Retention on Anti-Retroviral Treatment Care and Associated Factors among Adult Anti-Retroviral Treatment Patients of Public Health Facilities in Hadiya Zone, Ethiopia

By Dawit Sullamo (Bsc)

A Research Thesis Submitted to Jimma University College of Health Sciences, Department of Health Economics, Management, and Policy in Partial Fulfillment for the Requirement for Master of Public Health in Health Services Management (MPH-HSM)

June, 2015

Jimma, Ethiopia

Retention on Anti-Retroviral Treatment Care and Associated Factors among Adult Anti-Retroviral Treatment Patients of Public Health Facilities in Hadiya Zone, Ethiopia

By Dawit Sullamo (Bsc)

Advisors: 1. Elias Ali Yesuf (Assistant Professor, MD, MPH)

2. Tesfamichael Alaro (BSC, MPH)

June, 2015

Jimma, Ethiopia

Abstract

***Introduction**: Patient retention on ART care is directly correlated with positive health outcomes for both individual patient and public health. In Hadiya zone different strategies are tried to improve retention on ART care. But status of retention on ART care and affecting factors of retention are not studied in the zone.*

***Objective**: To assess status of retention on ART care and affecting factors among adult anti-retroviral treatment (ART) patients in public health facility of Hadiya zone, Ethiopia.*

***Methods**: A cross-sectional study was conducted in Hadiya zone using secondary data. Total sample size of 311 was proportionally allocated to 8 health facilities having more than20 alive ART cases. Participants were selected by systematic sampling method. We used adapted check list, and descriptive statistics and logistic regression analysis were employed to identify factors associated with retention on ART care. Odds ratio and 95% CI was used to declare significantly associated factor with retention on ART care.*

***Result**: The over all retention on ART care was 75.7%. Being female, secondary or above educational status, disclosure of self HIV/AIDS status to others, having les addiction level in alcohol/tobacco and history of drug regimen change have significant positive relation with retention on ART care in multivariate analysis at $p< 0.05$. Also for a unit increase in duration of month on ART, log odds of retention on ART care decreases by 0.80 times with 95% CI; (0.67, 0.96) and $p<0.05$.*

***Conclusion**: - This study has identified comparatively lower level of retention on ART care from finding of other Ethiopian and African ART Clinics. Ongoing counseling on importance of retention on care, disclosure of self sero-positivity status to family member, reducing the abuse of alcohol/tobacco is recommended.*

Key word: - Adult patient, ART, Hadiya zone, Retention.

Acknowledgement

First of all, I give my praise to the Almighty God, Who made everything possible.

My sincere gratitude goes to my advisors Dr. Elias Ali and Mr. Tesfamichael Alaro for their fruitful assistance by giving me comments and relevant guidance in this research.

I would like to extend my heartfelt thanks to Jimma University, Collage of Health science, and Department of Health Economics, Management and Policy for the opportunity and support for this research papers. I would like to acknowledge the public health facilities and woreda health office in Hadiya zone and Hadiya Zone Health Department for their cooperation.

At last but not least, I would like to extend my heartfelt gratitude for my friends and family for their support by advice.

Table of Content

Abbreviation and Acrimonies

AIDS- Acquired Immune disease syndrome.

AOR- Adjusted Odds Ratio

ART- Anti Retroviral Therapy

ARVs – Anti-Retro-Virals

CD4+- White blood cell types that are the prime targets of HIV

CI- Confidence Interval

EC- Ethiopian Calendar

HAART- Highly Active Antiretroviral Therapy

HC- Health Centre

LTFU- Lost To Follow Up

NEMH- Negist Eleni Memorial Hospital

OPD- Out Patient Department

OR- Odds Ratio

PLWH- People Living With HIV

SNNPR- South Nation Nationality People Region

SPSS- Statistical Package for Social Science

WHO- World Health Organization

List of Tables

List of Figures

Chapter 1: Introduction

1.1. Background Information

In resource limited setting, retention is usually defined as ending at some interval of time after a scheduled appointment (1). But the actual interval of time is not clearly established and scholars use different time interval to define it. For the patients who have started the Anti-retroviral treatment (ART), scholars defined retention on ART care as patients identified to be alive and receiving highly active antiretroviral treatment at the end of a follow-up period (41). A variety of methods of measuring retention are used by scholars. Five most commonly used methods are missed visits, appointment adherence, Visit constancy, gap in care and HRSA HAB performance measure (70). But there is no gold standard measure and each of them has their own advantage and limitations. Among the most widely used retention measures in the literatures, the missed visit counts measure of ‘‘no show’’ visits and can be used as both a dichotomous and as a count measure (4, 71).

Patient retention in ART care is directly correlated with positive health outcomes for both individual people living with HIV (PLWH) and public health interventions. For an individual patients, it facilitate treatment adherence and clinical monitoring, which consequently lead to improved viral load suppression, reduced occurrence of opportunistic infection (OIs), decreased odds of antiretroviral drug resistance, and reductions in mortality (2, 3, 4, 5). Patients with regular clinic visits are also more likely to receive comprehensive health care including: preventive care (such as risk reduction counseling and mental health referral), and on time management of opportunistic infection (5, 6, 7). Furthermore, those Patients who are engaged in regular medical care and become virologically suppressed are also less likely to transmit the virus to others, and this establishes retention as a key strategy for HIV prevention (6, 7, 13). Antiretroviral therapy (ART) also has led to substantial increases in life expectancy and quality of life for HIV infected Persons (10, 11, 12).

Due to these effects on individual and public health, retention in HIV/AIDS treatment care has been cognized as a crucial step in patient care and public intervention. So HIV Medicine

Association guidelines for primary care of HIV infection recommended giving emphasis on the importance of adherence to care rather than focusing solely on adherence to medication (38). So retention in care is taken as a key step in the HIV treatment cascade, the aim of which is to ensure that all individuals living with HIV are successfully treated (8).

In Ethiopia task shifting and decentralization of the service to increasing numbers of both health centers and hospitals was done since August 2006(16). Similarly in Hadiya zone, free ART service was started in 2008 in Negist Elene Memorial Hospital (NEMH) with the small number of cases (18).

1.2. Statement of the problem

Study showed that one third to two thirds of persons with known HIV infection are not following ART outpatient care regularly (14). In Sub Saharan Africa 94% of PLWH are adult aged 15 years and above but only 37% of the total people living with HIV had access to antiretroviral therapy in 2013 (9). Poor retention with limited uptake and difficulties in accessing care remain a serious concern for ART programs in Sub-Saharan Africa (23, 34, 25).

In Sub Saharan Africa, none retention had resulted in treatment discontinuation, raising some of the concern about drug resistance and limiting much of the benefit sought after implementing treatment programs (26, 27). Although research evidences show that patients with clinical AIDS who discontinue ART will likely die within a relatively short time (28), retention of patients in treatment programs has received far less attention perhaps because most large-scale treatment providers have few resources available to track missing patient (23, 29). As a result, much attention has focused on patient day-to-day adherence to antiretroviral medications (29).

None retention results in inadequate adherence to treatment leading to unfavorable health outcomes (high rates of viral load failure, morbidity, mortality, drug resistances, risk of transmission) and reduced cost effectiveness (increased costs and lower productivity) (34, 35, 36). Lack of adherence, which might be due to poor retention on ART care, causes suboptimal viral suppression that may result in higher risk of developing drug resistance, transmission of such drug resistance virus and increasing treatment costs (2, 3, 30, 31, 32 33).

Beyond the effects on individual health, retention also has important consequences for the public health as it plays a pivotal role in prevention of HIV transmission and secondary HIV infections. This importance will be demonstrated by viral load suppression, (3, 33) and reduced risk of transmission of HIV to others (35, 36, 37) which are achieved more commonly among those patients with better retention.

In Ethiopia number of intervention has been undertaken on HIV/AIDS program like; fee-based ART program in 2003 until it has been replaced by free ART program since early 2005 (15). And task shifting and decentralization of the service to increasing numbers of both health centers and hospitals has been intervened since August 2006(16). Although these trials had been undertaken, nearly two third of the patients who have ever started ART remain in care at the end of June 2011, showing challenges of poor retention on the available care (17). And little is known on factors affecting on ART care in this decentralized service. Similarly, after starting a free ART service in 2008, different strategies has been tried to improve ART care services, including multi discipline team meeting and catchment area meeting in health facilities in Hadiya zone. But affecting factors of retention are not studied in Hadiya zone (18).

Therefore, the aim of this study is, to assess status of retention on ART care and affecting factors among adult ART patients in public health facility of Hadiya zone, Ethiopia.

1.3. Significance of the Study

Studying retention on ART care in adult HIV/AIDS patients of public health facility helps to assess status of retention on ART care and affecting factors. So, findings from this study helps evidence based intervention to improve retention to ART by addressing factors affecting retention on ART care. Policy makers, program managers and health facilities may use the result to develop or improve their program and service on ART retention. It also will be used as references for researches in the similar topics.

Chapter 2: Literature Review

2.1. Retention on ART Care

Chronic HIV/AIDS care for on ART patient is clinical care and support services include providing ART, follow-up services for people on ART, treating opportunistic infections, palliative care like pain management and nutritional rehabilitation. WHO report showed that at the end of 2013, an estimated 37% of all adult people living with HIV in the Africa Region were receiving ART (9).

