PATIENT RELATED PREDICTORS OF VIROLOGICAL NON- SUPPRESSION AMONG HIV INFECTED INDIVIDUALS ON ANTIRETROVIRAL THERAPY; A CASE STUDY OF ALEBTONG HEALTH CENTRE IV, ALEBTONG DISTRICT.

ODUNG TONNY

(MBChB)

REG. NO: BU/GS16/MPH/16

A DISSERTATION SUBMITTED TO DIRECTORATE OF GRADUATE STUDIES, RESEARCH AND INOVATIONS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE MASTER OF PUBLIC HEALTH DEGREE OF BUSITEMA UNIVERSITY

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Tonny Odung

(MBChB)

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A dissertation submitted to Directorate of Graduate Studies, Research and Innovations in partial fulfilment of the requirements for the award of the Master of Public Health Degree of Busitema University

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Declaration

I **Tonny Odung**, declare that this research dissertation is my original work, except where due acknowledgement has been made. I declare that this work has never been submitted to this University or to any other institution for funding/ for partial fulfillment for any award.

Registration number………………...……Signature…………………. Date……………………

Supervisors' Approval

This dissertation is submitted for the award of Masters of public health of Busitema University, with our   approval as the academic supervisor(s), in partial fulfilment of the requirements for the award Master of Public Health Degree of Busitema University.

1). Jayne Byakika-Tusiime, B Pharm, MSc, PhD (Supervisor)
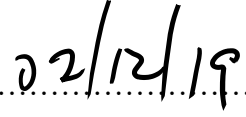
Associate Professor of Epidemiology

School of Health Sciences, Department of Public Health

Soroti University

P O BOX 211 Soroti

Uganda

Signature……………………. Date…02/12/19……..

2). Dr. Mpagi Joseph, PhD (Supervisor)

Senior Lecturer,

Department of Microbiology and Immunology, Faculty of Health Sciences

Busitema University

P O BOX 236 Tororo

Uganda

Signature…………………………...Date…………………………………

Dedication

This work is dedicated to my supervisors: Associate Professor Jayne Byakika –Tusiime and Dr. Mpagi Joseph, who have dedicated their time amidst busy work schedules to guide and supervise me throughout the entire dissertation process. May the almighty God reward you abundantly. Further dedication goes to my family members, Ms. Sarah Odung, Odung Arnold, Odung Chris, Auma Marion, and Okello Norbert, not forgetting my sister, Santa who encouraged me tirelessly throughout the two-year study period. Lastly, to my work-mates and my parents for all forms of support during the study period.

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Acronyms and Abbreviations

AIDS	Acquired Immunodeficiency Syndromes
ART	Anti-retroviral Treatment
ARV	Anti-retroviral
CD4	Cluster of Differentiation 4
CPHL	Central Public Health Laboratory
Cpm	Cubic Cells per Microliter
DART	Development of Antiretroviral Treatment
DBS	Dry Blood Spot
dVL	Detectable Viral Load
EFV	Efavirenz
EID	Early Infant Diagnosis
FDC	Fixed Dose Combination
HIV	Human Immunodeficiency Virus
IAC	Intensive Adherence Counselling
IDI	Infectious Disease Institute
ILI	Influenza Like Illness
TASO	The AIDS Support Organization
TB	Tuberculosis
UNAIDS	United Nations Program on HIV/AIDS
VCY	Viremia copy-years
VL	Viral Load
WHO	World Health Organization

Operational Definitions

Virological failure: Refers to a viral load above 1,000 copies/ml based on two consecutive viral load measurement in a 3-month interval, with adherence support following the first viral load test, after at least six months of starting new ART regimen.

Clinical failure: Refers to new or recurrent clinical event indicating severe immunodeficiency after 6 months of effective treatment.

HIV client: Refers to an HIV infected individual in HIV care.

Viral load suppression: Refers to viral load less than 1000 copies/ml of an HIV infected individual who has been on antiretroviral treatment for at least six months.

