2.6 The literature review

A systematic literature review is performed in order to document interventions and strategies for improving ART adherence.

The purpose of literature review is to analyze the current situation of ART adherence in Nigeria using the previously published literature.

The **Systematic Review** is important to health care and medical trials and other subjects where methodology and data are important. The systematic review identifies and compares answer to health care related questions.

The articles, reviewed are Report of National agency for control of Aids, Partnership of Nigeria for Control of HIV/Aids, National HIV strategic plan 2016. Report of HIV epidemiology in Nigeria is viewed. The articles are searched using Pub Med, Google scholar and online Articles of the World Health Organization (WHO), UNAIDS and Nigerian government websites are also consulted. Journals and previous theses from the KIT library were used to find information concerning ART issues.

The key words used for the search are HIV prevalence in Sub Saharan Africa, ART adherence in Nigeria. Barriers to adherence with ART, Poverty level Nigeria, ART services in Nigeria. Adherence protocols for HIV treatment in Nigeria, WHO strategies and interventions for ART.

Inclusion and Exclusion Criteria

The scientific articles and annual official reports are only reviewed. The articles published from 2000-2017 are included in the search. Search filter is set to see the literature only from Sub Saharan region.

CHAPTER THREE: FINDINGS

3.1 Individual level factors

3.1.1 Knowledge, Attitude and beliefs

There are several studies that are available in Nigeria as well as different African countries that are reporting patient's knowledge with adherence to medication with HIV treatment. There is a positive relationship between literacy and HIV treatment. High level of literacy improves health literacy which is major factor related with the awareness of HIV/AIDS among the people. A study in Cross River State confirmed that level of Knowledge in cross river state is inadequate and due to less literacy in the state people adherence to the ART is less.

Another finding of this study is that there is high correlation between literacy level and HIV/AIDS management and prevention in Nigeria. This means level of literacy determines the level of adherence with ART (41).

The patients' HIV/AIDS related knowledge is poor in south east Nigeria. The literacy percentage on only 30% which leads to poor health literacy as well as enhance superstitious beliefs of patients about HIV (42).

Positive and negative beliefs about HIV/AIDS treatment are another variable that changes the perception of the patient and adherence to ART. The Patients perception about cost, benefits of taking medicines and its side effects are main factors that affect the adherence to the treatment (43).

Studies from Africa has shown that 70 % sub Saharan Africans has access to traditional healers. In Nigeria there is evidence that patients consult traditional healers due to un-affordability of ART and the belief that this disease is due to the reason that God is angry on them so they consult traditional healer as well as witchcraft to purify them. This cultural belief is acting as barrier in continuing the ART adherence in Nigeria (44)(45).

Studies from South East Nigeria revealed that there is a serious HIV/AIDS related risk in the practices of traditional heals which includes continuous usage of unsterilized instruments and cross contamination with patients' blood and body fluid in their practices (46).

3.1.2 Misunderstanding of prescribing instructions

Health literacy is defined as the degree to which the patient understands the basic health information. The health literacy helps patient to take decisions about their health. From patients perspective health literacy is a less recognized barrier to ART. Studies from South African region has proved that patients with less health literacy have a poor understanding of prescribing instructions, medication and their indications. This decreases the adherence to ART (47).

Low literacy rate is related with the health literacy and awareness about the health issues. People with lower education and lower health literacy are more emotionally depressed and are less optimistic and less adhered with their treatment.

In sub Saharan Africa poor health literacy is a barrier to medical care and people with lower health literacy are experiencing severe illness and are less adhered with HIV/AIDS treatment. Therefore the health literacy is an important factor in continuing the ART (48).

3.1.3 Life style, drug use, Alcohol

PLWHIV face day to day physical and mental challenges throughout their lives. Research published in USA proved that Alcohol use disorder (AUD) is linked with the enhanced toxicity of ART. Alcohol use disorder is associated with the liver damage from concurrent infection of hepatitis C virus and increased risk of opportunistic infections due to decreased effectiveness of ART and immune suppression. Moreover alcohol use also increase the risk of transmission of HIV infections including multiple sex partners, high risk injection behavior, unprotected sex (49).

Research from Johns Hopkins University proved that Non adherence to ART is also associated with hazardous levels of alcohol and higher viral load during the course of HIV treatment and accelerated decline of CD4 cells and faster disease progression and development of HIV resistant strains (50).

Large scale studies from Nigeria showed that AUD are common in Nigerian PLWHIV (51). It is Estimated that 40% of Nigerian youth is engaged in substance abuse (52). In Nigeria the prevalence of alcohol dependence is high among youth population and students and estimation is 3.5 %. Alcohol use disorder is more in male and young adults in Nigeria (53).

3.1.4 Forgetfulness or missing dose

For the effectiveness of (HAART) high level of adherence is required. Missing of even few doses of ARV medication can lead to resistance to HIV drugs (54).

Studies from Nigerian Tertiary hospital found that the most common reason for the forgetfulness of dose is travelling away from home, busy schedule and unclear dose instructions, side effects and religious beliefs (55).

Research conducted in urban areas of Nigeria proved that patients missed doses because they feared that family or friends would discover their HIV positive status (56).

3.1.5 Psychological factors/depression

The factors related with non adherence with HIV treatment are multidimensional. They may be patient related, provider related medication related or psychological factors.

Research conducted in ART center of Northwest Nigeria investigated that HIV related challenges start from emotional trauma, disclosure of HIV status, disease progression uncertainties, and sorrow in case of death and separations from loved ones. On the other hand stigma and discrimination from society are depressing factors for patients. If not properly managed these situations cause anxiety and depression and substance abuse in HIV patients (54).