WHO data from 23 countries indicate that average retention for people on ART decrease over time; (86% at 12 months to 72% at 60 months) (56). The study in Kenya reported a total retention on ART care of 79% (39). Other study conducted in Malawi, showed that the 95% of the cases were retained on ART care (47). A systematic review of cohorts in sub-Saharan Africa estimated program attrition (deaths and LTFU) to be 22.6% at 12 months, 25.0% at 24 months, and 29.5% at 36 months (24)

From the study in Ethiopia, out of all patients who started ART, 74% were retained on ART care in 12^{th} month (23). Other study in North-West Ethiopia identified lost of the patient with unknown out come as a main reason for attrition from ART care (for 31.4% of participants) (40). The overall retention on ART care of 73.3% is reported from study in Mizan-Aman General Hospital in the SNNPR of Ethiopia(63), and other study in Jimma University Specialized Hospital reported 13.6% of none retention on ART care (54).

2.2. Socio-Demographic Characteristics

Study done in seven African countries showed that, rate of none retention was high in the youngest when compared with the oldest age group (42). The study that was done in young adult, in Kampala, capital of Uganda, has showed that significant relationships between regular ART care follow up visit and elder age group of the participant (20–24 years) (43). In the Study conducted in Urban African ART clinics, changing resident area

was reason for 73% of participant none retention on care and male sex and primary or less than primary educational status were more associated with it than their counter category (39). In Zambia secondary and above educational level was also more associated with retention than primary or less educational level (19). Study also has revealed that rural residences were more likely to be regular follow up utilizes compared to those residing in urban areas (43).

In the study that was done in University of Alabama at Birmingham (UAB) 1917 bad retention in the first 2 years was associated with substance abuse (21). Study in Jimma Specialized Hospital showed that patients who drink alcohol most of the time were 3.57 times none retained in care than never alcohol users (54).

Study in Nigeria showed that patients who had disclosed their status to their family were more retained on care than none disclosed patients (65). The qualitative study that was done in Felege Hiwot hospital and Gonder university hospital identified- having social support and disclosure of patients' HIV status to their friends, family and neighbors- as a facilitator for appointment adherence (54). Disclosed patients might get social supports and they may not fear the stigma when they come and take drugs from the health facilities. In the study done in Kenya, a targeted program providing social support for youths found retention was better at the intervention clinic with 70% remaining in active care versus 55% at the general site for the same age group (51). Even though qualitative interviews in South Africa found stigma did not represent a big challenge to retention (52) a study from Malawi, showed that stigma led to none-retention in 25% of on-ART patients (53).

2.3. Clinical Characteristics

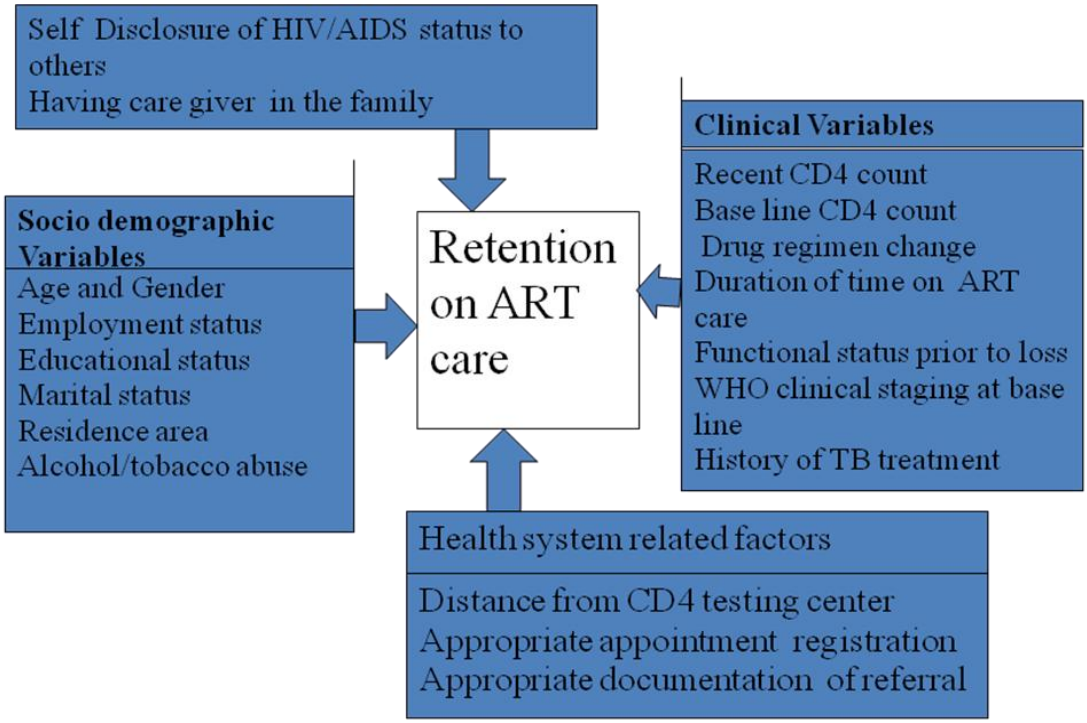
Base line CD4+ cell count was seen as factor for poor retention in researches of resource limited setting but this study assessed the effect of resent CD4+ cell count at the retention of patient. In the study that was done in University of Alabama at Birmingham (UAB) 1917 worse retention in the first 2 years was associated with higher baseline CD4 count (21). The study done in Nigeria identified that CD4+ cell count is affecting the retention on ART in a manner of changing

through time (44). The study that was done in Mizan Aman General Hospital identified the higher risk of non retention on ART care in patients with baseline CD4 cell counts <200 cells/mm^3 (with HR 1.7) compared to baseline CD4 counts ≥200 cells/mm^3 (63). The above study has also identified drug regimen change had inverse association with retention on ART care and toxicity was responsible for majority (50%) of drug change (63). Study in Uganda also revealed that cases of WHO clinical stages III were 1.94 times more likely to be regular utilizes compared to those in stage I and cases in category of WHO HIV clinical stage IV were 2.22 times more likely to be regular utilizes compared to those in stage I (43). Study that was done in Jimma Specialized Hospital showed that bedridden patients were 7.44 times none retained in care than normal (working) patients (54).

2.4. Health System Related

The study conducted in 55 health facilities in Ethiopia also found that ART retention rates varied considerably among health facilities, ranging from 51% to 85% after 24 months on ART and it showed that there is positive relation between distance from health centers to the nearest ART hospital with CD4 count and patients receiving treatment at these health centers (23).

Conceptual Frame work



Conceptual framework showing the factors affecting the retention on ART care, adapted from different literatures (19, 21, 23, 39, 42, 43, 44, 54, 55, 63)

Fig1. The conceptual framework showing the factors affecting retention on ART care, 2015

Chapter 3: Objectives

General Objective

To assess status of retention on ART care and affecting factors among adult anti-retroviral treatment patients in public health facility of Hadiya zone, Ethiopia.

Specific Objectives

1. To measure proportion of patient retained on ART care in adult ART patients of public health facility of Hadiya zone.
2. To identify factors affecting retention on ART care in adult ART patients of public health facilities of Hadiya zone.

Chapter 4: Methods and Materials

4.1. Study Area and Period

The study was conducted in ART sited public health facilities of Hadiya zone and data collection period was from March 10 to 19, 2015. The zone is found in South Nation Nationalities and Peoples Region (SNNPR). It is located in south west of Ethiopia and northern part of the region, and bordered in North-East with Slite Zone; the Gurage Zone in the North; the Yem Special Woreda in the West, and Kambata Tambaro, Alaba special woreda, Wolaita zones and Oromia region in the South and South-West & Omo river in the West. It is 230 km far away from Addis Ababa, capital of Ethiopia and 194 km from regional city, Hawassa. The zone has 10 woredas and Hosana town administration with the total population of 1,547,846 with female distribution dominance (50.53%). The total number of health institution by type is 61 health centers and 1functional general hospital, Negest Elene memorial hospital (NEMH). NEM hospital and 15 health centers are giving chronic HIV/AIDS care service and they have total of 3,659 ever enrolled in chronic HIV/AIDS care cases and 1993 currently on ART cases in January of 2007 EC (19).

4.2. Study Design

An institution based cross-sectional study was conducted by using quantitative secondary data.

4.3. Population

4.3.1. Source Population

The source populations were all adult PLWH who were registered on ART care in public health facilities of Hadiya Zone.

4.3.2. Study Population

The study populations were adult on ART patients whose registrations were sampled.

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion Criteria

Health facility having more than 20 alive ART patients was included in the study. All adult patients aged 15 or more years and have taken ART for at least 12 month was participated in the study.

4.4.2. Exclusion Criteria

Cases whose registrations lack record of age and ART initiation date were excluded from the study. Females with record of pregnancy in the last visit date and transferred out case were also excluded.

4.5. Variables

Outcome Variable: - Retention on ART care.

Independent variables: -

Socio-demographic variables were age, sex, employment status, marital status, level of education and residence area.

Clinical variables were baseline CD4+ count, recent CD4+ count, WHO clinical staging, functional status, duration of time on ART care and ART drug regimen change.

The facility related variables are distance from the CD4 testing center, appropriate appointment registration, appropriate documentation of referral information. Other variables were having support in the family and self HIV/AIDS status disclosure for others.

4.6. Sample Size Determination and Sampling Technique

4.6.1. Sample Size Determination

Sample was calculated using single population proportion formula; with the following assumptions.

Assumption of 95% Confidence interval, 5% desired precision;

Considering 68.6 % proportion of retention of adult on ART care which was from the study that was done in North-West Ethiopia (40);

$$n = \frac{(z\alpha/2)^2 \times p(1-p)}{d^2}$$

Hence, n- is the minimum sample size required.

