Adherence to Antiretroviral Therapy Among HIV-Positive Pregnant Women on followup at Mizan Tepi University Teaching and Tepi General Hospitals, Southwest Ethiopia

Temesgen Aferu[1] (iD), Gatluak Doang[2], Ameha Zewudie[1], and Tadesse Nigussie[1] (iD)

Abstract

Background: The introduction of highly active antiretroviral therapy has not only improved longevity in human immunodeficiency virus (HIV)–infected individuals but in addition has had a significant impact on the rate of mother-to-child transmission of the infection. **Objective:** To assess antiretroviral therapy adherence among HIV-positive pregnant women on follow-up at antiretroviral therapy clinic of Mizan Tepi University Teaching and Tepi General Hospitals. **Methods:** A descriptive cross-sectional study was undertaken in antiretroviral therapy clinics of Mizan Tepi University Teaching and Tepi General Hospitals from April to May 2018. Data were collected through face to face interview using structured and pretested questionnaires and analyzed using Statistical Package for Social Sciences version 20. **Results:** Majority of the patients had good adherence to their antiretroviral therapy, 68 (66.00%). Medication side effects, 12 (34.00%) and forgetfulness and distance of the hospital from home, each accounting 11 (31.00%) were the main reasons for nonadherence among nonadherent patients. Frequency of counseling ($P = .000$), CD4 count ($\chi^2 = 37.529$, $P = .000$), World Health Organization's clinical stage ($\chi^2 = 17.515$, $P = .000$), stigma ($\chi^2 = 70.426$, $P = .000$), and family support ($\chi^2 = 46.383$, $P = .000$) were found to be associated with patients' medication adherence. **Conclusion:** The overall patient adherence to antiretroviral therapy in the study facilities was good. Collaborative work among patients, health care organizations, and the public are necessary to tackle the adherence obstacles and enhance patient adherence to the prescribed medication.

Background

The introduction of highly active antiretroviral therapy (HAART) has not only improved longevity in human immunodeficiency virus (HIV) infected individuals but in addition has had a significant impact on the rate of mother-to-child transmission (MTCT) of the infection.[1] The rates of MTCT of HIV infection has practically crashed to less than 2% following the introduction of HAART.[2,3] However, the success of HAART, like any medication is dependent on both the intrinsic properties of the drugs and the individual's ability to take the medication as prescribed. This is particularly true in the prevention of MTCT, where the consequence of failing to achieve viral suppression leads to transmission of the virus to the baby.[4] Adequate adherence to the prescribed antiretroviral medications is essential to achieve maximal viral suppression necessary to prevent MTCT.[3] Adherence rates exceeding 95% are necessary to maximize the benefits of antiretroviral therapy (ART). Higher levels of drug adherence are associated with improved virological, immunological, and clinical outcome[5] while poor adherence can lead to suboptimal viral

[1]Mizan Tepi University, Mizan Teferi, Ethiopia
[2]Nyinenyang Hospital, Gambela Region, Gambela, Ethiopia

Corresponding Author:
Temesgen Aferu, Department of Pharmacy, College of Health Sciences, Mizan Tepi University, Mizan Teferi, Ethiopia.
Email: temesgenaferu@mtu.edu.et

suppression, development of viral resistance, higher risk of MTCT, and mother-to-child transmission of resistant HIV strains.[4] Interrupting medication permits the virus to resume rapid replication and as many as 10^{10} viral particles will be produced per day. This allows resistant mutant strains to be generated, which are no longer responsive to available anti-retroviral drugs, posing a public health danger.[6] Even though great investment and increased access to prevention of mother-to-child transmission services by global health is underway to nullify HIV infection to children, MTCT still remains a global concern[7,8] and achieving optimal adherence to ART among pregnant woman also remained a universal challenge.[9] The same problem is happening in Ethiopia where HIV transmission from pregnant mother to child is high[10-12] and data on ART adherence during pregnancy are limited. Only few published studies that addressed level of adherence to option B+ and factors affecting it are available and no previous studies conducted in the study settings on this issue. Therefore, the current study aimed at assessing HIV-positive pregnant mothers' adherence to ART in Mizan Tepi University Teaching and Tepi General Hospitals.

Methods

Study Setting

The study was conducted at antiretroviral therapy clinics of Mizan Tepi University Teaching and Tepi General Hospitals, Southwest Ethiopia. These facilities are found 568 and 565 km away from Addis Ababa, capital city of Ethiopia, respectively. The ART clinic of Mizan Tepi University Teaching Hospital was established in 1986 while that of Tepi General Hospital was established in 1989. Both clinics provide prevention of mother-to-child transmission services in addition to adult and pediatric HIV/AIDS services.

