

# Adherence to Antiretroviral Treatment Services and Associated Factors among Clients Attending ART Clinics in Hosanna Town, Southern Ethiopia

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## Abstract

**Background:** Global burden of HIV/AIDS remain enormous. Ethiopia is one of the Sub-Saharan countries that are hardly hit by the HIV/AIDS epidemic. Adherence is a vital component and main concern knotted with strategic decisions in service provisions. Therefore, the main objective of this study was to assess adherence to antiretroviral treatment and associated factors among clients attending ART clinics in Hosanna town.

**Methods:** Cross sectional study design using both quantitative and qualitative methods of data collection was conducted from January to February, 2015. Consecutive sampling technique was applied to select individual client. Data was analyzed by using SPSS version 16.0. Binary logistic regressions were used to identify independent predictors. Qualitative data was collected using in-depth interview with clients and health providers and used for concurrent triangulation with quantitative one.

**Results:** The study revealed that adherence rate to ART treatment of clients was 90.70%. As independent predictors, rural residents [AOR (95%CI)=2.14 (1.12 to 3.01)], and marital status (divorced) [AOR (95%CI)=2.37 (1.33 to 4.24)] were positively associated with non-adherence whereas living alone [AOR (95%CI)=0.37 (0.19 to 0.72)] and perceived availability of services [AOR (95%CI)=0.16 (1.03 to 1.31)] were negatively associated with non-adherence. In total, 76.98% of the variance in the quality of services in terms of adherence could be explained by Donabedian model.

**Conclusion:** Despite higher numbers of clients was adherence to ART treatment, considerably intolerable numbers were below level of adherence in the service provided. Therefore, due attention should give to fill the gap of perception of the clients to existing services through ART mentorship by inaugurating with IEC/BCC in the context of their residence, educational level and living conditions.

**Keywords:** ART; Quality services; Adherence; Ethiopia

## Introduction

According to reports from the joint united nations program on HIV/AIDS (UNAIDS) the global burden of HIV/AIDS is one of the most destructive epidemics the world has ever witnessed [1,2]. Global AIDS death in adults and children were estimated at 2.1 million of whom 1.6 million was again from sub Saharan Africa. To calm negative socio-economic impact of this epidemic, the government of Ethiopia has been conducting a comprehensive HIV care and treatment program that includes access to ART. Adherence is a vital component and main concern knotted with strategic decisions in service provisions [3,4].

The advent of Highly Active Antiretroviral Therapy (HAART) has markedly reduced morbidity and mortality associated with the Human Immune deficiency Virus (HIV) [5]. However, these therapeutic regimens are very complex, often requiring that patients take numerous pills for long period of time and food restrictions or requirements. Failure to adhere very closely to the regimens appears to be related to continued viral replication, treatment failure and the emergence of drug-resistant strains of HIV [6].

Much effort has been put into the scaling up of access to ART [7]. The efficacy of ART depends largely on adherence to treatment regimens. Poor adherence is associated with poor immunological response and also responsible for the development of resistant strains [8]. Very high levels (>95%) of adherence are necessary for sustained clinical success [9]. Numerous reports have documented that the key to the success of the new ART is the ability and willingness of HIV-positive individuals to adhere ARV regimens. Attaining this high level of adherence is a serious concern today in the world. Because of this, provision of antiretroviral to the poor and marginalized segment of the

population was the most controversial and feared act due to the number of impacts to the individual as well as to the whole of society [10,11].

Quality of care for patients suffering from HIV/AIDS in particular adherence to regimen and strict follow up schedules play a central role in treatment success. Therefore, the quality of care strengthen the success of public health policies in enhancing access to care, especially for policies targeted at promoting access to ART [12-14].

Doing studies on quality of care helps to identify gap between client's expectation and what has been providing for them from institution. So, better facilities, equipment, availability of drugs, staffing and training determine outcome through improving process which is the direct measure of quality [15,16]. Therefore, study is aimed to assess adherence to ART services at Hossana health facilities by using quality models (Figure 1).