Zα/2 – critical value for normal distribution at 95% confidence interval =1.96 (Z value at alpha=0.05).

P= 68.6% proportion of retention on ART care.

d=5% margin of error.

$$\frac{(1.96)^2(0.686)(0.314)}{0.05^2}$$

$$n = 331$$

Since number of adult on ART cases i.e. source population (N) is 1,993 (<10,000) correction formula was used as follows:

$$nf = \frac{n}{1 + n/N}, n = \frac{331}{1 + 331/1993} = 283$$

By adding 10% for incomplete data, it becomes 283 +28 = 311

So the sample size will be 311.

4.6.2. Sampling Technique

All facilities were considered in the sampling technique. The samples size of 311 was proportionally allocated to size of currently on ART registered cases in each ART sited public health facility having more than 20 alive on ART patients (8 health facilities in number). Then systematic sampling method (every 6th registration after selecting 1st sample by lottery method between 1st and 6th registration) was used to identify participant registration in each health facility by using ART registration log book as a sample frame. The registrations were jumped to the next registration if they have out come death or transferred out or female who were pregnant in the last visit.

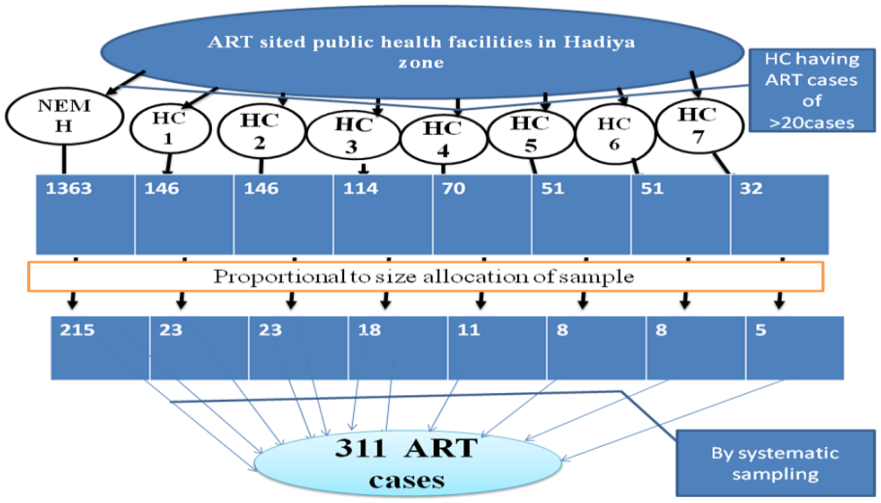


Fig2. Diagrammatic presentation of sampling technique for registrations of adult ART patients, South Ethiopia, March, 2015.

4.7. Data Collection Instrument and Procedure

4.7.1. Data Collection Instrument

The data extraction check list was adapted from similar study. The content of tools was designed to obtain information on socio-demographic characteristics, clinical characteristics and status of retention on ART cares. In the socio-demographic part there were items addressing age, gender, religion, employment status, marital status, level of education, status of disclosure and residence. The clinical characteristics of the patient also contain items addressing baseline CD4+ count, most resent CD4+ count, duration of time on ART, baseline WHO staging and ART regimen and regimen change. The last part of the check list was retention on ART care. Finally the check list was prepared and administered in English language.

4.7.2. Data Collection Procedure

The data was collected by reviewing secondary data from ART registration log book, patient intake form, and ART follow up form by English version instruments. The data was collected for 9 days by five diploma nurses who were working out of assignment health facility, and trained & certified on chronic HIV/AIDS care and have experience in data collection. Two BSc nurses who have been trained & certified on chronic HIV/AIDS care and experienced in supervision was recruited and participated as a supervisor in the study.

4.8. Data Quality Control

Pretesting of the instrument was conducted in 15 (5%) ART follow up patients' registration of Halaba district hospital which is out Hadiya zone. And necessary modifications and correction was undertaken. Data collectors and supervisor was trained for one day by the principal investigator on the study instrument, consent form, how to review and data collection procedures. The data collection process had been supervised in daily basis for completeness and consistency of the filled questionnaires. The data was

coded and entered using Epidata 3.1 to minimize entry errors and then exported to SPSS version 21.0 for analysis. Data was cleaned carefully and missing values was handled.

4.7. **Operational Definition**

A. Retained on ART care:- From reviewed data, adult HIV/AIDS patient who is on ART return to care in initial follow up health facility to get ART care with in the 14 days after last appointment date (20).
B. Non retained on ART care:- From reviewed data, adult HIV/AIDS patient who is on ART doesn't return to care in initial follow up health facility to get ART patient care with in the 14 days after last appointment date and yet not classified in patient clinical outcome as 'dead' or 'transferred-out' (20).
C. ART care: - is clinical care and support services include providing ART, follow-up services for people on ART, treating opportunistic infections, palliative care like pain management and nutritional rehabilitation.
D. Adult patients of HIV/AIDS - patients whose age is 15 or more and who have got clinical care in public health institutions of Hadiya zone (16).
E. CD4 count at ART initiation: - the 1st recorded CD4 count in the patient registration with in 2 months of ART initiation.
F. Base line CD4 count: - 1st record of CD4 count in the patient registration at the time of registration.
G. Resent CD4 count: - the most resent recorded CD4 count in the patient registration before data collection time or attrition from the ART care.
H. Time duration on ART: - registered duration of time the patient has been stayed on ART care.
I. Alcohol/tobacco abuse: - registered substance use by the patient that is registered as +++ in the box of the substance use in patient intake form.

4.8. Data Processing and Analysis

Data was entered in to Epidata to edit and clean for inconsistencies and missing values and analyzed using SPSS version 21.0 statistical software. Different descriptive summaries were used to describe the study variables.

Bivariate logistic regression was employed to identify the candidate variable for multivariate regression. All candidate independent variables in bivariate analysis with $p< 0.25$ entered in to multivariate analysis to assess the strength of association.

Independent variables with p-value less than 0.05 and odds ratio whose 95% CI that didn't include 1 was considered as having significant association with dependent variables and was reported using both p-value and odds ratio in the multivariate analysis part. The fitness of model has been tested by Hosmer and Lemshows model test with $p>0.05$. The finding was presented in text, figures and tables.

4.9. Ethical Consideration

Ethical clearance was obtained from institutional review board of Jimma University, College of Health Science. A formal letter, from college of Health Science of Jimma University was submitted to Hadiya zone Health Department and in response to this Hadiya zone Health Department has written formal letter to all woreda health office in the Zone and NEM hospital. Then permission letter was written to each respective health centers from respective woreda health office. The purpose of the study was explained to the focal health professional in ART clinic to confirm cooperation by availing all necessary registration logbooks & patient intake form in the time of data collection. Confidentiality for collected data is being ensured throughout the research process.

4.10. Dissemination Plan

The finding of this study was presented to JU scientific committee by mock defense; and it will be presented in external defense. Also it will be presented to Hadiya zone Health

Department, and will be distributed to NEMH, respective woreda health office & health centers and other stakeholders working on related program in the study area. The findings also will be presented in different seminars, meetings and workshops. Finally all effort will be made to publish the thesis in a reputable journal.

Chapter 5:- Results

The data was extracted from a total of 305(98% of sample) registrations from March 10 to 19/2015. Six registrations were left due to incomplete data. Two hundred fourteen (70.16%) were from Negist Elene Memorial Hospital and remaining 91(29.83%) from different ART sited health centars in the zone.

5.1. Socio-Demographic Characteristics

From selected cases 192 (63%) of registrations were females. The mean (±SD) age of the study subjects was 33.5 (±8.15) years with a median age of 32 years at ART initiation. The mean (SE) and median staying time duration on ART care was 57 (1.55) and 59.00 months. Regarding the marital status, 213 (69.8%) of the participants were married; and remaining were never married and currently not married (due to reasons like divorced, widow/er and separated). One hundred eighteen (38.6%) of them had primary educational status. Regarding to their religion, majority, 154 (50.5%) of them were protestant followed by Orthodox, 110 (36.1%). One hundred thirty eight (45.3%) of them were unemployed, 34 (11.1%) were not working due to ill health, and remaining were either working full time or part time at registration. One hundred forty nine (48.9%) of participant were urban residents and remaining were from rural kebeles (table 1).

Table1 Distribution of socio demographic characteristics of the study subjects in the Hadiya zone, South Ethiopia, May 2015.

Variables		No.	%
Sex - female		192	63
– male		113	37
Age 16-24		33	10.8
25-34		150	49.2
>35		122	40
Marital status-			
Currently married		213	69.8
Never. Married		32	10.5
Widow/er		27	8.9
Divorced		18	5.9
Separated		15	4.9
Religion- Protestant		154	50.5
Orthodox		110	36.1
Muslim		28	9.2
Other		13	4.2
Educational status :-			
No education		104	34.1
Primary education		118	38.6
Secondary education		63	20.7
Tertiary education		20	6.6
Employment status:-			
Unemployed		138	45.3
Working full time		99	32.5
Working part time		34	11.1
Not working due to ill health		34	11.1
Place of residence	Rural	156	51.1
	Urban	149	48.9

When we see the substance abuse, forty four (14.4%) of the participants were abusing either alcohol or tobacco at registration. From these 70.5% were male.