Research from Nigeria confirmed that medication adherence is affected with the psychological distress of HIV infected patients. Depression and anxiety are most common indicators of psychological distress and leads to poor adherence to ART (57).

3.1.6 Use of traditional medicines

According to the World Health Organization (WHO) estimates about 80% people living in Africa use traditional medicines for the treatment and management of diseases (58).

The main reason to use traditional medicines is accessibility, affordability, availability and acceptability of traditional herbal medicines by the majority of population. Herbal medicine practitioners are living within the communities and have already gained the trust of the local population. These practitioners share same cultural and spiritual beliefs and always willing to help people (59).

The use of herbal (or traditional) medicine is high in the general HIV positive population in Africa. The strong status of traditional herbal prescriber makes

many patients to cease their ART and start traditional herbal medicines and this practice reduces their adherence to the ART.

In Sub Saharan Africa majority of patient have no accessibility options to the standard care of management. In this situation the only option left for patient is to rely only on herbal medicines for their chronic illness. Accessibility issues of ARV are also a contributing factor in the use of traditional medicines (59).

3.1.7 Acceptance of HIV status

In Sub Saharan Africa acceptance of HIV status also acts as a barrier to the adherence to the HIV treatment. It is sometimes difficult for a patient to accept the personal positive HIV status and to accept that the individual can not smoke and drink alcohol and cannot do sex without condom. People normally change temporarily but not for life this is also a potential factor for non adherence (60).

People find that they are HIV positive, their first reaction is the denying of the truth. More commonly they say that the HIV test reports came out wrong or there was mix-up of results (56).

Studies form Sub Saharan Africa has proved that denial of HIV positive status and stigma are associated with each other. The factors operating behind the denial are multi dimensional, Infected people already know that there is stigmatization related with this disease and they will be isolated from the society and they will have to live alone bearing the stigmatization from the society (61).

3.2 Community level factors

3.2.1 Stigma

Negative attitudes in the population about the PLWHIVs lead to potential discrimination and stigma. Negative attitudes of society about PLWHAs are some of the most common reason of AIDS stigma, which potentially lead to discrimination (62).

According to the research in sub Saharan Africa shows that sigma persist around the HIV/AIDS patients because it is deeply linked with social, personal and religious views, fears and death. Incomplete knowledge is fueling up the beliefs and contributes in stigma. Moral judgments and attitudes particularly about sex are shaping the views of communities towards PLWHIV with HIV/AIDS. In practice people are often unaware about their stigmatization and discriminatory attitudes. They are unaware of what

they say and what they do. This is the main reason of existence of stigma in the society (61).

The problems that HIV people face are isolation, low self esteem, loneliness, identity crisis and lack of interest about prevention of HIV/AIDS (63).

The PLWHIV also lack of motivation in practicing preventive measure and their care seeking behavior is casual and they don't participate in routine testing of HIV/AIDS (64).

Findings of studies from Nigeria confirmed that there is stigma and discrimination in the society. Stigma and discrimination in Nigerian society is creating a hidden epidemic of HIV/AIDS that is based on lack of Knowledge, denial and misinformation. Due to poor health literacy people even don't know the exact information about HIV/AIDS. They judge HIV patients according to their religious and social beliefs and show negative attitude towards HIV positive people. Studies conducted in North Central Nigeria showed that the level of acceptance of PLWHIV is low and level of rejection is very high towards PLHWA in the community (65).

3.2.2 Disclosure

Disclosure is linked with the stigma of losing the social and emotional support and isolation in the society. PLWHIV are fearful of their involuntary disclosure of status before their marital partners and social networks and facing the social exclusion. As a result to avoid the disclosure of their positive status they stop treatment to remain in social support system (66).

Disclosure of HIV status is important and gives potential benefit to the community. It motivates the sexual partners to participate in the HIV/AIDS testing and start the treatment of HAART and these behaviors are ultimately helpful to decrease the transmission of HIV/AIDS. On the other side disclosure of HIV positive status may initiate the stigma, social isolation, rejection in the society. The fear of discrimination and stigmatization is the one of the main reason to hide the HIV/AIDS positive status (67).

Studies from Sub Saharan Africa indicated that the disclosure percentage of HIV positive status to their sexual partners is very low and the percentage varies form 16 – 86 % (68). In Nigeria studies have proved that HIV positive disclosure percentage is very low (69).

3.2.3 Social Support

Studies in Nigeria confirmed that community support of HIV positive patients showed greater adherence rate to the ART (70).

Poor social support also flares up the symptoms of depression in the HIV positive patients. Depression is psychological condition which is strongly associated with the non adherence of the ART (71).

One of the barriers that is influencing the poor social support is intense stigma in Nigerian society that initiates Post traumatic stress disorders in HIV patients and leads to non adherence to ART (72).

3.2.4 Food and Hunger

Food insecurity is defined as the condition when people don't have physical, social and economic access to the sufficient food that meet their dietary requirements for an active live (12).

Food insecurity is an important barrier to adherence for ART. Research has examined the association between food insecurity and adherence to ART among HIV infected population.

In sub Saharan Africa studies explored the fact that PLWHIV infected people not only face sickness but also suffered from decreased productivity and declined income which leads to increasing financial difficulties, insufficient food and malnutrition. Poverty is the root cause of food insecurity (72).

According to the World Bank survey the poverty level of Nigeria was 53% in 2009 and rise to 61 % now. As a result of high poverty level in Nigeria people are unable to even fulfill their daily needs as well as to continue their ART (73).