Viral load non- suppression: Refers to viral load more than 1000 copies/ml of an HIV infected individual who has been on antiretroviral treatment for at least six months with adequate adherence to treatment.

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Abstract

Background:

In Uganda, recent data about viral load non-suppression among HIV infected individuals on antiretroviral treatment is relatively scarce and this complicates the design of effective HIV/AIDS mitigation strategies. The purpose of this study was to determine the proportion and predictors of viral load non-suppression among HIV patients on ART in Alebtong district, Northern Uganda.

Methods:

A retrospective cohort analysis of 323 HIV positive patient records from July 2016 to June 2017 was conducted at Alebtong Health Center IV. Data was collected using a data abstraction tool and was summarized using descriptive statistics. A chi square test was done to assess the association between viral load suppression status and other covariates. Multivariable logistic regression was used to determine the predictors of virological non-suppression. The data were analyzed using STATA version 14 software.

Results:

Of the 323 patient records reviewed,159(49.2%) were males and 164 (50.8%) females.250 (77.7%) were between 13 to 49 years, 42 (13.2%) were 13 years and below, 30(9.3%) were 50 years and above. About 53% (n=170) had non-suppressed viral load, 66% (n=213) had >95% adherence to ART. Late initiation (>3months) on ART increased the odds of poor viral load suppression (AOR 57.0, 95% CI 12.27-264.97). Poor adherence (≤95%) to ART was a strong predictor of viral load non-suppression (AOR 37.4, 95% CI 10.1-137.9). Weight above 20 kg was significantly protective against viral load non-suppression (AOR 0.008, 95% CI 0.001-0.068).

Conclusion:

Only 47.4% of patients receiving ART at Alebtong HC IV achieved viral load suppression in the period July 2016 to June 2017. This is about half way the 90-90-90 global HIV treatment target of 2020. Late initiation on ART and poor adherence to ART are predictors of viral load non suppression while a weight above 20kg at ART initiation is protective against viral load non suppression.

Recommendations:

HIV patients in Alebtong should be initiated onto ART at the earliest possible time regardless of WHO clinical staging or CD4 count up on confirmation and should be supported to maintain good adherence to minimize viral load non-suppression in this population.

1.0 Chapter One: Introduction

1.1 Background

HIV pandemic still remains a global challenge. It is estimated that there are 36.7 million people living with HIV worldwide with 2.1 million new infections in 2016 (UNAIDS, 2017c). It is estimated that by 2016 in sub Saharan Africa, 19.4 million people were living with HIV AIDS, 790,000 new infections and 420,000 people had died of HIV (UNAIDS, 2017c). In Uganda 1.4 million people are living with HIV, with 67% on antiretroviral treatment (UNAIDS, 2017c).

In 2014, the Joint United Nations Program on HIV/AIDS (UNAIDS) and other partners launched the 90–90–90 targets; with the mission to diagnose 90% of all HIV-positive persons, provide antiretroviral therapy (ART) for 90% of those diagnosed and achieve viral suppression for 90% of those on ART by 2020 (UNAIDS, 2014).

Between the years 2013 and 2015, the number of people living with HIV on antiretroviral therapy increased to 17 million from 15 million (UNAIDS, 2017b). Since the first global treatment target was set in 2003, annual AIDS-related deaths have decreased by 43% (UNAIDS, 2017b).

Uganda has updated the WHO HIV treatment guidelines (2016) for the care and treatment of HIV infected patients which recommends; all patients diagnosed with HIV should be started on ART immediately. In Uganda, 67% of HIV infected individuals were on ART in 2017 (UNAIDS, 2017c).

WHO recommends that ART should be initiated among all adults with HIV regardless of WHO clinical stage and at any CD4 count. As a priority, ART should be initiated among all adults with severe or advanced HIV clinical (WHO, 2015).