Table2 Distribution of alcohol/tobacco abuse among ART patients in male and female in Hadiya zone, South Ethiopia, May 2015

Sex	Alcohol/tobacco abuse		
	Yes{No,(%)}	No {No, (%)}	Total {No, (%)}
Female	13 (29.5)	179(68.6)	192(63)
Male	31 (70.5)	82(31.4)	113(37)
Total	44 (100)	261(56)	305(100)

Majority of the respondents, 143 (46.9%), disclosed their status to their partners (wife or husbands), and 41 (13.4%) doesn't disclose their status to any one (table 3).From those, 259 (84.9%) had care giver (treatment supporter) and husband/wife was treatment supporter for majority of them

Table3. Self HIV/AIDS status disclosure and care giver of the study subjects in the Hadiya zone, South Ethiopia, May 2015.

Variables		No.	%
Disclosure	To wife/husband	143	46.9
	To own Daughter/son/parent	52	17
	To brother/s/sister/s	40	13.1
	To other	29	9.5
	Not disclosed at all	41	13.5
Care givers	Husband/wife	128	42
	Brothers/sisters	65	21.3
	Doughtier/son	30	9.8
	Father/mother	11	3.6
	Others	24	8
	No care giver	46	15.1

5.2. Retention on ART Care

From the study subjects 231 (75.7%) were retained on ART care in the time of data collection (fig.3). In the last one year majority of the cases 168 (55.1%) have experienced none retention on the ART care at least once.

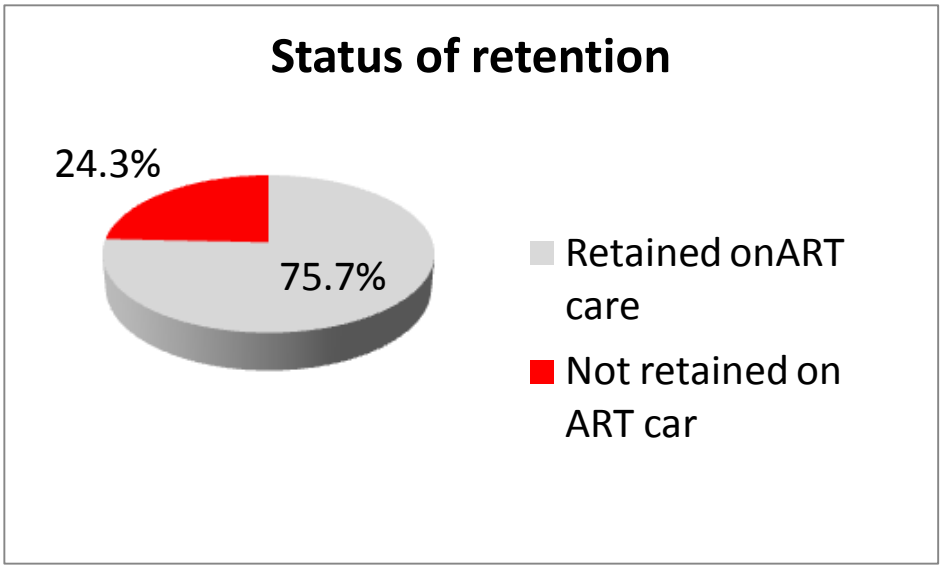


Figure 3 Retention status of ART patients on care in Hadiya zone, South Ethiopia, May, 2015

5.3. Clinical Characteristics

Majority of the patients 129 (42.3%) had started the ART service when their WHO clinical staging was 3 (fig.4).

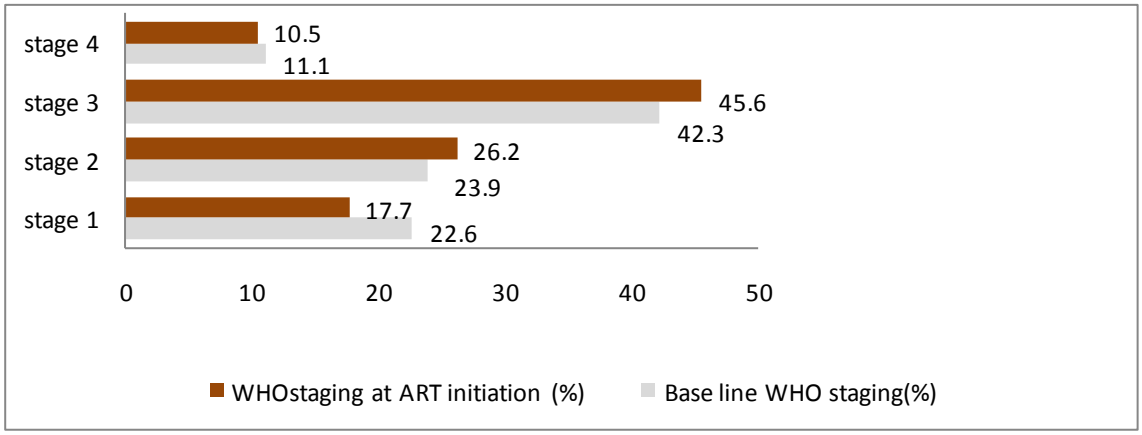


Figure 4. WHO clinical stage at base line and ART initiation in Hadiya zone, South Ethiopia, May, 2015

From those study subjects, 208 (68.2%) and 210 (68.9%) were working at base line and ART initiation time respectively (fig.6).

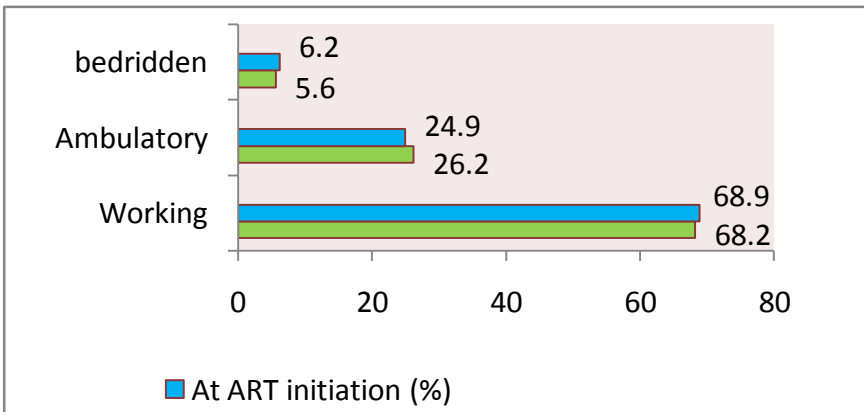


Figure 5 Functional status at base line and ART initiation HIV/AIDS patients in Hadiya zone, South Ethiopia, May 2015

Table 4 History of OIs at base line and in ART initiation in ART patients in Hadiya zone, South Ethiopia, May 2015

OIs	Base line	Last 12 month

	No,	%	No,	%
Pulmonary TB	59	19.3	16	5.2
Bacterial pneumonia	20	6.6	3	1
Zoster	19	6.2	6	2
Thrush (oral or vaginal)	10	3.3	2	0.7
Extra pulmonary TB	3	1	0	0
Cryptococcal Meningitis	2	0.7	0	0
Other	33	10.8	3	1
No registered OIs	159	52.1	275	90.2
Total	305	100	305	100

Pulmonary tuberculosis is more common OI than others both at the time of registration (19.3%) and with in the last 12 month (5.2%) (table 4).

Eighty five (27%) of the cases have history of TB treatment in their life time and 63 (74.1%) of them have completed the treatment. Regimen change was done in 88 (28.9%) of cases during the follow up. The reason for the majority 39(44.5%) of them were Planed program switch of stavudine (d4t); and toxicity and drug out stock were reason for 19.4% and 3.4% of change respectively (table 5).

Table 5 Distribution of clinical characteristics of ART patients in Hadiya zone, South Ethiopia, May, 2015

Variables		Number	Percent
History of Tb treatment	No	220	72.1
	Yes	85	27.9
	Total	305	100.0
Was the TB treatment completed? .	Yes	63	74.1
	No	22	25.9
	Total	85	100
ART regimen change	No	117	71.1
	Yes	88	28.9
	Total	305	100
Reason for regimen change			
	Planed program switch of d4t	39	44.5
	Drug out stock	17	19.4
	Toxicity	3	3.4
	Virological failure	2	2.3
	No recoded reason	27	30.6
	Total	88	100

The mean (SE) and median CD4 count was 245.1(10.15) & 203.00 at base line; 211.56 (7.52) & 201.00 at ART initiation, and 428.82(12.09) & 392.00 in resent one (fig6).

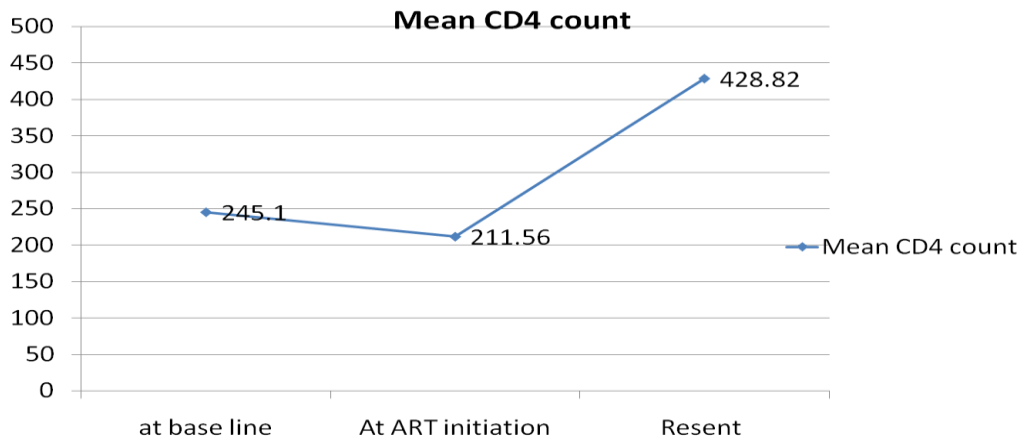


Fig.6 Mean CD4 count of the ART patients in different time, Hadiya zone, South Ethiopia, May, 2015.