3.2.5 Economic Hardship

The most important factor and that acts as a barrier in ART adherence is the cost of treatment. Although the ARV medicines are subsidized in the Nigeria due to donor findings but the cost of travelling to the health facility and the laboratory testing is bearing by the patients. Poverty is a strong determinant of ART treatment adherence. Due to high poverty level people are unable to continue the treatment and also they cannot afford the travelling cost.

In Nigerian health system patients pay for health care out of their pocket and poor people who don't have money are unable to access the health care services. ART services are subsidized in Nigeria but laboratory tests are not fee. Out of pocket expenditure places a financial burden over the patients who have only money for their food. So patient's family members are forced to scarify for their very essential items necessary for their well being.

Rural population with low income status pays more to access antiretroviral treatment. Rural population travel more to reach the health facility and this increases the cost of travelling (74).

According to World Bank statistics the percentage of rural population in Nigeria in 2014 is 53%. This means that more than half of the total population is living in rural areas (75).

Non adherence with the ART treatment develop drug resistance and worsening the patients health status and also increase the cost of treatment because patients administer combinations of ART medicines of second line and third line to overcome the resistance (76).

3.3 Treatment related factors

3.3.1 Side effects

Current ART have some limitations such as side effects (77). The presence of side effects of ART is also related with non adherence to the treatment. (78). Patients also need to take medication to manage opportunistic infection along with ARVs. In Nigeria side effects of ARVs are also a significant reason for non adherence. The number of tablets can be 16-20 daily. This pill burden is imposing profound side effects on the patients. The side effects maybe nausea, vomiting, diarrhea, neuropathy and lip dystrophy (79).

It is evident in published literature that due to side effects patient cease their ART and seek other options for their treatment like consulting with witchcrafts (80).

3.3.2 Pill burden regimen complexity

The shifting from conventional HIV treatment to HAART for HIV has increased the drug regimen. This situation is a challenge for health care provider and patient. To suppress HIV viral replication adherence with the treatment is required. This means that patients need to take combination of pills. But this situation causes Pill burden in patients on ART. Patients stop taking medicines for some period of time. This behavior of patients is also an indicative of low health literacy (81).

Studies in Nigeria proved that when patients take their medicines once or twice daily they are not get fatigued by pill burden. The smaller will be the pill burden the better will be the adherence. Pill burden negatively affect the adherence to the treatment (77).

3.3.3 Treatment monitoring

ART retention in care is necessary to evaluate the outcomes of medications toxicities and also check the treatment effeteness or its failure. Retention of patients in care provides additions benefits to the patient and prevents the

emergence of lifelong complication in the patients (82). Poor retention is also an indication of an inefficient performance of HIV program and results in increased mortality of HIV patients (83).

In Sub Saharan Africa there are many pitfalls in the monitoring and retention of patient in health care that ultimate leads to the non adherence to the treatment and high mortality in HIV positive patients (84).

3.3.4 Provider patient relationship

Trust and the therapeutic relationship between patient and physician are important in the ART initiation process (78).

The relationship between patient and clinician are associated with the greater adherence of treatment. If patient is in a positive relationship with the health staff, they can ask question about their health condition and treatment which provides basis for adherence with ART (80).

There are several barriers for patient provider relationship, such as patient beliefs, patient concerns about the treatment and poor understanding or less health literacy (85).

In sub Saharan Africa poor health literacy is a problem and it leads to poor patient provider relationship. People with lower health provider relationship are experiencing severe illness and are less adhered with HIV/AIDS treatment (48).

3.3.5 Restrictions of food, Alcohol, Specific dietary requirements

Due to inadequate dietary intake HIV patients are susceptible to malnutrition. Main reason is metabolic changes and increased requirement of micronutrients (86). The role of nutritional support is well known in HAART in PLWHIV (87).

In sub Saharan Africa including Nigeria PLWHIV suffering from lack of support due to stigmatization and discrimination. Due to stigma and discrimination HIV positive people are isolated in society and they lose their jobs and are less productive. This situation creates lack of availability of food and dietary intake for HIV patients. These conditions result in non adherence of the patients with the ART (65).

3.4 Structural related factors

3.4.1 Health system factors

The quality of care and adherence are associated with each other. The long waiting time for people living with HIV, frequent trips to clinics presented a high cost that patients are not willing to pay. This is the situation when poor patients have to choose and decide either livelihood or treatment. The long clinical appointments often last for whole day. Non availability of drugs, lab test and rude behavior, attitude of clinical staff frustrates the patients. Patients try to avoid these situations for future and the finally non adherence to the treatment (88).

3.4.2 Inadequate staff

In Sub Saharan Africa there is shortage of Health resources and health workers. As a result long lines in hospitals and patient wait for hours for their checkup. Factors behind the shortage of health staff are difficult working conditions, less salaries, low motivation and long working hours (89).

3.4.3 Provider attitude

Most health care professionals in Nigeria reported being in compliance with their ethical obligations and dealing positively HIV patients. Despite of this many other studies from Nigeria also proved the stigma and discriminatory behavior of health workers (90).

The health sector is the place where HIV positive patients are perceived to be supported and treated, but practically patients cope stigma and discrimination in health facilities (91).

Studies in Nigeria investigated that there is a high level of stigma among health workers, the underlying reason is lack of understanding of how HIV is transmitted and how to protect oneself in the workplace. Studies among nurses and laboratory technicians showed that most of them realized that HIV people are deserved of being infected with HIV as punishment for their illegitimate sexual misbehaviors (92).