Study Design and Period

A descriptive cross-sectional study was undertaken from April 17 to May 15, 2018.

Source and Study Population

All HIV-positive pregnant women on follow-up at the ART clinic in Mizan Tepi University Teaching and Tepi General Hospitals were the source population while all HIV positive pregnant women on follow-up at the ART clinic in the same hospitals during the study period who were 18 years of age and older and had no any mental problem were the study population.

Sample Size Determination and Sampling Technique

There was no sample size calculation made since the source population was small and therefore, consecutive sampling technique was used to include all patients who ever came during study period and fulfilled the inclusion criteria of the study.

Data Collection Procedure

Different literatures were referred to prepare tool used to measure adherence.[13,14] The prepared tool was then pre-tested and applied to pregnant mothers on ART follow-up through exit interview.

Data Processing and Analysis

The collected data were checked for consistency and completeness of information and analyzed using SPSS version 20. The relationship between dependent variable (patient medication adherence) and selected independent variables was examined using chi-square test. Then the final result of the analysis was presented using tables and descriptions.

Data Quality Assurance

To assure quality of the data, pretest was done on 5% of the sample population. The collected data were also checked daily for completeness, clarity, and logical consistency.

Operational Definitions

Good adherence: At least 95% consumption of ARTs in the past 3 months (with a maximum of 1 skipped dose a week).[5]
Poor adherence: Less than 95% consumption of ARTs in the past 3 months (with 2 or more skipped doses a week).[5]

Results

Sociodemographic Characteristics of the Respondents

A total of 103 pregnant women on ART follow-up at Mizan Tepi University Teaching and Tepi General Hospitals were interviewed regarding their ART adherence. The mean age and body mass index of these patients were 27.60 ± 5.53 years and 20.05 ± 2.16 kg/m^2, respectively. Many of the study participants were Sheka and Oromo in ethnicity accounting for 35 (34.00%) and 25 (24.30%), respectively. Concerning residence, 61 (59.20%) of the respondents lived in urban area and 42 (40.80%) were rural residents. Majority of the study participants were Muslims and protestants by religion accounting 40 (39.00%) each. Significant proportion of the respondents were married, 101 (98.00%) and had primary education, 64 (62.00%). Forty-seven (46.00%) of the respondents were housewives while 37 (36%) were merchants by occupation. Regarding pregnancy, 81 (79.00%) of the study participants were in gestational age of less than 5 months and many of the patients, 49 (48.00%), were on their third antenatal care visit (Table 1).

Table 1. Sociodemographic Characteristics of HIV-Positive Pregnant Women on Follow-up at the Antiretroviral Therapy Clinic of Mizan Tepi University Teaching and Tepi General Hospitals, 2018 (N = 103).

Sociodemographic Profile	Frequency (%)
Marital status	
Married	101 (98.05)
Divorced	1 (1.00)
Widowed	1 (1.00)
Ethnicity	
Bench	10 (10.00)
Oromo	25 (24.27)
Amhara	9 (9.00)
Maji	2 (2.00)
Sheka	35 (34.00)
Others[a]	22 (21.00)
Educational status	
Cannot read and write	26 (25.00)
Primary (grades 1-8)	64 (62.00)
Secondary (grades 9-12)	7 (7.00)
College/University	6 (6.00)
Occupation	
Farmer	12 (12.00)
Government employee	7 (7.00)
Merchant	37 (36.00)
Housewife	47 (46.00)
Religion	
Islam	40 (39.00)
Orthodox Christian	23 (22.00)
Protestant Christian	40 (39.00)
Residence	
Urban	61 (59.20)
Rural	42 (40.80)
Gestational age	
<5 mo	81 (79.00)
≥5 mo	22 (21.35)

[a]Majang, Checko, and Agnuak.

Clinical Factors Related to Respondents

Majority of the patients had a CD4 cell count of >350 (82, 80.00%) and were in the WHO clinical stage II and above (59, 57.20%). Forty-nine (48.00%) participants were on the third antenatal care visit. Many had experienced opportunistic infection (91, 88.30%) (Table 2).