## Methods and Materials

### Study period and setting

This study was conducted in Hosanna town at health facilities providing ART as of January to February, 2015. Hosanna town is located

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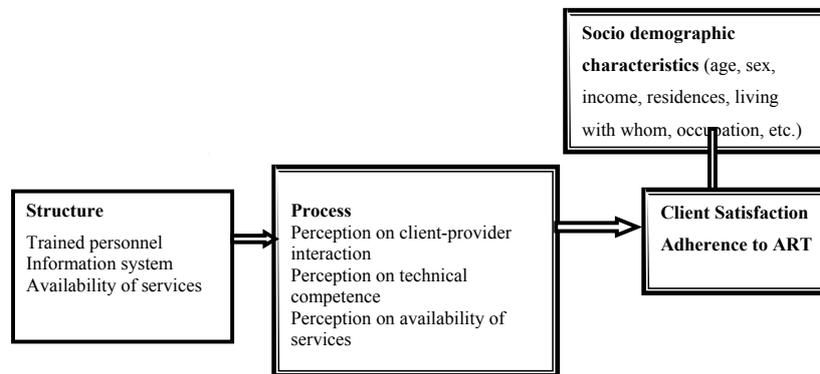


Figure 1: Conceptual frame work adapted from Donabedian Model and Guideline for implementation of ART in Ethiopia.

in Hadiya Zone in Southern Ethiopia, 230 km away from Addis Ababa. In the town currently one zonal hospital and one public health center were providing ART services. Cumulatively a total of 3,200 clients were enrolled and 1,003 are currently on ART. Clients load in both health facility was assessed a week before study was conducted.

### Study design and populations

Facility based cross sectional study design triangulated by qualitative methods of data collection was used to collect data. Source populations were all clients receiving ART drugs. Study populations were sampled adult clients on ART.

### Sample size and sampling procedure

The required Sample size was determined using single population formula by taking adherence prevalence rate 50% (assuming proportion of clients who are adhered with quality services) proportion sample size calculation formula  $n = [Z\alpha/2]^2 p(1-p)/d^2$  considering marginal error (d) of 5%, confidence interval of 95% and  $Z\alpha/2$  is the value of the standard normal distribution corresponding to a significant level of alpha ( $\alpha$ ) 0.05, which is 1.96. This yields a sample size of 384. Since the source population is less than 10,000, an adjustment formula (FPC),  $nf = n/1 + n/N$  was used, where,  $N = \text{Source population}$  - Source populations were all clients receiving ART drugs in the year of 2015,  $nf = \text{Required Sample Size}$ ,  $n = \text{calculated sample size}$ , Hence, the sample size were calculated at total of source population  $N = 1003$  and  $n = 384$  and  $nf = 274$ . Considering non-response rate of 10%, the total sample size was 301 clients. For qualitative part, 4 in-depth interviews with health workers and 4 clients following ART from Hosanna town health center and Nigist Elleni Mohammed memorial general hospital. Consecutive sampling was employed and recruitment of clients was made in each study facility till respective allocated sample size was filled. For qualitative part, criterion related sampling technique was used to select study subjects from clients on ART and health care providers. Accordingly, eight in-depth interviews were made with clients on ART and health care providers.

### Measurement and variables

Outcome of this study was Adherence status to ART. Adherence levels of in this study  $>95\%$  (missing no more than three doses per month) of patients were adhered. Adherence to ART- The extent to which a patient continues the agreed-upon made of treatment or intervention as prescribed ART medication. As independent variable, the instrument comprises in part I: Socio-demographics characteristics such as age, sex, religion, marital status, educational level, income, ethnicity, residence, occupational status, etc. 19 items, Part II: Structure variable: minimum package/resources