3.4.4 Drug supply

Access to ARV drugs is a great concern for HIV patients and one of the significant predictor of adherence. In Nigeria ARV medicine stock outs raised serious concerns about the HIV running programs. In 2004 and 2005 there

were severe shortage of ARV medicines in Nigeria and this situation jolted the HIV programs. People were not able to continue HIV treatment. This situation demoralized the patients and shaken their trust on government and treatment programs. Finally this situation increased the viral load in PLWHIV and outcome was development of drug resistance in the patients and worsening the health condition of patients (93).

3.4.5 User fee and Accessibility

The most significant factor and a major barrier to adherence is cost of treatment. Despite the fact that ARVs are heavily subsidized in Nigeria still patients have to bear the cost of transportation and laboratory tests. This is a huge burden in HIV patients for the patients who are poor. In Nigeria majority of population is living in rural areas and poor. People travel to health facilities from far places and their travelling cost is very high. This system induced non adherence causes drug resistance in the patients and high risk of further transmission of infection. The specific factor that is operating behind this situation of non adherence is poverty (78).

3.5 Interventions to Promote Adherence

Factors influencing the Adherence to ART with related Interventions

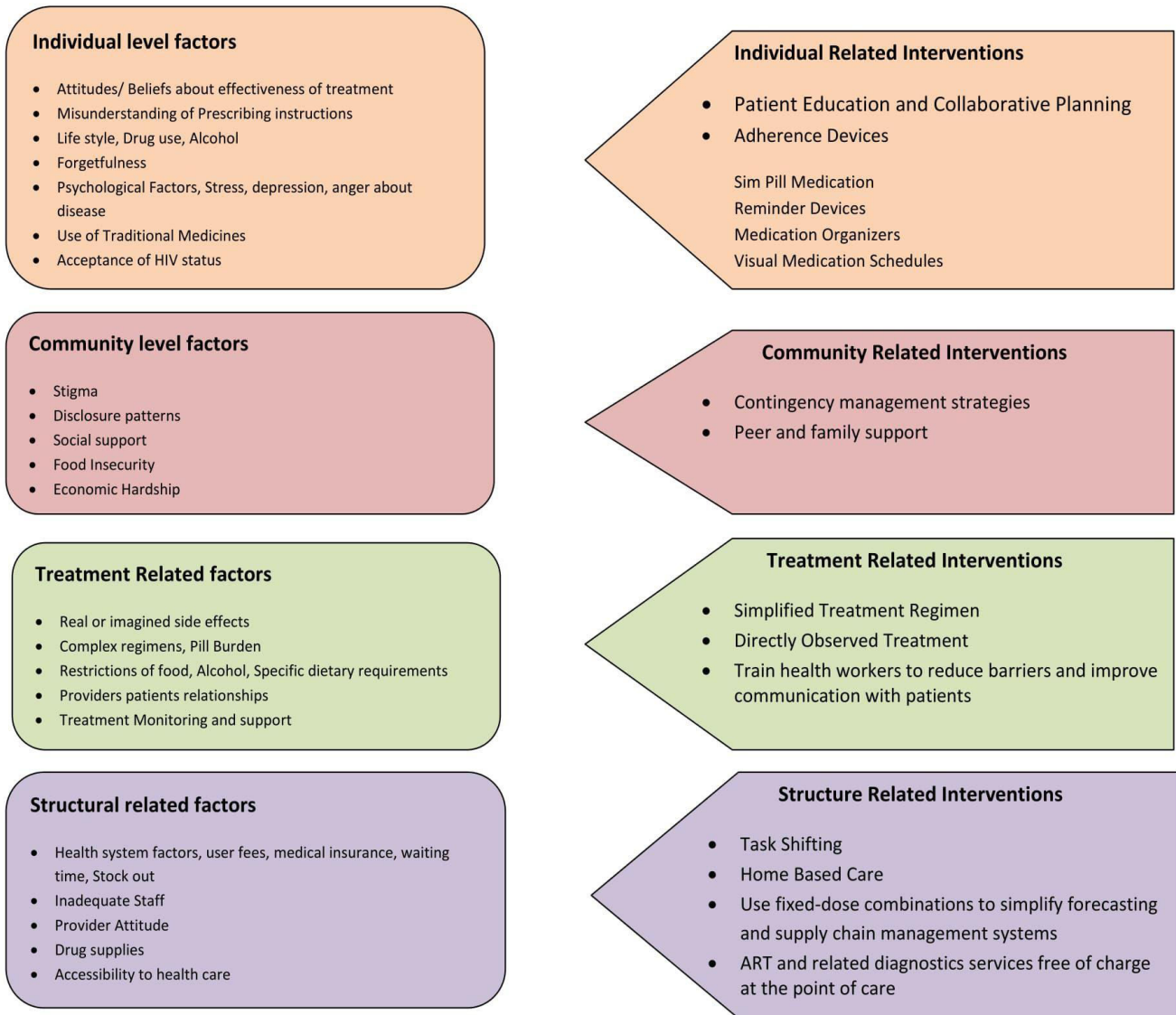


Figure6: Factors influencing the adherence to ART with related interventions

A number of studies as well as WHO recommended interventions are discussed to improve the adherence in Nigeria. The following interventions are classified into four classes and are linked with adherence problems in ART.

3.5.1 Patient Education and Collaborative Planning

Patients knowledge about the HIV conditions and treatment is considered as a factor that influences the ART and improvements can be done through educational programs (94).

Information about HIV treatment and its adherence is provided to obtain better results and prevent drug resistance. Dosing schedule for each individual can be developed to improve the habits to take and remember the doses easier (95).