5.4. Health System Related Variables

Two hundred seventy (88.5%) of them had documented referral information at the time of registration. Also 251 (82.3%) participants have documented appointment on each visit in the last 12 months, and 21 (6.9%) participants didn't visit the health facility for unknown reason in the last one year (table 6).

Table 6. The patient referral information handling in ART clinic in Hadiya zone, South Ethiopia, May, 2015

Variables		Number	Percent

Referral information	Have documented referral information.	270	88.5
	Have no documented referral information.	35	11.5
	Total	305	100.0
Appointment	Have appointment on each visit.	251	82.3
	No appointment on at lest one visit.	33	10.8
	Doesn't attend any follow up in the last 12 month.	21	6.9
	Total	305	100

5.5. Risk Factors Associated with Retention in ART Care

Age, sex, employment status, educational status, marital status, residence area, recent CD4 count, base line CD4 count, drug regimen change, WHO clinical stage, History of TB treatment, duration of time on ART care, alcohol/tobacco abuse, functional status of the patients prior to loss, self disclosure of HIV/AIDS status to others, having care giver in the family, distance from CD4 testing center, appropriate appointment registration and appropriate documentation of referral were entered in to bivariate analysis to test if the variables are candidate for the multivariate analysis. And sex, age at ART initiation, educational status, marital status, alcohol/tobacco abuse, disclosure of self HIV/AIDS status to others, duration of month on ART, WHO clinical stage at base line, History of TB treatment, documented referral information at initial time and history of the drug regimen change had been selected as candidate for multivariate analysis at the $p=0.25$ in bivariate analysis.

In a multivariate logistic regression sex, educational statuses, self disclosure of HIV/AIDS status, alcohol/tobacco abuse, duration of month on ART and regimen change were identified as independent risk factors for retention on ART care at $p<0.05$.

Female were 4.04 times more likely retained as compared to male with 95% CIs; (2.05, 8.00). Patients with secondary and above educational status were 2.75 times more likely retained when compared to primary or les educational status with 95% CIs; (1.24, 6.10). Patients who disclosed their HIV sero-positivity status were 9.26 times more likely to be retained as compared to patients who doesn't disclose with 95% CI (4.06, 21.12). Patients with the addiction level of les than +++ in either Alcohol or tobacco use were 2.3 times more likely retained than patients with addiction level +++ in alcohol or tobacco. Patients whose drug regimen was changed during the follow-up period were 3.58 times more likely retained than patients with out regimen change with 95% CIs; (1.59, 8.09). For a unit increase in duration of month on ART, log odds of retention on ART care decreases by 0.8 times with 95% CI; (0.67, 0.96).

Table 7 Factors affecting retention on ART care among HIV patients of Hadiya zone, South Ethiopia, May, 2015.

Variables	Retention Status		COR (CI 95%)	AOR (CI 95%)
.	Retained	Not retained		
.	No, (%)	No, (%)		
Sex- Female	161(83.9)	31(16.1)	3.20(1.86, 5.48)	4.04(2.05, 8.00)*
. - Male	70(61.9)	43(38.1)	1	1
Marital status				-
Currently on marriage	168(78.9)	45(21.1)	1.72(0.99, 2.98)	1.15(0.58, 2.28)
-Currently not married	63(68.5)	29(31.5)	1	1
Educational status				--
Secondary/above	72(86.7)	11(13.3)	2.59(1.20, 5.39)	2.75(1.24, 6.10)**
-Primary/below	159(71.6)	63(28.4)	1	1
Disclosure status				
-Disclosed	218(82.6)	46(17.4)	10.21(4.92, 21.12)	9.26(4.06, 21.12)*
-Undisclosed	13(31.7)	28(68.3)	1	1
Alcohol/tobacco level of addiction				
< +++	209(80.1)	52(19.9)	4.02(2.07, 7.81)	2.3(1.02, 5.21)**
= +++	22(50)	22(50)	1	1
Age at ART initiation			0.97(0.94, 1.00)	0.99(0.95, 1.03)
Duration of month on ART			0.87 (0.75, 1.00)	0.80(0.67, 0.96)**
Drug regimen change				
-Yes	75(85.2)	13(14.8)	2.26(1.17, 4.36)	3.58(1.59, 8.09)**
-No	156(71.9)	61(28.1)	1	1
WHO clinical stage at base line				
stage 1& 4	121(81.8)	27(18.2)	1.86(0.97, 3.56)	1.95(0.89, 4.27)
stage 2	57(69.5)	25(30.5)	0.95(0.48, 1.88)	1.31(0.54, 3.17)
Stage 3	53(70.7)	22(29.7)	1	1
History of TB treatment				
Yes	69(81.2)	16(18.8)	1.54(0.83, 2.87)	2.19(0.82, 5.60)
No	162(73.6)	58(26.4)	1	1
Documented referral information at initial time				
Yes	208(80)	52(20)	3.83(1.98, 7.49)	2.21(0.98, 4.97)
No	23(53.1)	22(58.9)	1	1

The model fitness is tested by Hosmer and Lemshow test of model goodness (p=0.396). In this model B is negative for age at ART initiation and duration of month on ART. The '*' indicates p<0.001; '**' indicates p<0.05 and its absence show p>0.05.

.

Chapter 6:- Discussion

Studies have shown that none retention poses challenges to the successful implementation of ART programs in low and middle income countries (55, 56). And

other studies have shown that patients who discontinued ART developed a rapid increase in viral load and depletion of CD4 T lymphocytes, putting them at risk of opportunistic infections and early death (54, 57). Therefore, understanding the affecting factors for retention on ART care is necessary to maintain retention on care in deferent groups of patients.

This study found an overall retention on ART care of 75.7% which is nearly comparable with the findings that is reported from Mizan-Aman General Hospital in the SNNPR of Ethiopia (73.3%) (63). But it is lower than that reported in Malawi (95%), Urban Africa ART clinics (79%) and the Jimma University specialized hospital of Ethiopia (87%) (47, 54, 60). The reason for discrepancy of retention may be due to difference in study method (in other studies operational definition of retention was different from this study) and study settings.

This study has showed that there is significant association between retention on ART care and sex, educational status, disclosure of self HIV/AIDS status to others, alcohol/tobacco abuse, time duration on ART and regimen substitution.

Female sex was nearly 4.04 times more likely retained than male. This result is in agreement with the study that was done in Urban African ART clinics, male sex was three times more associated with non retention than female (60). Similar finding was also reported from Zambia and Nigeria (19, 65). The contradicting finding was reported from the study of Mizan Aman General Hospital, in which male and female have more likely equal risk of non retention on ART care. The disparity may be doe to the involvement of pregnancy mothers in the Mizan Aman's study (studies that involve pregnant mothers has identified even more non retention on female when compared with the males) (63, 69). None retention in males may be due to variation in mobility of men adult PLWH which is most common reason for none retention predominantly due to job loss or change in employment. Again, given the overall higher likelihood that men travel for work particularly in professions of truck drivers, the observed association between men and loss to follow-up may be due at least in part to migratory labor patterns (61).

In this study disclosed patients were 9.26 times more likely to be retained in ART care than none disclosed. This finding is inline with the finding from Nigeria (65). The qualitative study that was done in Felege Hiwot hospital and Gonder university hospital also has identified- disclosure of patients' HIV status to their friends, family and neighbors- as a facilitator for retention on ART care (55). Disclosed patients may also get social support from the community that may help the patients to be retained in ART care (51). In this study most of the disclosed patients have treatment supporter in the community that may give social support which helps in retention on care. This also might be Patients who disclosed their HIV status to others like relatives and close friends did not fear stigma and discrimination to come health facility to take drugs (55, 64). To days ART service in Ethiopia is becoming more decentralized in near by health centers and hospitals for the patients that may lead to unplanned disclosure of the patients while they come for usual ART care and making the patient to be none retained on care.

In this study, patients with secondary and above educational status were 2.75 times more likely retained on ART care than those with educational status of primary and les than primary educational level. This is inline with the study that was done in Urban African ART clinics, in which primary and less than primary educational status is 4 times associated with non retention than above primary educational level (42). In Zambia primary or less educational level was also 1.5 times more associated with none retention than secondary and above educational level (19). Similar finding was also reported from the study in Nigeria (65). Study that was done in Living Stone, Zambia showed that secondary and above educational status was associated with having perfect knowledge on ART (19). So this might be due to people in higher levels of general education are likely to have better access to information on ART and may have had more exposure to free discussion about human biology and other areas of knowledge that are relevant to understanding the functioning of ART.

Patients with the addiction level of les than +++ in either Alcohol or tobacco use were 2.3 times more likely retained than patients with addiction level +++ in alcohol or tobacco. Similar finding was also reported from Jimma University Specialized Hospital and

University of Alabama at Birmingham (UAB) (21, 54). The none retention in the alcohol/tobacco abusers may be due to lack of appropriate judgment on the retention on care. Patients with alcohol/tobacco abuse may also experience higher toxicity due to interaction with ARV drugs that leads to none retention (62, 42).