requirement for provision of ART services and described comparing with guideline for implementation of ART services such as trained professionals, infrastructure, material and drugs supply, information system, time spent reach to health facility, provision of integrated services, etc., 12 items. Part III & IV: Process variable and Perception related items: ways of service provision according to guideline and were measured by interviewer guide five point liker scale questionnaire by using mean score level to describe process of service provision from client perspective. Perceived client-provider interaction: perceptions for service principally the received expressive content of exchanges between providers and clients. Perceived availability of resources: Clients view on availability of resources for provision of ART services (ARV drugs, OI drugs, Trained health providers, laboratory service when needed and medical care availability during emergency services), and is assessed by five point Likert scale with five items, and explained by mean score level after computed to under one factor/component. Perceived technical competence: - Perception and knowledge of clients on ARV drugs: - Clients awareness and understanding about antiretroviral treatment drugs on the effect of the time to take medication, missing dose, and consequence of missing dose or take incorrectly and is measured by four times five points Likert scale and described by mean score level and others 45 items. Each of the responses was scored as: 'strongly disagree'=1, 'disagree'=2, 'undecided/not sure'=3, 'agree'=4 and 'strongly agree'=5. After reversing for negatively worded items, scores were summed for each respective concept. For validation of the instrument factor analysis was done during which confirmation factor loading score of greater than or equal to 0.4 was accepted for construct validity after using Eigen value of greater than 1 for confirming major constructs of the model. Internal consistency of items was seen separately for each construct on which items were loaded and cronbach's alpha score of greater than or equal to 0.7 was accepted for ordinal scale items and spearman score have seen for dichotomized scale otherwise was removed. Items correlation with total correlation of scores greater than or equal to 0.3 was accepted after items internal consistency is assured otherwise were checked again and removed. For qualitative part, the qualitative data collection method was applied using in-depth interview in order to supplement the result of the quantitative data. The guideline which inquiries about the reason why they were responding or not, clients logical decisions in accepting or not accepting the pills, perceived difference of acceptors and rejecters, and delivering style with some probing questions were prepared for clients and health care providers separately. Respective responses were recorded by using tape recorder and hand written notes, and were analyzed according to their themes.

### Data collection instrument and procedure

Data were collected using pre-tested structured interviewer

administered questionnaire that adapted from different related literature to increase comparability of finding. There were four data collectors who are health professionals working in the ART unit and two supervisors. Training was given for data collectors and supervisors on objectives of the study, methods of data collection and ways of data collection for two days. Qualitative data were collected by principal investigators in-depth interview from health care provider and clients. Respective responses of informants were recorded by using tape recorder and hand written notes, and were analyzed by using Atlas software.

### Data quality management, processing and analysis

Questionnaires were translated to Amharic and then back translated to English to maintain its consistency. Training was given for data collectors and pretest was made on 5% of the clients in a Shurmo health center which was similar population before the actual data collection. Supervisors and principal investigator performed immediate supervision on a daily basis. Each and every completed questionnaire was checked for completeness. In qualitative study, the recorded voice was transcribed first in Amharic and translated to English to keep consistency of the original meaning.

The collected data was coded, entered into a data base, cleaned and analyzed using SPSS version 16.0. Assumption checking was executed before proceeding to any kind of analysis that was done in this study. For uniform scoring of items of five point Likert scale response format; negatively worded items was reversed that higher score was given in agreement with positive statements and disagreement with negative statements. Subsequent to uniform scoring throughout the items is complete; the score of concepts identified by factor analysis was treated as factor score and thus factor score was used for further execution of prediction analysis. Descriptive statistics are used for frequency, description and data exploration. Factor analysis and reliability estimate was conducted for each components arranged to measure perception of clients on process of ART provision. Factors with reliability scores >0.7 of Cronbach's alpha was taken. Perception of clients on process of ART provision was analyzed as continues variable and explained by using mean score of each factor and items. Logistic regression analysis was used to identify the predictors of adherence on ART services provision.

Finally adherence to ARV drugs in past a month at >95% is considered to measure and describe adherence to ARV drugs by dichotomizing into adherence and non-adherence; and binary logistic regressions were used to determine predictors of adherence to ART services from independent variable. P-value less than 0.05 were considered as cut off point for statically significant throughout the analysis.

### Ethical consideration

Prior to data collection, a formal letter was obtained from the faculty of medicine and health science of Wachemo University and submitted to each health facility. All study clients were informed about the purpose of the study verbally and in written form. All clients' right to self-determination and autonomy were respected. Participation is voluntary and clients can withdraw from the study at any time.