3.5.2 Adherence Devices

There are a variety of adherence devices that are simple and inexpensive and easy to integrate in routine care available. Often these devices are available free of charge. Clinicians can provide these devices to the patients.

Given below are the commonly used adherence devices.

3.5.2.1 The SIM pill Medication Adherence Solution

This is a medication system which is programmed to work with patients medication schedule. It monitors the intake of dose. Electronic system with Sim is installed in the lid of the bottle and Sim is connected with the mobile network. When lid is not opened at scheduled time, it sends text message as a reminder of the missing dose on the mobile of the patient (96).

3.5.5.2 Reminder Devices

One of the reason for non adherence is the forgetfulness of the dose (97). The reminder devices commonly used are watches beepers, electronic schedulers. Mobiles phone can also be used as a reminder device that can be used to remember missing of dose (98).

3.5.5.3 Medication Organizers

Medication organizers are available in different sizes, according to the need of the patients. This facilitates patients to organize their weekly dose of medication in one location, instead of carrying of the pill bottles. Patients

visiting clinics carrying pill boxes help clinicians to monitor the recent non adherence (96).

3.5.3 Visual Medication Schedules

Visual medical schedule allows the patients to see the images of prescribed medication on the weekly calendars. Images of prescribed medicines are available in sticker form and they are pasted on a calendar so that the patients can remember and understand the prescribed regimen. A VMS can be provided to the patients by the physician (99).

3.5.4 Contingency management strategies

In this system rewards, raffled prizes and vouchers are given to the patients to reinforce the behavior change. The data collected related with adherence is taken from electronic pill caps. The major drawback of this intervention is that improvements vanishes when the incentives are removed (100).

3.5.5 Directly Observed Therapy

Modified DOT (mDOT) or directly administered ART involves the clinical staff, trained peers who observe the patients ingesting their ART doses. In mDOT therapy patient take the remaining part of regimen by themselves. The benefit of Modified DOT is that it develops a behavior in patients to continue their regimen by themselves without any support. With the passage of time patient adherence habits are developed (101).

3.5.6 Simplified Treatment Regimens

Regimen complexity is one of the most important barriers to adherence. Most studies investigated that reducing the pill burden can improve the adherence of the patient with the treatment. Research has proved that once daily dosing vs. twice daily dosing is yielding more satisfactory treatment results. Reducing pill burden and high dietary requirements influence positively the adherence of the patient with the treatment (96).

3.5.7 Home based care HBC

HBC is a program started in Uganda where access to HIV care facilities is less due to poverty and lack of transportation. Patients receive treatment at their home. It is an alternative for visiting to the facility (102).

In rural Uganda Home based care program started by the collaboration of (CDC) Center of disease control. The HBC program treated hundreds of HIV

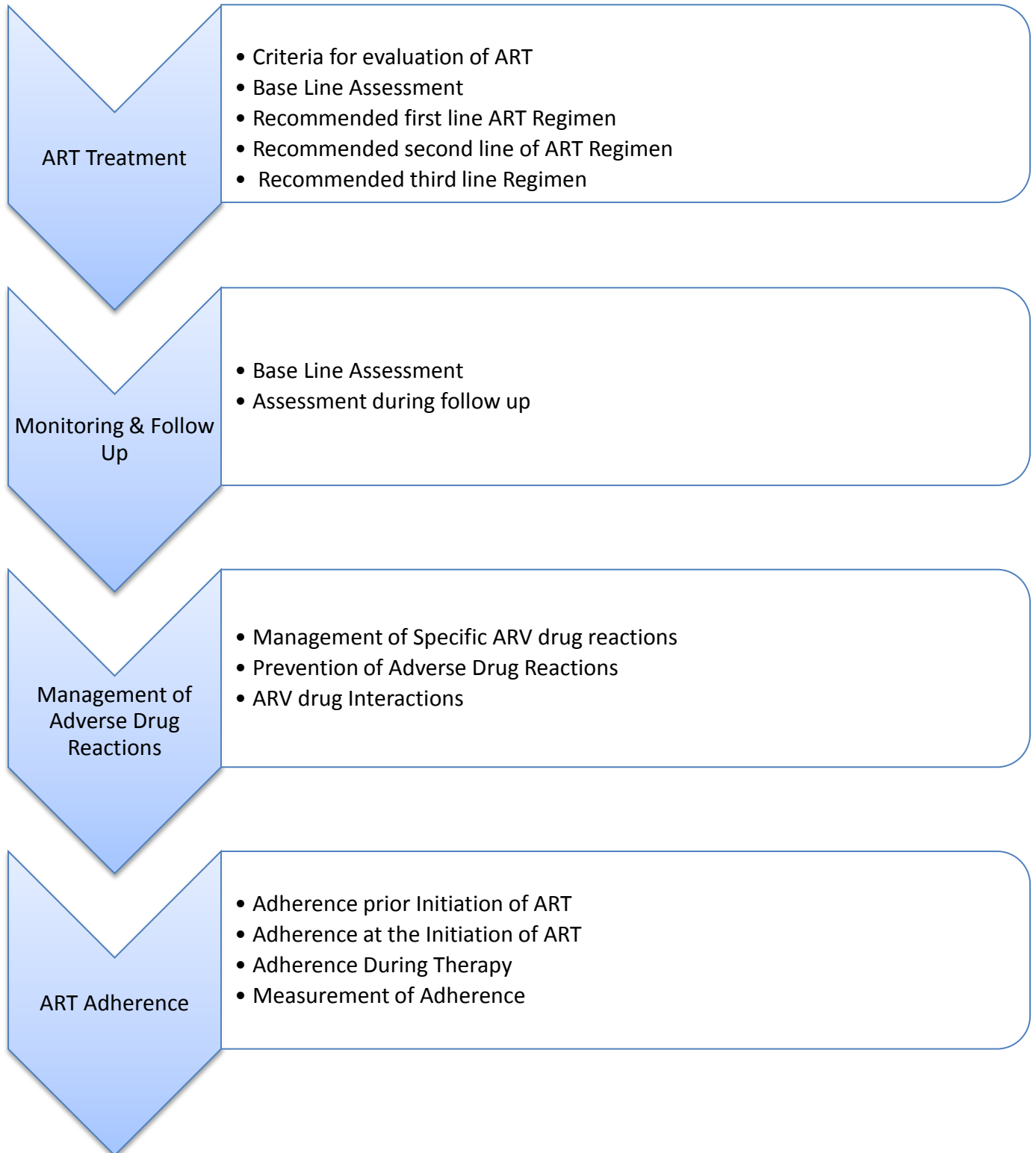
positive patients at their home. HBC home based Aids care includes weekly home visit by the medial officer with a basic package of ARVs, perform pill count and fill a questionnaire to assess the toxicity of dose and also collected the necessary specimens. This intervention worked well in Uganda and significantly reduced the AIDS related deaths in the community (103).