In contradiction with the findings from the study that was done in Mizan Aman General Hospital (63), in this study, patients with drug regimen change were 3.58 times more likely retained in ART care than patients with out regimen change. Previous study identified that toxicity was responsible for majority (50%) of drug change (63). But in this study it is a case for only 19.4% of change. Rather planed program switch of d4t is reason for 44.5% of the drug change that prevent much of the side effects that might be caused by drug regimens containing d4t. In the study that was done in Mizan Aman General Hospital, stavudine (d4t) induced peripheral neuropathy is reported from most of the study participants (63). So in this study drug regimen change has associated with retention on ART care, and it might be due to prevented stavudine induced drug toxicity by regimen change.

After 12^{th} month on ART, log odds of the retention on ART care and time duration on ART care were associated inversely in this study. Similar finding was reported by the study that was done in Mizan Aman General Hospital, Ethiopia, in which the probability of retention on ART care at the 12^{th} and 24^{th} months after initiation of treatment was 82.3% and 75.0%, respectively (63). This might be in part due to lack of information on life long treatment of ART. ART patients may have false understandings like complete cure from HIV/AIDS by the Antiretroviral drugs and this might be due to poor counseling on use of drug.

The following limitations should be considered when interpreting the results of this research. Since the study has used the secondary data, there might be manipulation of the real data by the health professional at data registration time. Some base line socio-demographic data that are registered at base line may be changed over time. The transferred out patients that are considered as they retain on ART care in the receptor

health facility that may not be always a case since some of the transferred cases may fail to go the new health facilities due to many reasons. The real out come of the non retained patient is not ascertained in this study.

CHAPER 7: Conclusion and Recommendation

7.1. Conclusion

This study has identified comparatively lower level of retention on ART care from other Ethiopian and African ART Clinics. Being female, having secondary or more educational level, disclosure of self HIV/AIDS status to other and presence of regimen change were found to be positive predictor for retention on ART care; and staying long time on ART care and having addiction level of $_{+++}$ in alcohol/tobacco is also affecting retention indirectly.

7.2. Recommendations

The full benefit of the scale-up ART services cannot be realized without achieving long-term retention in ART care. So the following recommendations are made according to the study finding.

- Policy Makers

To improve retention on care in males with migratory working conditions; improved job access and use of emergency drug refill card in National level were recommended. In this case drug refill information will be accessed by using telephone communication method for the original health facility.

Educational promotion for the PLWH to up their educational status to secondary and above by educational status–like distance and face to face education is recommended.

- Health Facilities

Case managers and adherence supporter are recommended for counseling and encouraging of patients to disclose their HIV status to others who can provide social support, reminders about appointment and financial assistance in this study area and similar settings. Adherence supporter at the clinics may facilitate this activity by giving emotional support and resolve patients' problem by sharing their experiences living with HIV like importance of disclosure for family. Counseling on self status disclosure service

may be promoted more effectively if integrated with dialogue and thinking about what needs to be done prior to disclosure and role-playing rather than separate interventions (66, 67).

Continuous and on going counseling to reduce abuse of alcohol/tobacco, and expected benefit of life long ARV drug and importance of retention on ART care for adult ART patient is recommended for care givers.

- Researchers

Further studies that address the out comes of non retained patients and the contributing factors by using primary data is required for clarity in the similar setting.

References

1. H Geng, D Nash, A Kambugu, Y Zhang, P Braitstein etal. “Retention in care among HIV infected patients in Resource-Limited Settings: emerging insights and new directions”, Curr HIV/AIDS Rep. 2010 November; 7(4): 234–44.
2. Berg MB, Safren SA, Mimiaga MJ. Non adherence to medical appointments is associated with increased plasma HIV RNA and decreased CD4 cell counts in a community-based HIV primary care clinic. AIDS Care 2005, 17(7):902-07.
3. P Giordano, L Gifford, C White, E Suarez-Almazor, L Rabeneck et al. Retention in care: a challenge to survival with HIV infection. Clin Infect Dis 2007; 44(11):1493–9.
4. Mugavero MJ, Lin HY, Willig JH. Missed visits and mortality among patients establishing initial outpatient HIV treatment. Clin Infect Dis 2009; 48(2):248-56.
5. Tripathi A, Youmans E, Gibson JJ. The impact of retention in early HIV medical care on viro-immunological parameters and survival: a statewide study. AIDS Res Hum Retroviruses 2011; 27(7):751-8.
6. Cavaleri MA, Kalogerogiannis K, McKay MM. Barriers to HIV care: an exploration of the complexities that influence engagement in and utilization of treatment. Soc Work Health Care 2010, 49(10):934-45.
7. Metsch LR, Pereyra M, Messinger S. HIV transmission risk behaviors among HIV-infected persons who are successfully linked to care. Clin Infect Dis 2008, 47(4):577-84.
8. Gardner EM, McLees MP, Steiner JF, Del Rio C, Burman WJ et al. The spectrum of engagement in HIV care and its relevance to test-and-treat strategies for prevention of HIV infection. Clin Infect Dis 2011. DOI: 10.1093/cid/ciq243
9. WHO, Report on Global update on the Health Sector Response to HIV, 2014(July) (unpublished).
10. Global report: UNAIDS Report on the Global AIDS Epidemic 2012. Joint United Nations Program on HIV/AIDS (UNAIDS) 2012 (unpublished).

11. Robert S Hogg. Antiretroviral Therapy cohort collaborations. Life expectancy of individuals on combination antiretroviral therapy in high-income countries: A collaborative analysis of 14 cohort studies. Lancet. 2008 July 26; 372(9635): 293–9. doi:10.1016/S0140-6736(08)61113-7.

12. Rodger AJ, Lodwick R, Schechter. Mortality in well controlled HIV in the continuous antiretroviral therapy arms of the SMART and ESPRIT trials compared with the general population. AIDS 2013.

13. Cohen MS, Chen YQ, McCauley M, et al. Prevention of HIV-1 infection with early Antiretroviral Therapy. New Engl J Med 2011.

14. Tweya H, Gareta D, Chagwera F, Ben-smith A, Mwenyemasi J. et al. Early active follow-up of patients on antiretroviral therapy (ART) who are lost to follow-up : the "Back-to-care" project in Lilongwe, Malawi. 2010, June.

15. Y.Assefa, D.Jerene, S. Lulseged, G.Ooms, and W.Van Damme, "Rapid scale-up of antiretroviral treatment in Ethiopia: successes and system-wide effects," PLOS Medicine, vol. 6, no. 4, Article ID e1000056, 2009. Federal Ministry of Health,

16. "Ethiopia HIV testing and counseling guidelines 2007" Federal Ministry of Health, 2007.

17. Central Statistics Agency (CSA), "Ethiopian demographic and health survey," Preliminary Report, Central Statistics Agency (CSA), Addis Ababa, Ethiopia, 2011

18. Hadiya zone half year performance report of 2007 EC (unpublished)..

19. Ikuma Nozaki, Mika Kuriyama, Pauline Manyepa, Matilda K, Zyambo et al. False beliefs about ART effectiveness, side effects and the consequences of non-retention and non-adherence among art patients in livingstone, zambia, AIDS Behav 2013 17:122–126 DOI 10.1007/s10461-012-0221-2

20. Hochgesang, M. Kuyenda, A. Hosseinipour. Active tracing of ART patients lost to follow-up at Lighthouse shows that few `stopped' treatment for their own reasons, but many have died. 16th International AIDS Conference; Toronto, Canada. Aug 13–18, 2006;

21. Kimberly B. Ulett, James H. Willig, Hui-Yi Lin, Justin S. Routman, Sarah Abroms. et al Therapeutic implications of timely linkage and early retention in HIV care, AIDS PATIENT CARE and STDs 2009. 23(1) DOI: 10.1089/apc.2008.0132.

22. Giordano TP, Visnegarwala F, White AC Jr, et al. Patients referred to an urban HIV clinic frequently fails to establish care: factors predicting failure. AIDS Care 2005; 17: 773–83. [PubMed: 16036264]

23. Assefa Y, Kiflie A, Tesfaye D, Mariam DH, Kloos H, Edwin W, et al. Outcomes of antiretroviral treatment program in Ethiopia : Retention of patients in care is a major challenge and varies across health facilities. BioMed Central Ltd; 2011

24. M. P. Fox and S. Rosen, "Patient retention in antiretroviral therapy programs up to three years on treatment in sub- Saharan Africa, 2007–2009: systematic review," TropicalMedicine and International Health 2010, 15(1), 1–15. [PMC free article] [PubMed]

25. M Sanne, D Westreich, P Macphail, D Rubel, P Majuba, A van Rie, "Long term outcomes of antiretroviral therapy in a large HIV/AIDS care clinic in urban South Africa: a prospective cohort study," International AIDS Society 2009, 12, 38.

26. W Van Damme, K Kober, M Laga. "The real challenges for scaling up ART in sub-Saharan Africa" AIDS 2006, 20(5), 653–6.

27. C. Unge, B. S¨ oderg˚ ard, G. Marrone et al., "Long-term adheence to antiretroviral treatment and program drop-out in a high-risk urban setting in sub-Saharan Africa: a prospective cohort study," PLoS ONE, 2010. 5(10). Article ID e13613.

28. O Keiser, H Tweya, P Braitsteinetal. "Mortality after failure of antiretroviral therapy in sub-Saharan Africa," Tropical Medicine & International Health 2010, 15(2), 251–8.

29. T Barnighausen, K Chaiyachati, N Chimbindi, A Peoples, J Haberer, L Newell, "Interventions to increase antiretroviral adherence in sub-Saharan Africa: a systematic review of evaluation studies," The Lancet Infectious Diseases 2011. 11(12), 942–51.