## Results

### Socio-demographic characteristics of the clients

A total of three hundred one (301) clients were participated in this study producing a total response rate of 100%. From the total clients, 83.1% (250) were from Nigist Elleni Memorial General Hospital and the rest 16.90% (51) were Hossana health center. Table 1 presents socio-

Variable	Options	No.	Percent
Facility Name	NEMGH	250	83.10
	HHC	51	16.90
Sex	Male	106	35.20
	Female	195	64.80
Age	18-24	25	8.30
	25-29	79	26.20
	30-34	105	34.90
	35-39	55	18.30
	40-44	24	8.00
	45-49	13	4.30
Residence	Rural	65	21.60
	Urban	236	78.40
Ethnicity	Hadiya	149	49.50
	Kembata	51	16.90
	Amhara	50	16.60
	Guraghe	26	8.60
	Others*	25	8.30
Marital status	Married	226	75.10
	Divorced	49	16.30
	Single	26	8.60
Religion	Protestant	179	59.5
	Orthodox	104	34.6
	Muslim	13	4.30
	Catholic	5	1.70
Educational status	Can't read and Write	39	13.00
	Read and Write	92	30.60
	Primary school	68	22.60
	Secondary school	38	12.60
	College diploma and above	64	21.30
Occupational status	Unemployed	107	35.50
	Employed	84	27.90
	Farmer	67	22.30
	Merchants	33	11.00
	No job	10	3.30
Monthly Income	Median 600EB ± 1.08		
Living with	Family	182	60.50
	live alone	106	35.20
	Parent	13	4.30
Substance use	Yes	68	22.60
	No	233	77.40
Substance use (type)	Alcohol	39	57.35
	Khat	13	19.12
	Smoking	24	46.15
Family size	1-4	263	87.38
	5-8	38	12.62
Disclosed HIV Status someone else	Yes	251	83.40
	No	37	12.30
	I don't know	13	4.30
Who know your HIV status?	Partner	17	5.60
	Offspring	38	12.60
	Parent	212	70.40
	Brother/Sister	16	5.30
	Relative	5	1.70
	Friend	13	4.30
I know other health facility give ART	Yes	264	87.70
	I don't know	37	12.30
Who told you for the first time about ART services in this HF?	health professional	237	78.70
	mass media	52	17.30
	Relatives	12	4.00

\*Others- Silte, Wolaita, Dawuro, Tigre, Oromo; \*\*- No job

**Table 1:** Shows socio-demographic characteristic of clients interviewed on adherence at Hossana health facilities, Southern Ethiopia, January to February 2015 (N=301).

demographic characteristics of the clients. Accordingly, more than half, 64.80% (195/301), of the clients were females. The mean age of the clients was 31.41 ± 6.61 years. Regarding residence, majority, 78.40% (236/301) of the clients came from urban areas. In terms of ethnicity, majority, 49.50% (149/301), of the clients were Hadiya followed by Kembata which accounts 16.90% (51/301). As far as marital status is concerned, 75.10% (226/301) of the clients were married. Concerning religion, 61.10% (184/301) clients were protestant. Of the clients, 30.60% (92/301) can read and write. Concerning occupational status, 27.90% (84/301) of the clients were employed followed by unemployed who accounts 25.20% (76/301). Majority, 60.50% (182/301) of the clients reported that they live with their family. Out of clients 22.60% (68/301) were using active substance (Chat chewing, cigarette smoking and alcohol) currently and of these 57.35% (39/68) drink alcohol. Concerning disclosure of HIV Status someone else 83.40% (251/301) of clients disclosed their HIV status for someone else. More than three fourth (237/301) were heard about availability of ART services for the first time from health providers (Table 1).

### Process (Provision of services)

**Time taken and information obtained:** Quality of service provision measured starting from time of entry to health facility and exit of the client as well as seeing health care provider or continual taking of prescribed drugs consistency and constantly. For this reason, clients were interviewed on time spent to reach to health facility, waiting time up to service provision, and health information provided by care providers. Table 2 presents about time spent to reach to health facility, waiting time up to service provision, and health information provided by care providers. Accordingly, 48.20% (145/301) of clients took less than thirty minutes to arrive to health facility followed by 39.50% (119/301) clients who waited for less than 30 minutes to see health care provider. Regarding health information provided during service provision, all clients were provided health information/education about HIV/AIDS and ARV drugs (Table 2).