ART Adherence Level of the Patients

As can be seen in Table 3, majority of the patients had good adherence to their ART medications, 68 (66.00%). Of the total patients having poor adherence, 12 (34.00%) stated that they failed to adhere to their medication because of the side effects they got from the pills. Forgetfulness and distance of the hospital from their home were also the main reasons for patients' nonadherence, each accounting 11 (31.00%) (Table 3).

Factors Associated With Medication Adherence

Analysis of medication adherence by selected independent variables indicated that patients' frequency of counseling was associated with adherence ($P = .000$). Patients who received counseling frequently were more likely adherent to their medication than those who did not. Patients who had greater than 350 CD4 cells were more likely to exercise overall good adherence practices than patients having 350 and less CD4 cells ($\chi^2 = 37.529$, $P = .000$). It was also found that WHO clinical staging criteria were associated with adherence. As can be seen in Table 4, patients who were in the clinical stage I (asymptomatic stage) were more likely to exercise good adherence when compared with patients who were in clinical stage II and greater ($\chi^2 = 17.515$, $P = .000$). There was an association between overall MMAS (Morisky Medication Adherence Scale) score in terms of mark of disgrace (stigma) associated with being HIV positive. Patients who did not experience stigma were more likely to exercise good adherence when compared with patients who experienced stigma associated with their HIV status ($\chi^2 = 70.426$, $P = .000$). Family support was also associated with adherence. Patients who had good family support were more likely adherent than those patients who had no family support ($\chi^2 = 46.383$, $P = .000$) (Table 4).

Discussion

Adherence to ART among HIV positive pregnant women varies from place to place based on different factors and the current study assessed this issue in selected facilities in Southwest Ethiopia. As to this study, good adherence was achieved by 68 (66.00%) respondents. This level of adherence is comparable to a study conducted in Ukraine, which revealed an adherence level of 65%.[15] But it is higher than the finding of studies conducted in Kyela District, Tanzania and Addis Ababa, Ethiopia that reported 50% and 61% adherence level, respectively.[16,17] The higher result in the current study might be because of differences in patient understanding of the importance of the adherence to medications and strength of adherence promoting activities done in the facilities. Facilities in the current study might have performed more in strengthening adherence and hence better patients understanding of medication adherence. On the other hand, the overall adherence level of this study is by far less than results reported by the studies conducted in Tigray regional state (87.1%) and western Kenya (89%).[14,18] This might be related to women's lower educational status, which affects understanding level of the importance of adherence. Many study respondents in the current study had

Table 2. Clinical Factors Related to HIV-Positive Pregnant Women on Follow-up at the Antiretroviral Therapy Clinic of Mizan Tepi University Teaching and Tepi General Hospitals, 2018 (N = 103).

Variable	Frequency (%)
CD4 cell count	
≤350	21 (20.00)
>350	82 (80.00)
WHO clinical stage	
Stage I	44 (42.70)
Stage II and above	59 (57.20)
Antenatal care visit	
First visit	13 (13.00)
Second visit	21 (20.38)
Third visit	49 (48.00)
Fourth visit	20 (19.41)
Opportunistic infection status	
Present	91 (88.30)
Absent	12 (11.70)

Table 3. Antiretroviral Therapy (ART) Adherence Status Among HIV-Positive Pregnant Women on Follow-up at ART Clinic of Mizan Tepi University Teaching and Tepi General Hospitals, 2018 (N = 103).

Adherence Characteristic	Frequency (%)
Adherence status	
Good	68 (66.00)
Poor	35 (34.00)
Reasons for poor adherence	
Medication side effect/s	12 (34.00)
Forgetfulness	11 (31.00)
Stock finished	1 (3.00)
Distance of the facility from home	11 (31.00)

primary education only compared to studies done in Tigray regional state and western Kenya.

Studies reported that HIV/AIDS patients failed to adhere to their medication because of the side effects of the drugs, forgetting the pills, and distance of the health facilities from home.[14,16,19] The current study also identified these factors among the main hindrances to patient adherence to the prescribed medication. Such obstacles may open door for disease progression and hence put patients' health at risk. Drug resistance, one of the challenges in the current health care delivery may also result and hence need to be paid attention.

The current study showed that frequency of counseling was associated with ART adherence. Respondents who were counseled repeatedly were more likely to have good adherence than those who were not. This finding is similar to study done in Tigray regional state that underlined patients counseling as one of the main factors affecting ART adherence.[14] The association between these 2 variables shows the significance of patient counseling in promoting adherence and therefore the facilities are expected to take lessons from this relationship and strengthen their counseling activity.