3.5.8 Task Shifting

Shortage of health care staff severely affected the ART in Sub Saharan Africa.

This strategy can be used in the places where there is shortage of human health resources. In Sub Saharan Africa patients wait for long hours in queue for checkup due to the shortage of health staff. This strategy improves and resolves the problems arising due to the shortage of staff in health care facilities. The Task shifting provides high quality services, cost effective to the patients. The main challenge is to train the staff for new responsibilities and pay according to their new job description and also integrate new health staff in existing system (66).

3.6 Antiretroviral treatment and adherence Protocols



3.6.1 Antiretroviral Treatment

The Art treatment of HIV is the treatment of HIV using a combination for antiretroviral drugs. According to the HIV treatment guideline from Nigeria, ART treatment should start immediately after diagnosing with HIV positive status regardless of WHO clinical stages and CD4 Cell count.

The base line assessment of patient for ART includes the retesting and reconfirmation of positive status of patient. Complete physical examination focusing on renal and cardiovascular diseases, pregnancy and anemia before starting the ART.

The treatment is started with first line of ARV with combination of drugs. In case of failure of first line of drugs second line of drugs are used considering the factors contributing the failure of first line of ARV. Third line of ARV is introduced in response to the failure of first line of ARV. Before starting the third line of drug sensitivity testing is done to verify the effectiveness of the third line of drugs

3.6.2 Monitoring and Follow-Up in Adults

After the initiation of ART monitoring and follow-up is done to check any new signs, drug toxicities, immunological response of the therapy, weight and height monitoring in children

3.6.3 Management of Adverse drug reactions

Adverse drug reactions ADR are related with the prolonged administration of drug or result from combination of two or more drugs. In ART patient administer combination of doses per day. This situation initiated the adverse drug reactions in HIV patients. ARVs that are pose serious ADRs on patients should be discontinued immediately and after necessary consultation new combination of ARVs should be suggested.

3.6.4 ART Adherence

The updated National guidelines for HIV prevention, Treatment and Care are launched in 2016 with the guidance of WHO. ART Adherence is maintained throughout the treatment at various steps. Adherence is maintained prior to the Initiation of therapy and during the treatment. Patients are also retained in the health facility before the treatment and during the treatment for better outcomes.

Adherence strategy includes the education of patients before starting of ART. It also assesses the readiness of the patient before the starting of treatment. Adherence before treatment includes the counseling of patient about ART and potential side effects. Peer support is also useful to motivate the patients for ART.

3.6.5 Adherence at Initiation

Special considerations are given for frequency of dose, pill burden, food restrictions and adjustment of ARVs with the patient lifestyle. Family members are also involved to support the patient and improve adherence.

3.6.6 Adherence during Treatment

Adherence during the treatment is most important step in the successful continuation of ART. Adherence assessment is done at every visit to ensure the viral suppression.

3.6.7 Measurement of Adherence

Adherence can be measured by pharmacy refill records, pill count, virus load monitoring and self reporting.

3.6.8 Retention of Patients in Health

People who are living with HIV should be retained in health facility till they are not eligible for ART. This provides an opportunity to health staff for the screening, prevention and treating patients for other conditions before the starting of ART. During ART they can also be retained for specific reasons for adverse drug reactions or co-infection with TB (73)(19).

CHAPTER FOUR: DISCUSSION

The study identified the factors that are influencing the ART adherence among PLWHIV. The study analyzed and explored the factors and their linkage as mentioned in framework.

4.1 Individual related factors

The factors that are discussed in this group are use of traditional medicines, forgetfulness and psychological factors. At individual level they are the most important factors with high influence on ART adherence.

4.1.1 Use of traditional medicines

The finding of the study indicates that PLWHIV already on ART using traditional medicines affect their adherence. Traditional medicines are always available as an alternative for ART.

Negative beliefs of people about ART as well as witchcrafts motivate people to stop their ART treatment and start using traditional medicines. In Sub Saharan Africa people superstitious believe is the one of the reasons for using traditional medicines and non adherence to ART.

4.1.2 Forgetfulness or missing doses

The study indicated that forgetfulness is a major barrier to the adherence for ART. The reason for forgetfulness is travelling far from home and busy schedules. Surveys in Africa analyzed that forgetfulness and missing of dose is interlinked with other factors such as side effects, depression, pill burden, and misunderstanding of the prescription information that is provided by the health staff, stigma and discrimination. Patients don't want to see them by the other people around during the administration of the dose. Therefore they miss the dose of ARV medicines.