### Perception of clients on provision of services

The Perception of clients were assessed and perceived expectation of clients for ART services provided were measured by five point Likert

Variables	Options	Frequency	Percent	Remark
How long did it take to you to arrive at this Health facility?	<30 min	145	48.20	
	30 min-1:00	119	39.50	
	1:00-2:00	13	4.30	
	>2:00	24	8.00	
How long did you wait before seeing health provider?	No wait	238	79.00	
	<30 min	39	13.00	
	30 min-1:00	0	0.00	
	1:00 and above	24	8.00	
Information given to clients about HIV/AIDS and ARV drugs during appointment date		301	100.00	
AIDS has no cure		301	100.00	
Benefit of ART drugs		289	96.00	
Side effect of ART		289	96.00	
Treatment is life long		288	95.70	
Adherence to treatment is crucial		291	96.70	
Practicing safe sex while on treatment is crucial		283	95.3	

\*Others- Silte, Wolaita, Dawuro, Tigre, Oromo; \*\*- No job

**Table 2:** Presents about time spent to reach to health facility, waiting time up to service provision, and health information provided by care providers ART at Hossana health facilities, Southern Ethiopia, January to February 2015 (N=301).

Clients Perception	Scale range	Scale Mean	SD
Perceived availability of Services	11-55	38.53	15.37
Perceived technical competence of health providers	4-20	14.60	7.01
Perceived client provider interaction	7-35	27.37	12.49
Perception & knowledge of clients on ARV drugs	6-30	19.65	8.79

**Table 3:** Presents perception of clients' on process service provision by their scale range of the clients in Hossana health facilities, Southern Ethiopia, January-February 2015 (N=301).

Variables	Adherence (Number)	Percent (%)
Previous day	295	98.00
Past three days	291	96.70
Past seven days	284	94.40
One month at 95%	273	90.70

**Table 4:** Presents ART adherence rate by self-reporting of clients' on process service provision in Hossana health facilities, Southern Ethiopia, January to February 2015 (N=301).

scale and the mean score was used for measurement. Table 3 presents the mean score clients' perception on process quality of ART service provision. Accordingly, the average score of Perceived availability of Services was (mean ± standard deviation) (38.53 ± 15.37) followed by perceived technical competency was (mean ± standard deviation) (14.60 ± 7.01) (Table 3).

### ART adherence rate

ART adherence rate is calculated and assessed by self-reporting. Table 4 presents ART adherence rate self-reporting. Accordingly, among the total of three hundred one (301) clients were participated in this study, 98.00% (295/301) did not miss single doses of ARV drugs according to self-report and pill counts in the week before the appointment date. In the previous three days duration of the interview, 96.70% (291/301) of the patient did not miss the prescribed doses of ARV drugs. More than ninety four percent (284/301) of the patients did not miss doses over past seven day's duration. In this study, the overall ART adherence was 90.7% based on no missed doses in the previous one month (Table 4).

**Reasons for ART non adherence:** The reasons for ART non adherence were assessed by yes or questions and reported as follows indicated in Table 5 below. Accordingly, simply forgot to take the pills is 92.86% (26/28) followed by I felt depressed 89.29% (25/28) (Table 5).

### Predictors of quality services in terms of adherence

Looking into the effect of socio-demographic factors, perceptions of clients, time spent to reach facility and get service, information given about ARV drugs during appointment date, reason for non-adherence, considering as process and outcome of service provision in Donabedian model, adjustment was made to see association of variables by far the description of each concept considered as variables for prediction of adherence in the model.