30. Information available at http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2013/gr2013/UNAIDS_Global_Report_2013_en.pdf.

31. Giordano TP, White AC, Sajja P. Factors associated with the use of highly active antiretroviral therapy in patients newly entering care in an urban clinic. J Acquir Immune Defic Syndr 2003; 32:399–405.

32. Lucas GM, Chaisson RE, Moore RD. Highly active antiretroviral therapy in a large urban clinic: risk factors for virologic failure and adverse drug reactions. Ann Intern Med 1999; 131:81–7.

33. Mugavero MJ, Lin HY, Allison JJ. Racial disparities in HIV virologic failure: do missed visits matter? J Acquir Immune Defic Syndr 2009; 50:100–8.

34. Michael J. M, Jeroan J. Allison; Missed visits and mortality in patients establishing initial outpatient HIV treatment, 2009.

35. Cohen MS, Gay C, Kashuba AD, Blower S, Paxton L. Narrative review: Antiretroviral therapy to prevent the sexual transmission of HIV-1. Ann Intern Med 2007; 146:591–601.

36. Dieffenbach CW, Fauci AS. Universal voluntary testing and treatment for prevention of HIV transmission. JAMA 2009; 301:2380–2.

37. Quinn TC, Wawer MJ, Sewankambo N. Viral load and heterosexual transmission of human immunodeficiency virus type 1. Rakai Project Study Group. N Engl J Med 2000; 342:921–9.

38. Aberg JA, Kaplan JE, Libman H. Primary care guidelines for the management of persons infected with human immunodeficiency virus: 2009 update by the HIV medicine Association of the Infectious Diseases Society of America. Clin Infect Dis 2009; 49:651–81.

39. Marson KG, Tapia K, Kohler P, McGrath CJ, John-Stewart GC, et al. Male, mobile, and moneyed: loss to follow-up vs. transfer of care in an urban African Antiretroviral treatment clinic. PLoS ONE. 2013. 8(10): e78900. doi:10.1371/journal.pone.0078900

40. Wubshet M, Berhane Y, Worku A, Kebede Y, Diro E. High Loss to Followup and Early Mortality Create Substantial Reduction in Patient Retention at Antiretroviral Treatment Program in North-West Ethiopia. 2012.

41. Rosen S, Fox MP, Gill CJ. Patient retention in antiretroviral therapy programs in sub-Saharan Africa: a systematic review. PLoS Med. 2007; 4 (10):e298.

42. Auld AF, Agolory SG, Shiraishi RW. World AIDS Day — December 1 , 2014 Antiretroviral Therapy enrollment characteristics and outcomes among HIV-infected adolescents and young adults compared with older adults — seven African. PLoS Med. 2014; 63.

43. Nyabigambo Determinants of utilization of a no-cost HIV transition clinic: a cross-sectional study of young adults living with HIV/AIDS, Uganda 2014.

44. Seema T M,Charlotte C, et al Time-Dependent Predictors of Loss to Follow-Up in a Large HIV Treatment Cohort in Nigeria, 2014.

45. Kloos, H. Utilization of antiretroviral treatment in Ethiopia between February and December 2006: spatial, temporal, and demographic patterns. 2007.

46. Geng EH, Bangsberg DR, Musinguzi N, et al. Understanding reasons for and outcomes of patients lost to follow-up in antiretroviral therapy programs in Africa through a sampling-based approach. J Acquir Immune Defic Syndr 2010; 53:405–11. [PubMed: 19745753]

47. Kwong-Leung Yu et al. True outcomes for patients on antiretroviral therapy who are "lost to follow-up" in Malawi. Bull World Health Organ 2007; 85:550–4. [PubMed: 17768504].

48. Rabkin, M.; Austin, J.; Nash, D., et al. High patient retention rates in a multinational HIV/AIDS treatment program: The Columbia University Mother-to-Child-Plus Experience. 17th Conference on Retroviruses and Opportunistic Infections; San Francisco, CA. February 16–19, 2010;

49. Joshi, K.; Jhanwar, S.; Mathur, A., et al. Barriers in adherence of ART (anti retroviral treatment): a experience of ART Centre of Western Rajasthan, India. 17th International AIDS Conference; Mexico City, Mexico. August 3–8, 2008;

50. Emenyonu, N Muyindike, W Habyarimana. Cash transfers to cover clinic transportation costs improve adherence and retention in care in a HIV treatment program in Rural Uganda. 17th Conference on Retroviruses and Opportunistic Infections; San Francisco, CA. 2010.

51. Otieno, V Marima, R Odhiambo. Improving enrollment and retention of youth into HIV services: lessons learned from Kisumu, Kenya. 17th International AIDS Conference; Mexico City. August 3–8, 2008;

52. Miller CM, Ketlhapile M, Rybasack-Smith H, Rosen S. Why are antiretroviral treatment patients lost to follow-up? A qualitative study from South Africa. Trop Med Int Health 2010; 15:48–54. [PubMed: 20586960]

53. McGuire M, Muyenyembe T, Szumilin. Vital status of pre-ART and ART patients defaulting from care in rural Malawi. Trop Med Int Health 2010; 15:55–62. [PubMed: 20586961]

54. Kebede Deribe, Fikre Hailekiros, Sibhatu Biadgilign, Alemayehu Amberbir, Biruk Kebede Beyene. Defaulters from antiretroviral treatment in Jimma University Specialized Hospital, Southwest Ethiopia. Trop Med Int Health 2008 March; 13(3): 328–33.

55. Woldesellassie M Bezabhe, Leanne Chalmers, Desalew M. Kassie; Barriers and facilitators of adherence to antiretroviral drug therapy and retention in care among adult HIV-positive patients: a qualitative study from Ethiopia. PLoS One. 2014; 9(5): e97353.

56. WHO. Global update on HIV treatment: Results, impact and opportunities. 2013. [Accessed March 14, 2014]. at: http://www.who.int/about/licensing/copyright_form/en/index.html

57. Wools-Kaloustian K, Kimaiyo S, Diero L, Siika A, Sidle J. et al. Viability and effectiveness of large-scale HIV treatment initiatives in sub-Saharan Africa: Experience from western Kenya. AIDS. 2006;20:41–8. [PubMed]

58. Fatti G, Meintjes G, Shea J, Eley B, Grimwood A. Improved survival and antiretroviral treatment outcomes in adults receiving community-based adherence support: 5-year results from a multicentre cohort study in South Africa. J Acquir Immune Defic Syndr. 2012;61:e50–8. (PubMed)

59. Schoni-Affolter F, Keiser O, Mwango A, Stringer J, Ledergerber B, Mulenga L, et al. Estimating loss to follow-up in HIV-infected patients on antiretroviral therapy: The effect of the competing risk of death in Zambia and Switzerland. PLoS One. 2011; 6:e27919. (PubMed)

60. Alvarez-Uria G, Naik PK, Pakam R, Midde M. Factors associated with attrition, mortality, and loss to follow up after antiretroviral therapy initiation: Data from an HIV cohort study in India. Glob Health Action 2013;6:21682. (PubMed)

61. Lagarde E, Schim van der Loeff M, Enel et al. Mobility and the spread of humanimmunodeficiency virus into rural areas of West Africa. Int J Epidemiol 2003;32:744–52.[PubMed: 14559743].
62. Gordillo V, del Amo J, Soriano V, Gonzalez-Lahoz J. Socio demographic and psychological variables influencing adherence to antiretroviral therapy. AIDS. 1999;13:1763–9. [PubMed]
63. Tezera Moshago Berheto, Demissew Berihanu Haile and Salahuddin Mohammed, Predictors of Loss to follow-up in Patients Living with HIV/AIDS after Initiation of Antiretroviral Therapy, in Mizan Aman General Hospital. N Am J Med Sci. 2014 Sep; 6(9): 453–9 (PMC)
64. Stutterheim SE, Shiripinda I, Bos AE, Pryor JB, de Bruin M. et al. HIV status disclosure among HIV-positive African and Afro-Caribbean people in the Netherlands. AIDS Care. 2011 Feb;23(2):195-205 (PubMed).
65. Charurat M, Oyegunle M, Benjamin R, Habib A, Eze E etal. Patient retention and adherence to antiretrovirals in a large antiretroviral therapy program in Nigeria: a longitudinal analysis for risk factors. PLoS One. 2010 May 11. 5(5): (PMC free article)
66. Murphy DA, Armistead L, Marelich WD, Payne DL, Herbeck DM. Pilot trial of a disclosure intervention for HIV+ mothers: the tarck program. J Consult Clin Psychol 2011. 79: 203–14 [PMC free article (PubMed)
67. Olley BO Improving well-being through psycho-education among voluntary counseling and testing seekers in Nigeria: a controlled outcome study. AIDS Care. 2006 Nov; 18(8):1025-31 (PubMed).
68. Michelle S. Li, Benjamin H. Chi, Predictors of patient attrition according to different definitions for loss to follow-up: a comparative analysis from Lusaka, Zambia. J Acquir Immune Defic Syndr. 2013 Jul 1; 63(3): e116–e9.
69. Kaplan R, Orrell C, Zwane E. Loss to follow-up and mortality among pregnant women referred to a community clinic for antiretroviral treatment. AIDS 2008; 22:1679–81. [PubMed: 18670232]

70. J. Mugavero, A. Davila, R. Nevin, P. Giordano. From access to engagement: measuring retention in outpatient HIV clinical care. AIDS patient care and STDs 2010. Volume 24 (10). DOI: 10.1089/apc.2010.0086.
71. Park WB, Choe PG, Kim SH. One-year adherence to clinic visits after highly active antiretroviral therapy: a predictor of clinical progress in HIV patients. J Intern Med 2007; 261:268–75.