4.1.3 Psychological factors/ depression and alcohol abuse

Research in Nigeria confirmed that after the disclosure of HIV status emotional stress and depression starts in HIV patients. This leads to the non adherence to ART and also some patients use alcohol and involve themselves in substance abuse. The patients think that this is a way to relief themselves from extreme depression. In case of disclosure of HIV positive status patients suffer a difficult situation in the society. Some time they lost their jobs and fall into the poverty and isolated from the society. They become non productive in the society. This situation cause mental tension and anxiety and depression in the patients. To manage depression and

refrain from the reality majority of patients use alcohol and substance abuse that worsen the condition of HIV positive patients as well as facilitate the non adherence to the treatment.

4.2 Socioeconomic factors

The discussion factors under this section are interlinked with each other. These factors are grouped together for discussion.

4.2.1 Stigma, disclosure, social support

Stigma and disclosure has a strong relationship with each other, they both exists in the society at the same time and potentially influence the adherence to ART.

In Sub Saharan Africa stigma is related with the negative attitudes and beliefs of the society about the disease. People consider HIV related with illegitimate sexual malpractices and according to their beliefs they consider it wrong in society and as a result stigma exists. One reason for stigma is also the religious beliefs of people in the society and they evaluate the HIV positive patients according to their religious beliefs and consider them bad people who are involved in sexual malpractices.

In sub Sahara and Nigeria disclosure of HIV status is related with the decreased social support and increased stigma in the society. The percentage of disclosure is very low in Sub-Saharan Africa and Nigeria. People don't disclose themselves due to the fear of lack of social support and social exclusion from the society.

4.2.2 Economic hardship, food, hunger and transport cost

The finding of the study states that poor economic status of patients is linked with the non adherence to ART. Poverty is the responsible factor in Nigeria for initiating the food insecurity, hunger and unbearable transport cost. The PLWHIV faces the problem of lack of productivity which ultimate results in decreased income that leads to the poverty, In Nigeria poverty is the main reason for food insecurity and transport cost.

4.3 Treatment related factors

The grouping of factors for discussion in this section as per their inter-relation is side effects, Pill Burden, Specific dietary requirements and Providers patient relationships Treatment Monitoring and support.

4.3.1 Side effects, Pill Burden, Specific dietary requirements

The presence of side effects is also related with the non adherence of the treatment. The side effects are very prominent due to the pill burden and increase drug regimen due to (HAART). As a result of side effects patient feel worried about their health and they cease their treatment and consult witchcrafts and start traditional herbal medicines. This problem arises if patient are unaware completely about the side effects of the treatment, one reason is also that patients are not well informed by the health staff about the potential side effects of ART. Switching from ART to traditional medicines has fatal effects of the patients. Patients cease their ART treatment and after this the virus load becomes high in the patients and worsening the condition of the patients. If patients again start the ART there are chances that first line of ARV drugs may not work due to the resistance in the body. The only options for the patients are to start the second line of treatment. This situation results in increased cost of the treatment and laboratory tests and also leads to the situation of pill burden in the patients. Research in Sub Saharan Africans indicated that in PLWHIV dietary requirements increase but due to the stigma and discrimination that leads to the social exclusion of patients from the society leads to malnutrition and ultimately causes non adherence to the treatment.

4.3.2 Provider patient relationships, Treatment Monitoring and support

Poor health literacy is also a barrier in achieving the goal of adherence to the treatment. In Nigeria poor people living in rural areas are health illiterate and as a result their understanding about health issue and communication with health staff is insufficient and ineffective. Patients don't discuss their disease conditions thoroughly with health staff. This insufficient communication leads to poor adherence to the treatment and may initiate undesired health effects for the patients. Studies from Sub Saharan Africa confirmed that there is stigma and discrimination in health facilities. Health staff doesn't treat HIV positive people in a friendly way and even they don't want to talk with them. This condition and negative attitude from health care staff leads to improper and incomplete communication with the patients. The patients after facing this stigma either don't come to the health facility or due to improper administration guideline of dose they stop their treatment which ultimately leads to non adherence with ART.

In sub Saharan Africa evidence has proved that patient retention in health facilities is poor. This results into lifelong complications of the patients and non adherence to ART and high mortality rate.

4.4 Structural related factors

Structural factors include Health system factors, user fees, waiting time, Stock out, Inadequate Staff, Provider Attitude, Drug supplies, Accessibility to health care.

Long waiting time and frequent trips financially overburdened the patients and causing the non adherence to ART. In Sub Saharan Africa majority of health facilities and ART centers are in urban areas. People who are living in rural areas travel from far places to the health facilities. Then spending a whole day in a queue in health facility is depressing for the patients and they either stop their treatment or they consult with the nearby traditional healer. Shortage of staff in health facility is also associated with the long waiting time. One main reason for long queue in the health facility is the shortage of health staff. The health staff is also overburdened due to the patient load. The underlying reason is the affordability of new staff in terms of salaries. Weak health system in Nigeria is not capable for affording a large number of health staff. Negative attitude and stigma exists in health facility in Nigeria that discourages the patient to continue their treatment that leads to non adherence with the treatment by the patient. Supply chain management issue of ARVs in Nigeria has greatly influenced the ART and people lost their trust on Government due to their mismanagement of arranging ARVs. The major barrier in adherence is user fee and accessibility. In Nigeria ART is subsidized but still patients are forced to bear the cost of laboratory tests as well as the transportation cost. People living in rural area bear more cost as compare to urban areas. The major health facilities are located in cities and the rural population travel from far places to visit the health facilities.