ART should give a fall in viral load of 30-100 folds within six weeks, with the viral load falling below the limit of detection within four to six months. When one or more of the medicines begins to fail, usually due to poor adherence, the virus will start to reproduce again, leading to a rise in the viral load, which happens at the expense of the body's immune system. This failure needs to be detected early so that clients can be switched to a second-line treatment.(Bulage et al., 2017).

WHO recommends routine viral load monitoring (every 6-12 months) to enable treatment failure to be detected earlier and clinical decision taken promptly (MOH, 2015a). It is expected that a

patient who has been on ART for more than 6 months and is responding to ART should have viral suppression (VL <1000 copies/ ml) at 6 months post initiation.

According to MOH, guidelines, viral load (VL) test in adults should be done at six months after initiating ART and thereafter, annually if it is suppressed. While in children and adolescents the first viral load test should be done 6 months after initiation and thereafter, every after 6 months if viral load is suppressed (MOH, 2016). Viral load suppression among adult HIV infected populations on antiretroviral treatment in Uganda as of 2017 was recorded as 59.6% (UNAIDS, 2017c).

Adherence to ART monitoring is an integral part of HIV care and treatment. WHO recommends pharmacy refill records and self-reporting over pill counts as adherence monitoring strategy. A recent validation study to assess the superiority of various adherence monitoring approaches found pharmacy refill records to be more reliable than other adherence monitoring strategies (Leigh F. Johnson1* & Andrew Boulle1, 2017).

However, in practice, HIV patients on ART are often monitored for adherence through self-reporting. This heavily depends on the level of sincerity of the HIV patient reporting, and may be misleading to the attending clinician.

In Alebtong district, viral load suppression among HIV patients on antiretroviral treatment as of February 2018 was 53.1 %. (DHIS2 un- published), yet not every client on treatment has their viral load monitored in time according to MOH-guidelines.

Because of regular drug stock outs and other logistics, newly diagnosed HIV patients are not often initiated on treatment immediately as recommended by MOH guidelines. For e.g. in 2017, there was stock outs of TDF/3TC combination in the month of April, and May (Health facility Records) at Alebtong HC1V.

Viral load monitoring in most ART accredited sites still has a number of challenges ranging from inadequate skills by health workers on sample collection, storage and transportation including correct filling of spacemen forms. This has sometime led to sample rejection at the Central Public Health Laboratory (CPHL). When samples are rejected, monitoring patients on care is affected, a situation likely to impact on late decision making by clinicians involved in HIV care. We did

not know the predictors of non-suppression of viral load among the HIV infected population on antiretroviral treatment in Alebtong.

This study was to determine patient related predictors of viral load non- suppression among HIV infected individuals in Alebtong in order to guide the design of an appropriate intervention to improve the level of viral load suppression in this population.

1.2 Problem Statement

In Uganda, viral load suppression still remains very low among HIV infected individuals at 59.6% (15-64 years) and 39.3%, (0-14 years) despite better achievements in HIV client testing and enrolment into care (UNAIDS, 2017c).

District Health Information System 2 (DHIS2) dashboard- MOH, February 2018(un-published) showed that only 53.1% of clients on ART in Alebtong HCIV are suppressing viral load in comparison with a national figure of 59.6% (15-64 years) and 39.3%, (0-14 years) respectively. Through support from USAID, Alebtong district in 2016, scaled up HIV testing and client initiation to treatment. This showed a remarkable improvement in HIV testing from 55% in 2016 to 97% in 2017 and client initiation on treatment from 61% to 87% in 2017.

In the same year, the ART team strengthened adherence monitoring by attaching linkage facilitators to every five (5) HIV infected individuals on treatment for easy follow up and support. This was supported by strengthening the hub system that ensured viral load samples were drawn and submitted to Central Public Health Laboratory (CPHL) for every eligible client on ART. Despite these interventions, the viral load suppression has remained low compared to disproportionate gains in the other components of the 90-90-90 goals.

Several studies done mostly in urban setting have shown significant association between poor adherence, time of initiation and duration on ART with viral load suppression levels. However, little is known whether similar findings could apply in a predominantly rural population like in Alebtong District.