It was revealed in the current study that patients with greater than 350 CD4 cells were more likely to exercise overall good adherence practices than patients having 350 and less CD4 cells. This higher adherence exercise might come from the fact that ART increases CD4 cells count and the patients' belief that they were getting better and better with increase in CD4 count and patients' self-convincing that they should adhere more to get better improvement. The decrease in adherence level with an increase in disease's clinical stage in the current study might be associated with patients' inability to tolerate the side effects of the medication with increased disease stage and hence patients preferring to skip or cut the doses. Distance of the facility from patients' home might also matter. Those patients with earlier stage are more likely to have the ability to collect their medication from distant facility compared to those with progressed stage.

It was found in Zambia and Tanzania that stigma associated with being HIV/AIDS positive demoralizes patients and negatively influences their adherence to the prescribed medication.[16,20] The current study also found that pregnant women who did not experience stigma exercised good adherence compared to those who experienced stigma associated with HIV/AIDS. The consequences of this odd view are not limited to the patients; it affects family, society, and the country at large. The effect that it has on economy and societal relation is also enormous and therefore the health facilities, nongovernmental organizations, scholars, and society should contribute much on how to tackle this sense of disgrace and empower HIV/AIDS patients in general and pregnant women in particular. Those patients who received support from their families were found to be more likely to adherence to their medication compared to those who did not in the current study just in line with the result of the study conducted in Nigeria.[19]

Conclusion

Even though there exist issues to be addressed, the overall patient adherence to ART in the study facilities was good. Concerned stakeholders including the health facilities, nongovernmental organizations, zonal health offices, regional health bureau, and ministry of health should work better in tackling the identified obstacles of adherence.

Table 4. Factors Associated With Medication Adherence Among HIV-Positive Pregnant Women on Follow-up at the Antiretroviral Therapy Clinic of Mizan Tepi University Teaching and Tepi General Hospitals, 2018 (N = 103).

	MMAS Overall Status			
Variables	Good, Frequency (%)	Poor, Frequency (%)	χ^2	P
Social drug use			—	.061
Coffee	56 (82.4)	20 (57.1)		
Others[a]	11 (16.2)	15 (42.9)		
Occupation			—	.080
Farmer	10 (15)	2 (6)		
Merchant	26 (38)	11 (31)		
Housewife	25 (37)	22 (63)		
Frequency of counseling			—	.000*
Yes	62 (91.2)	27 (77)		
No	6 (8.8)	8 (23)		
CD4 count			37.529	.000*
≤350	2 (3)	19 (54)		
>350	66 (97)	16 (46)		
WHO clinical stage			17.515	.000*
Stage I	39 (57)	5 (14)		
Stage II and above	29 (43)	30 (86)		
Stigma			70.426	.000*
Yes	4 (6)	31 (89)		
No	64 (94)	4 (11)		
Family support			46.383	.000*
Yes	52 (76.5)	2 (6)		
No	16 (23.5)	33 (94)		
Opportunistic infection status			—	.065
Yes	56 (82)	29 (82.8)		
No	12 (18)	6 (17.14)		

Abbreviation: MMAS, Morisky Medication Adherence Scale.
[a]Tea and chemo.
*Statically significant (P < .05).

Ethical Approval

Ethical clearance was secured from the department of pharmacy, college of Medicine and Health Sciences, Mizan Tepi University and submitted to the study hospitals' administrative bodies for obtaining a permission to undertake this study.

Informed Consent

Participants were provided an explanation on the study aims and were included in the study after they provided verbal consent. The confidentiality of the study participants was maintained by assigning unique study identifiers during data collection and analysis.

ORCID iDs

Temesgen Aferu [iD] https://orcid.org/0000-0003-1532-7359
Tadesse Nigussie [iD] https://orcid.org/0000-0003-3123-5809

References

1. Ikechebelu JI, Ugboaja JO, Kalu SO, Ugochukwu EF. The outcome of prevention of mother to child transmission (PMTCT)

of HIV infection programme in Nnewi, Southeast Nigeria. *Niger J Med*. 2011;20:421-425.

2. Homsy J, Moore D, Barasa A, et al. Mother-to child HIV transmission and infant mortality among women receiving highly active antiretroviral therapy (HAART) in rural Uganda. In: Proceedings of the XVI International AIDS Conference; August 2006; Toronto, Ontario, Canada.