4.5 Interventions

The interventions that are discussed in this section are patient education and counseling, Modified DOT therapy, Contingency management strategies, Medication organizers, reducing the pill burden, visual medical schedules, reminder devices, home based care and task shifting.

4.5.1 Patient education and counseling can be done through educational program. In Nigeria most of population is living in rural areas with poor health literacy. This intervention targets the poor population living in rural

areas. Through this intervention patients can be well informed about ART treatment and associated side effects.

4.5.2 Modified DOT therapy is the intervention that can be best implemented in health facility that is retaining the HIV patients. Most important benefit of this intervention is to change the casual attitude of patients about taking dose. Adherence habits are developed through this intervention.

4.5.3 Contingency management strategies, Adherence may be increased by motivating the people through monetary reward but sustainability of this intervention is also challenge.

4.5.4 Medication Organizers can be used to organize the weekly dose of the ART. Chances of forgetfulness decreases due to the use of medication organizers

4.5.5 Reducing the pill burden is an important factor in improving the adherence with treatment. Pill burden and forgetfulness are associated with each other. Studies have revealed that reducing the dose of ART provides an ease to the patient to take medicine on time and adherence with the dose schedule.

4.5.6 Visual Medication Schedules are good source to minimize the problems of forgetfulness and dose frequency errors by the patients. Visual schedules are helpful where electronic adherence devices are not available and they can be used alternatively.

4.5.7 Reminder Devices, Adherence and reminder devices such as alarm devices, pill boxes can be integrated into daily routine for adherence. Reminder text on mobile phone is a strategy that can be implemented well in Nigerian population due to fact that majority of population is using mobile phone despite of the high poverty level.

4.5.8 Home base care, HBC is a feasible intervention for poor people with accessibility problems. Services are provided at door steps. In Uganda this intervention is working successfully.

4.5.9 Task shifting, is used to overcome the shortage of health staff. Through task shifting integration of ART services into HBC services can be applicable and feasible in Nigeria. Possible challenges may be lack of policy support and ongoing refresher trainings. Research has proved that task shifting has good outcome including the adherence with ART.

4.5.10 ART Adherence protocols in Nigeria

Nigeria has well developed updated ART treatment protocols as they have updated in 2016 with the collaboration of WHO. Due to infrastructure problems and weak health system in Nigeria the outcomes of the National policy of HIV/AIDs are practically insufficient. According to WHO out of pocket payments should be avoided at health facility but practically patients are still bearing the cost of diagnostic tests. Retention of patients in health facility is also a problem. According to the studies majority of ART patients lost after first visit to health facility and only few is retained in Nigeria. According to WHO guideline text messaging service as an intervention to ART should be provided as part of a total ART package. Practically this strategy is not fully implemented in Nigeria. Despite of having full awareness about interventions still implementation of intervention strategy is a challenge in Nigeria. The reasons are weak infrastructure, less financial resources and socio economic problems of population.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study map different factors influencing adherence of the patients with ART in Nigeria at different levels. (Individual, community, treatment and structure related).

The study identified that only focusing on individual level factors are insufficient to address the non adherence. In Sub Saharan Africa community level and structural factors are most important. In Sub Saharan Africa social and structural adherence barriers operates beyond the individual level and treatment factors due to the influence of social beliefs and practices in society. The social and structural barriers that are identified in the study are Stigma, Disclosure patterns, Social support, Food Insecurity, Cost of Treatment, Health system factors, user fees, waiting time, Stock out, Inadequate Staff, Provider Attitude, Drug supplies, Accessibility to health care.

The interventions that are mention in study that are use of reminder devices, Task shifting and use of HBC services are feasible but their implementation may face challenges including unsupportive policies and financial constraints at government level.

5.2 Recommendations

- Government of Nigeria should cooperate with ministries and potential stakeholders to address Infrastructure related issues (Inadequate staff, drug supplies, user fee and accessibility of healthcare) to overcome the problems of PLWHIV.
- Steps should be taken to empower the patients so that they take their medicines in public places where normally they hide the medicines due to cultural norms. Moreover Ministry of Health should launch and intensify the health education campaigns to address the problem of Stigma and discrimination.
- The health care providers should be given clear instruction for the counseling of HIV patients and prescribing the simplified ART regimen to reduce the pill burden and promote the adherence of the patient with ART.

- HIV/Aids services should also include the treatment of depression, counseling regarding use of harmful substances and beliefs that luck determine the health outcomes.
- Different electronic reminder devices such as pillboxes, alarm systems, watches should be manufacture in bulk and supplied to the health facilities so they can be distributed into the patients.
- The Ministry of Health of Nigeria should collaborate with the mobile phone companies to streamline the use of mobile phone texting so that this system can be used to solve the problem of forgetfulness. Mobile phone ownership and use is high in Nigeria considering the scenario this is a feasible approach to address the problem of forgetfulness of dose by the PLWHIV.
- Ministry of health Nigeria should also launch guideline for HBC program so that the ART services can be integrated into HBC to address inaccessibility of the services in poor population.
- Ministry of Health should also strengthen the synergy in ART services, HBC and staff sharing to reduce the cost for services.
- Ministry of health should also conduct research on the effectiveness and concomitant use of traditional medicines with antiretroviral drugs. Counseling should be provided to the patients who use traditional medicines due to weak and superstitious belief or unavailability of ARVs. This may reduce the use of traditional medicines. Documentation of these finding should be properly communicated to health workers so they can be effectively communicated to the patients.

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