Annex-1 Checklist

Tool for data extraction for assessment of the determinants of non retention on Anti-Retroviral Treatment in adult ART patients of public health facilities in Hadiya zone, Ethiopia

Verbal consent form for ART focal health professional before conducting data extraction:

Name of health institution----------

Greeting

Hello! How are you?

My name is ---------- and I am representing the study team being coordinated by the Jimma University, collage of health science, department of health economics, management and policy. And I am reviewing data on ART care service at---------- (name of the health institution) about the retention on Antiretroviral Treatment Care and associated factors among adult Anti-Retroviral Treatment patients of public health facilities in Hadiya Zone, Ethiopia.

The study will be conducted through secondary data review. Registration from this ART clinic is selected to be participated in the study. Name of the participants is not going to be required (registered) only code number will identify every participant and the information collected would be kept confidential and will be used only for study purpose. If a report of the result is published, only summarized information of the total group will appear. However, participation of registrations from this ART clinic is important to fulfill the study and the study will help to design appropriate strategy to improve retention on ART care for Hadiya zone and other similar setups.

Was the information/objective clear? 1. Yes 2. No

Are you willing to be cooperative and participate in this study? 1. Yes 2. No

Thank you!!

If the responsible professional agrees to be cooperative to avail materials for the study, start reviewing data.

Interviewer's name---------- Signature----------

Supervisor's name---------- Signature----------

Data extraction check list to asses retention on ART care and associated factors among adult ART patients in public health facility of Hadiya zone.

Code of the check list ---------- Date of interview---------- Started time ----------
Completed time, ----------

PART ONE- Socio-Demographic Parts

No	Question	Code/description	Answer
101	Gender	1. Female 2. Male	
102	Date of registration	(Write as dd/mm/ yyyy)	
103	Age at registration	write specific age	
104	Age at ART initiation	write specific age	
105	Marital status	1. Never married 2.maried 3. Divorced 4. Separated 5. Widow/er	
106	Record educational status	1. No education 2. Primary 3. Secondary 4. Tertiary.	
107.	Religion	1. Protestant 2. Muslim 3. Orthodox 4. Catholic 5. Others(specify) -------	
108	Place of residence	If it is woreda towns record -1 If it is kifle ketema- record -1 If it is rural kebele- record- 2	
109	Does any one know about HIV status? (all)	1. Disclosure to wife or husband. 2. Disclosed to own children 3. Disclosed to parents. 4. Disclosed to brother/s or sister/s. 5. Relatives 6. Disclosed to friends. 7. Disclosed to other 8. Not Disclosed.	
110	Employment status	1. Working full time 2. Working part- time 3. Not working due to ill health 4. Unemployed 5. Other (specify)	

No	Question	Code/description	Skip	Answer
111	Is there child at house?	1. Yes (any one with age <15yr) 2. No	if 1→112 if 2→113	
112	Record age of the children	Write specific ages for each child from older to younger.		
113	Is there registered history of active substance use?	1. Yes, 2. No---	If 1→114 If 2→116	
114	Which substance was used? (Circle all)	1. Tobacco 2. Alcohol 3. Other (specify)		
115	Addiction level (record alphabet for each)	Tobacco a. – b. + c. ++ d. +++		
		Alcohol a. – b. + c. ++ d. +++		
116	Is there care giver/emergency contact person?	1. Yes 2. No (there is no registered emergency contact person)	If 1→117 If 2→201	
117	Specify the relation ship of giver/emergency contact person	Record the relationship.		
118	Sex of care giver or emergency contact person	1. Male 2. Female		
PART TWO- Clinical Characteristics;				
201	Is the baseline weight and height taken?	1. Yes (if both Wt & Ht are taken) 2. No (Both are not taken)		
202	Record specific base line weight and height if taken.	Write weight in Kg and height in meter		Wt ----- Ht ------
203	Record base line BMI if taken.	Specify if documented		
204	Record weight at ART initiation if taken	Record weight in kg		

No	Question	Code/description	Skip	Answer
205	Is the base line CD4 cell tested?	1. Yes (if test result is documented) 2. No (if sample was not sent or no record of the result) 3. Sample has been sent and appointed for result	If 1 → 206 2&3 → 207	
206	What was its result	Record /ml		
207	Record CD4+ at ART initiation.	Record in number if it has been taken.		
209	Record resent two test results of CD4+ cell count & the date of test.	Re cord as result1 …… date --/--/---- Result2…… date --/--/----		……/ml, --/--/---- …/ml, --/--/---
210	Base line WHO stage (at enrolment to chronic care).	1. Stage I 2. Stage II 3. Stage III 4. Stage IV 5. Not documented		
211	Record WHO stage at ART initiation.	1. Stage I 2. Stage II 3. Stage III 4. Stage IV 5. Not documented		
212	WHO stage at last visit date.	Specify, if there is?		
213	Functional status on base line	1. Working(W) 2.Ambulatory(A) 3. Bedridden(B)		
214	Functional status at ART initiation if it was recorded	1. Working(W) 2. Ambulatory(A) 3. Bedridden(B)		

No	Question	Code/description	Skip	Answer
215	Which OIs was/were registered at ART initiation or at base line? More than one is possible.	1. Zoster 2. Bacterial pneumonia 3. Pulmonary TB 4. Extra pulmonary TB 5. Thrush (oral or vaginal) 6. Ulcer(mouth or genital) 7. Diarrhea (chronic or acute) 8. PCP 9. CNS toxoplasmosis 10. Cryptococcal Meningitis 11. Other (specify)	If 3 &4 ⇨ 217 Other wise ⇨ 218	
216	Is there history of Tb treatment?	1. Yes 2. No	If 1⇨ 217 Other wise ⇨ 218	
217	Was the treatment completed?	1. Yes 2. No		
218	History of OIs registered with in the 12 months.	1. Zoster 2. Bacterial pneumonia 3. Pulmonary TB 4. Extra pulmonary TB 5. Thrush (oral or vaginal) 6. Ulcer(mouth or genital) 7. Diarrhea (chronic or acute) 8. PCP 9. CNS toxoplasmosis 10. Cryptococcal Meningitis 11. Other (specify)		

No	Question	Code/description	Skip	Answer
119	Which drug regimen is used initially?	1. 1a (30) 2. 1a (40) 3. 1b (30) 4. 1b (40) 5. 1c 6. 1d 7. 2a 8. 2b. 9. 2c 10. 2d		
220	Is there drug regimen replacement?	1. Yes 2. No	If 1 ⇨ 41 Other wise ⇨ 42	
221	Which one was replaced?	1. 1a (30) 2. 1a (40) 3. 1b (30) 4. 1b (40) 5. 1c 6. 1d 7. 2a 8. 2b. 9. 2c 10. 2d		
222	What was the reason for drug regimen change?			
PART THREE- Facility Related Factors				
301	Is there documented referral information at the time of enrollment in chronic care? (Place of reference to the facility)	1. Yes 2. No	If 1 ⇨ 301 Other wise ⇨ 304	
302	If yes for q301, from where? (Circle any)	1. From with in the health institution 2. From out of the health institution.	If 1 ⇨ 303 If 2 ⇨ 304	
303	From which dpt/care unit?	1. In patient 2. Medical OPD 3. STI clinic 4. TB clinic 5. PMTCT 6. General VCT 7. Other		

No	Question	Code/description	Skip	Answer
304	If 2 for the q 301, from where? (circle any)	1. Health center 2. Public hospital 3. Private hospital 4. NGO/FBO Hospital 5. Private clinic 6. Self referred 7. Community referred 8. Other 9. unknown		
305	Is there documented appointment date on each visit in the last 12 month?	1. Yes – if all have documented 2. No- if at least one is not documented	If 1 ⇨ 306 If 2 ⇨ 401	
306	How many of them have no appointment date?	Write exact number.		----
307	How many of them have registered appointment	Write exact number.		
PART FOUR- RETENTION ON ART				
401	Record date ART started	Write by dd/mm/yyyy		--/--/----
402	Record months on ART?	Record number of months		
403	Follow up schedules in the last 12 months.	Write total ART schedules in the last 12 months		
404	How many of them visits are in prescheduled date?	Write total schedule schedules		

No	Question	Code/description	Skip	Answer
405	How many visits aren't in prescheduled date?	Write total schedule schedules		
406	From unscheduled visits, how many are before the schedule?	Write schedules number		
407	From those unscheduled visits, how many are after schedule?	Write total schedules in number		
408	For those who are not appearing after 14 day of appointment, when was the last visit?	Record date of last appointment as apt- dd/mm/yyyy And last visit date as visit- dd/mm/yyyy		Apt1 --/--/---- Visit1 --/--/--- Apt2 --/--/---- Visit2 --/--/--- Apt3 --/--/---- Visit3 --/--/--- Apt4 --/--/---- Visit4 --/--/--- Apt5 --/--/---- Visit5 --/--/----

No	Question	Code/description	Skip	Answer
409	From those visit of after schedule how many days late from appointment date to visit date?	Write for each late visit for more than 14 days.		V1 – v2— v3- - v4— v5 --
410	Does the patient come for resent visit?	1. Yes 2. No	If 2 ▷ 411 If 1 ↯ end	
411	Record resent appointment date for the patients who didn't come at current visit.	Record as dd/mm/yyyy		--/--/----
412	How many days late from last appointment date to data extraction date?			