Since the level of viral load suppression was much lower in Alebtong compared to national figure, our study investigated the predictors for the observed findings in Alebtong in line with 90-90-90 targets.

1.3 Study Objectives

1.3.1 General Objective

To determine the patient related predictors of viral load non-suppression among HIV infected individuals on antiretroviral therapy attending Alebtong HCIV in order to improve patients' treatment outcomes and quality of life.

1.3.2 Specific Objectives

1) To establish the proportion of HIV infected individuals on ART for at least one year attending HIV care at Alebtong HCIV that are virologically non-suppressed.

2) To determine the patient related predictors of virological non-suppression among HIV infected individuals attending HIV care at Alebtong HCIV.

1.4 Research Questions

1) What proportion of HIV infected individuals on ART for at least one year attending HIV care at Alebtong HCIV are virologically non-suppressed?

2) What are the factors associated with poor virological suppression among HIV infected individuals attending HIV care at Alebtong HCIV?

1.5 Justification of the Study

This study identified patient related predictors of virological non-suppression among HIV patients on ART in Alebtong District. The study will guide HIV care and treatment implementation approaches, both to the ART treatment team, district, MOH and other implementing partners involved in HIV care. The recommendations from this study will guide HIV care strategy and policy formulations for viral load monitoring among HIV patients enrolled in care both nationally and internationally.

1.6 Scope of the Study

The study was conducted in Alebtong HC IV which is the largest health facility and busiest ART site in Alebtong district located in Northern Uganda. Alebtong district has a catchment population of 227,530 (2014 national census). The district has an HIV prevalence of 5.1 % (DHIS2 data base) with 3765 HIV clients on ART. Alebtong HCIV alone has total of 2600 HIV clients on ART.

1.7 Conceptual Frame work

Socio-demographic factors:

- Race
- **Age**
- **Sex**

Viral load suppression

Clinical factors:

- **Baseline CD4 counts**
- **Opportunistic infections (O. Is)**
- **Nutritional status; (MUAC)**
- **Adherence to ART**
- **Duration on ART**
- **Weight at initiation**
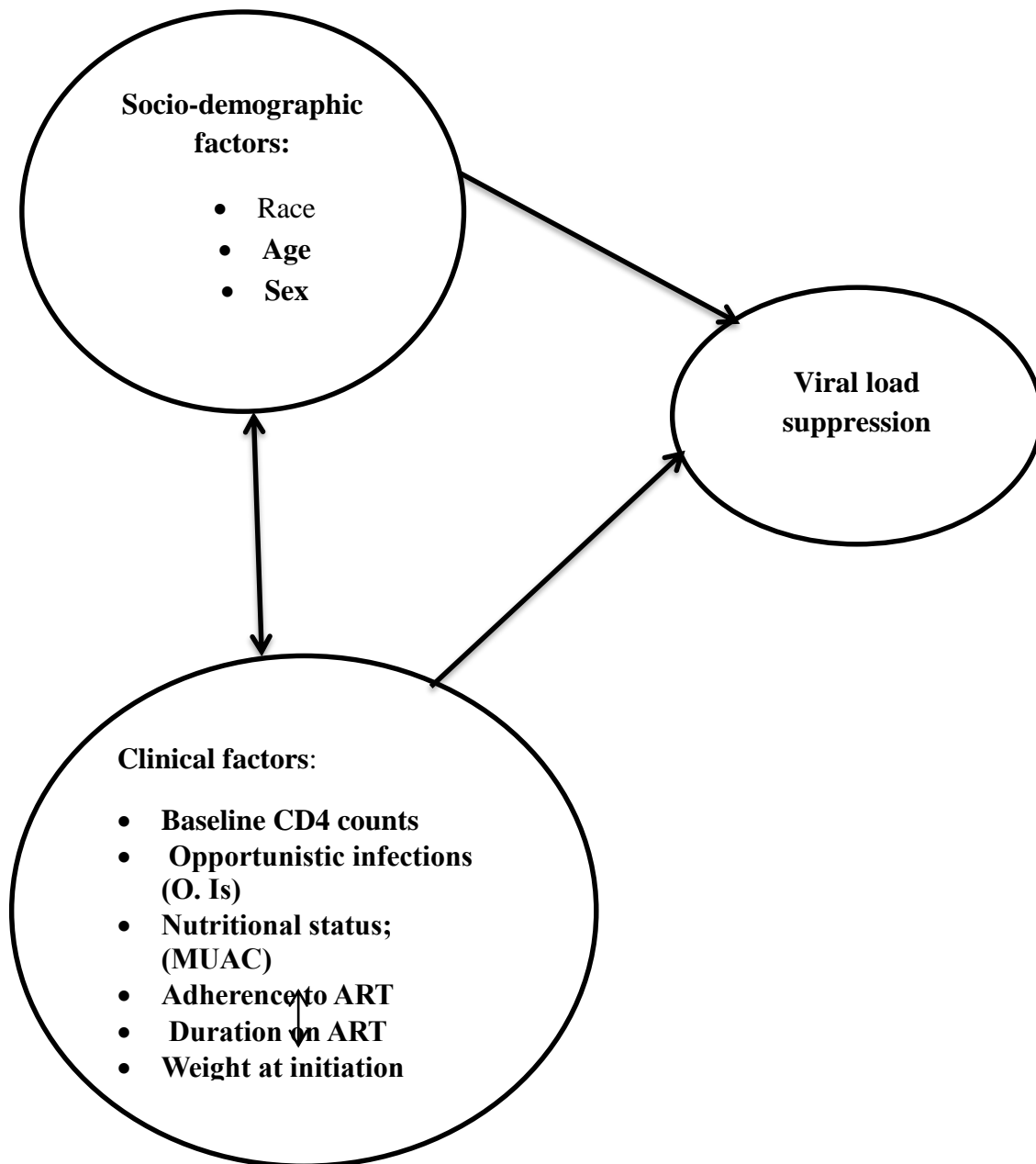
Narrative of Conceptual Frame work

In this conceptual framework it can be shown that virological outcome depends on a number of independent factors which are interrelated. Adherence is closely linked to improvement in body mass index (BMI) and immunological and virological status. When HIV positive client adheres to ART, immunity improves by adequately suppressing the viral load. This leads to reduced frequency of opportunistic infections. Less frequent hospitalization due to opportunistic infections means improved appetite hence gain in weight, resulting in improved BMI.

HIV patients with good adherence often maintain adequate plasma concentrations of the antiretroviral medicine. This helps to prevent HIV virus from mutating hence results in good suppression levels that further result in improved immune status.

Age has been shown to affect viral load outcome. Young people tend to enroll in care much later, hence may result in poor viral load suppression.

Females have better health seeking behavior, and as such they enroll early in care compared to males. This results in a good virological outcome.

Race has been associated with virological outcomes; with blacks having poor virological outcome compared to whites. This could be attributed to differences in health seeking behavior.

Episodes of different OIs such as TB, influenza and many others have been shown to affect the viral load suppression status. This is because of increased pill burden hence an HIV patient with comorbidity may have poor adherence to medication.

ARVs are better tolerated with adequate food intake. Patients who are malnourished are more likely not to adhere to treatment owing to various side effects hence affecting viral load outcome.

Patients who have taken long on ART have better outcome compared to those who have been on ART for shorter time. This is also related to the time of initiation on ART. Better outcome is also closely linked to good adherence. When ARVs are out of stock for some-time, patients go off treatment hence contributing to poor adherence leading to viral load non-suppression and resistance to the current ARV regiment. This is also closely associated to inadequate human

resources managing ART clinics, often leading to postponements of planned schedules for client-clinicians interface or even drug refills resulting in poor adherence and low viral load suppression.

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