Regarding the socio-demographic variables as covariates (Table 1), previous residence, marital status and living with whom had significant crude and adjusted effect on adherence. Accordingly, those clients who previously resided in rural area as compared to those who came from urban area had higher odds of non-adherence for ART with odds ratio [AOR (95% CI)=2.14 (1.12-3.01)]. In other speaking, those clients who are divorced as compared to married had higher odds of non adherence for ART with odds ratio [AOR (95% CI)=2.37 (1.33-4.24)] those clients who are divorced were 2.37 times more likely to be not adhered than

married one. Similarly, those clients who were living alone as compared to living with family had lower odds of non adherence for ART with odds ratio [AOR (95% CI)=0.37 (0.19-0.72)] those clients who are living alone were 0.37 times more likely to be non-adherence than living with family (Table 6).

## Discussion

This study has shown that the adherence prevalence with antiretroviral drugs by self-reports was 90.70%. The study is in line with the study conducted Debre-Markos and Tigray but slightly higher percentage of adherence [17,18]. The reason may be due to health extensions workers are vigorously working in increasing awareness of ARV drugs. The other is improvement was also observed with different levels based on the intervention increased accessibility to information.

In this study, regarding previous residence, being rural resident is more significantly positive association with non-adherence as

compared to urban residents. This study is not in line with the study with conducted in Debre Markos which believed residence doesn't matter [18,19]. The potential reason of higher significant acceptance of ARV drugs/adherence in urban residents compared to rural residents may be many exposing films, even talks, also cultural disparities in rural are attached with fear stigma and discrimination of ART drugs.

This study found that marital status being divorced had significantly positive association with non-adherence as compared to married one. Similar to this concept in qualitative part, a 37 years mother said "taking this treatment is important not only to me but also for my children not to lack mother as well as not to be infected with other diseases. As to me, when we lost to follow up from treatment distributing newly resisted virus to other which is the second burden and economically crisis for families and nation at large. In short, we are losing three things: new generation, development and ourselves." The potential reason might be peoples are aware of the diseases HIV/AIDS through intensive and remarkable achievements of government in providing information about HIV/AIDS and ART drugs.

In this study, those clients who were living alone as compared to living with family had lower odds of non adherence for ART which results i.e. they are protective. This study contrasts some studies conducted in Ethiopia [18] and abroad [20,21] but in line with the qualitative findings, one of the female client following ART at hospital said that "we are separated because my husband didn't want to take ART (he dislikes medication not only for ART but also others) that is why I separated from him since I don't want to stop taking pills and I don't want suffer because of him." The potential reason may some individuals living alone may not have no fear to take the drug as compared to those with families who are not disclosed information about their status.

In this study, both perception of client on the availability of the services and client provider interaction had positive association with adherence. This study is in line with the studies conducted in abroad and Ethiopia and the very nature of Donabedian model [16,18,20-23]. Similar to this concept in qualitative part, all clients explained that ARV drugs are available during their appointment session. One ART provider of hospital said, even if, sometimes we encountered shortage of ARV drug, the clients were never sent without ARV drugs and we give from other nearby health facility. For frankly speaking, sometimes, there is encountered shortage of prescribed drugs for opportunity infection, and our clients were sometimes obliged to buy outside of hospital or health center. Resource wise, human power, examination and counseling room and pharmacy there in hospital but this may a bit

Reason for non-adherence to ART drugs	Frequency	Percent
Simply forget	26	92.86
Felt depressed	25	89.29
Fear of medication side effect	21	75.00
Too many pills to take	18	64.29
Felt sick	16	57.14
Busy with other things	14	50.00
Away from home	14	50.00
Fear of stigma and discrimination	13	46.43
lost my pills	12	42.86
No food to take with medication	11	39.29
Lack of confidentiality on the centers	11	39.29
Felt good	10	35.71
Run out of pills	8	28.57
Bothered by my dreams	6	21.43
Drunk alcohol at specified	5	17.86
I was took Holy water	4	14.29
Lack of confidentiality on the centers	4	14.29
Transportation problem to got ART clinic	3	10.71
Not fully understand the regime and requirement	3	10.71
Non availability of ARV drugs from ART clinic	2	7.14

**Table 5:** Presents reasons for ART non adherence of clients' on process of ART service provision in Hossana health facilities, Southern Ethiopia, January-February 2015 (N=301).