3. Hamdela B, Zekiewos G, Workneh T. Knowledge on mother to child transmission and utilization of services designed to prevent mother to child transmission of HIV/AIDS among pregnant women in Hosanna Town, Southern Ethiopia. *Journal of AIDS & Clinical Research*. 2014;5(12):396.

4. Bardeguez AD, Lindsey JC, Shannon M, et al. Adherence to antiretrovirals among US women during and after pregnancy. *J Acquir Immune Defic Syndr*. 2008;48:408-417.

5. Murphy DA, Roberts KJ, Martin DJ, Marelich W, Hoffman D. Barriers to antiretroviral adherence among HIV infected adults. *AIDS Patient Care STDS*. 2000;14:47-58.

6. World Health Organization. *Progress Report. Global Health Sector Response to HIV, 2000-2015: Focus on Innovations in Africa*. Geneva, Switzerland: World Health Organization; 2015.

7. Joint United Nations Programme on HIV/AIDS. *UNAIDS Report on the Global AIDS Epidemic 2016*. Geneva, Switzerland: Joint United Nations Programme on HIV/AIDS; 2016.

8. World Health Organization. *Antiretroviral Drugs for Treating Pregnant Women and Preventing HIV Infection in Infants: Recommendations for a Public Health Approach*. Geneva, Switzerland: World Health Organization; 2010.

9. Paredes R, Marconi VC, Lockman S, Abrams EJ, Kuhn L. Impact of antiretroviral drugs in pregnant women and their children in Africa: HIV resistance and treatment outcomes. *J Infect Dis*. 2013;207(suppl 2):S93-S100.

10. Department of Health and Human Services. *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women, for Maternal Health and Interventions to Reduce Prenatal HIV Transmission in the United States*. Washington, DC: Department of Health and Human Services; 2014.

11. Federal HIV/AIDS Prevention and Control Office and Federal Ministry of Health. Guidelines for prevention of mother-to-child transmission of HIV in Ethiopia. https://www.ilo.org/wcmsp5/groups/public/—ed_protect/—protrav/—ilo_aids/documents/legaldocument/wcms_125389.pdf. Published July 2007. Accessed January 14, 2020.

12. World Health Organization. *UNAIDS Report on the Global AIDS Epidemic 2013*. Geneva, Switzerland: World Health Organization; 2013.

13. Steel G, Nwokike J, Joshi MP. *Development of a Multi-Method Tool to Measure ART Adherence in Resource-Constrained Settings: The South Africa Experience*. Arlington VA: Management Sciences for Health, Rational Pharmaceutical Management Plus Program, Center for Pharmaceutical Management; 2007.

14. Ebuy H, Yebyo H, Alemayehu M. Level of adherence and predictors of adherence to the Option B+ PMTCT programme in Tigray, northern Ethiopia. *Int J Infect Dis*. 2015;33:123-129. doi:10.1016/j.ijid.2014.12.026

15. Bailey H, Thorne C, Malyuta R, Townsend CL, Semenenko I, Cortina-Borja M; Ukraine European Collaborative Study Group in EuroCoord. Adherence to antiretroviral therapy during pregnancy and the first year postpartum among HIV-positive women in Ukraine. *BMC Public Health*. 2014;14:993.

16. Ngarina M, Popenoe R, Kilewo C, Biberfeld G, Ekstrom AM. Reasons for poor adherence to antiretroviral therapy postnatal in HIV-1 infected women treated for their own health: experiences from the Mitra Plus study in Tanzania. *BMC Public Health*. 2013;13:450.

17. Mirkuzie AH, Hinderaker SG, Sisay MM, Moland KM, Mørkve O. Current status of medication adherence and infant follow up in the prevention of mother to child HIV transmission programme in Addis Ababa: a cohort study. *J Int AIDS Soc*. 2011;14:50.

18. Ayuo P, Musick B, Liu H, et al. Frequency and factors associated with adherence to and completion of combination antiretroviral therapy for prevention of mother to child transmission in western Kenya. *J Int AIDS Soc*. 2013;16:17994.

19. Ekama SO, Herbertson EC, Addeh EJ, et al. Pattern and determinants of antiretroviral drug adherence among Nigerian pregnant women. *J Pregnancy*. 2012;2012:851810.

20. Okawa S, Chirwa M, Ishikawa N, et al. Longitudinal adherence to antiretroviral drugs for preventing mother-to-child transmission of HIV in Zambia. *BMC Pregnancy Childbirth*. 2015;15:258. doi:10.1186/s12884-015-0697-7