Variables of Equations	Options	Fre.	%	COR (95%CI)	AOR (95%CI)
Previous residence	Urban	236	78.40	1	1
	Rural	65	21.60	2.73 (1.17-3.12)*	2.14 (1.12-3.01)*
Marital status	Married	226	75.10	1	1
	Divorced	49	16.30	3.17 (1.92-5.24)*	2.37 (1.33-4.24)*
	Single	26	8.60	1.00 (0.48-2.07)	1.49 (0.61-3.63)
Living with	Living with family	182	60.50	1	1
	Living alone	106	35.20	0.43 (0.22-0.83)*	0.37 (0.19-0.72)*
	Parent	13	4.30	0.77 (0.31-1.07)	0.64 (0.33-1.18)
Perceived availability of services		11-55	38.53	4.37 (2.51,7.63)	2.08 (1.05,4.15)
Perceived client provider interaction		7-37	27.27	2.59 (1.53,4.39)	2.10 (1.13,3.93)

\*Statistically significant at p-value<0.05; 1 is Odds ratio for reference category.

COR is crude odds ratio; AOR is adjusted odds ratio

**Table 6:** Multivariable logistic regression analysis (Crude and adjusted odds ratio) for final model prediction for adherence among clients of hosanna health facilities, Southern Ethiopia, January to February 2015.

problem in health. In health center, human resources wise I am only one provider was assigned for provision of ART services. One health officer who is adherence supporter here in our health center and she replaces me since she took every training that I took. Though I am very happy in this service provision since I am helping several individuals, I was normalized due to shortage of human resources even I am focal for more than five teams. You know we are providing this services for client with this narrow room whatever we are committed work overload and restless decrease our service quality of care which in turn decreases client adherence. As strength of the study, the current study used tested model for evaluation as conceptual frame work. Qualitative and quantitative data were triangulated. As limitation of the study, those individuals in adherence, they may not actually perform the behavior which may lead to over reporting of adherence. In case perception variables, the researcher used five point Likert scale, this may not precisely told us to say so.

In conclusion, despite higher numbers of clients was adhered to ART treatment, considerably intolerable numbers were below level of adherence. Our study found that some socio-demographic characteristics and perceptions about services provision were associated with adherence as well, though many were not. Also, neither waiting time nor travel-time was related to the adherence rating. However, as discussed above, the current literature is not in total agreement about these predictors, so perhaps this lends itself to the idea that such determinants might be more locally than generally associated with adherence. Even though majority of structural requirement for provision of ART service according to guideline were available, there were different gaps exists within both health facilities. Shortages and tied examination and counseling room, absence of nutritional support, shortage of some OI drugs, adherence nurses being more than one focal, Otoloscope clinical chemistry auto analyses and reagent hematology auto analyzer in Hossana health Center as guideline.

Generally, the independent predictors of the quality of services in terms adherence residence, marital status, educational status, clients who disclosed to their parents and perception of respondents in service provision based constructs of Donabedian model had an effect either in acceptance or in rejection of ARV drugs.

To zonal health department, health offices, health facilities, HIV/AIDS prevention and control offices, researcher and any organizations working in the area of ART should follow the following recommendations.

- Since considerably intolerable numbers are non-adhered. Thus, special attention should be given for ART service during integration supervision of health facilities undertaken through clinical mentorship and developing IEC/BCC materials for awareness creation
- Since one person is focal persons for many case teams in health center, adherence nurses should be assigned for ART clinic for this purpose only.
- Since the existence of the services is the best predictor of adherence. Availability resources for provision of ART services (OI, drugs, ARV drugs, trained human power, etc) should continuously avail for clients during their appointment date
- Researchers should do further research preferably longitudinal designs needed to examine independent predictors of ART adherence.

### Authors' Contribution

Feleke Doyore and Beminet Moges wrote the proposal, participated in data collection, analyzed the data and drafted the paper. Research committee approved the proposal with some revisions, supervised in data collection and analysis, commented on the analysis and improved the first draft. Both authors revised subsequent drafts of the paper. Feleke Doyore prepared this manuscript.

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