Research Article

Predictors of Poor Quality of Life among People Living with HIV/AIDS on Antiretroviral Therapy in Jimma Zone Public Hospitals, South West Ethiopia: A Mixed-Method Study

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ABSTRACT

Background: Given the benefits of ART (Antiretroviral Therapy) for people living with HIV/AIDS, their quality of life continues to impair. Moreover, several studies have been investigated the magnitude of quality of life among developed countries with a paucity of behavioral and psychosocial factors. Thus, the objective of this study was to identify predictors of poor quality of life among people living with HIV on ART in Jimma Zone Public Hospitals, Southwest Ethiopia.

Methods: Institution-based case-control study triangulated with a qualitative method was employed. The sample size was determined using Epi-info 7.1.1 using the ratio of 1:3 cases to controls. Census was employed to screen cases and controls. Then, all cases with apparently a random sampling technique of controls were enrolled. Quality of life was measured using the mean value of the WHO-HIV brief measurement. Data were entered into Epi-Data and analyzed using SPSS version 20. Qualitative data were collected from purposely selected key informants and analyzed manually. The study was conducted from March 10 to April 30, 2018.

Results: a total of 81(25.1%) cases and 242(75.9%) controls were included in the study. Those PLWHA who chew Khat occasionally (AOR: 4.3; 95% CI: 1.01,17.8) and at weakly intervals (AOR: 6.3, 95% CI:2.0, 20.7), Stigmatism(AOR: 9.2; 95% CI:3.5, 24.3), severe depression(AOR: 16.1; 95% CI:5.2, 49.6), fair baseline ART adherence (AOR: 10.4; 95% CI:2.4, 44.8), poor baseline ART adherence (AOR: 6.4;95% CI:2.0,20.7), baseline WHO stage III, IV(AOR4.9,95%CI:2.0,11.5), current WHO stage III,IV (AOR: 3.9; 95% CI: 1.1, 13.5), current BMI <18.5 kg/m^2 (AOR 2.37 95% CI (1.00, 5.62) and recent low hemoglobin level <12.8 mg/dl (AOR: 4.1; 95% CI:1.7, 9.7) were independently associated with poor quality of life. Key informant interviews identified that financial and food insecurity, stigma and discrimination, poor adherence, and side effect were the predictors that affect the quality of life.

Conclusion: Multiple predictors of poor quality of life have been identified from the quantitative and key informant interviews. Khat chewing frequency (occasionally and weekly), stigma, depression, baseline drug adherence, duration on ART (less than 36 months), baseline WHO stage III/IV, Current WHO III, IV, being underweight in the current BMI, most recent hemoglobin level below 12.8 mg/dl, including financial and food insecurity, stigma and discrimination, poor adherence and side effect from key informant interview. Therefore, targeted behavior change programs and support on avoiding behavioral factors like khat chewing, alcohol, shisha should be ensured by incorporating responsible bodies. Counseling and guidance on treatment adherence and follow-up should be done. Continuous awareness creation, dietary diversity, and modifications and guide on income-generating activities.

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ABBREVIATIONS

AH: Agaro Hospital; AIDS: Acquired Immune Deficiency Syndrome; ART: Antiretroviral Therapy; BMI Body Mass Index; CI: Confidence Intervals; ART: Highly Active Antiretroviral Therapy; HIV: Human Immune Deficiency Virus; JUMC: Jimma University Medical Center; PLWHA: People Living with HIV/AIDS; LGH: Limu Genet Hospital; PCA: Principal Component Analysis; SSA: Sub-Saharan Africa; SGH: Shenen Gibe Hospital; WHO: World Health Organization.

INTRODUCTION

HIV/AIDS (Acquired Immunodeficiency Syndrome) is a fatal illness that affects the body's immune system [1,2]. Globally since the start of the epidemic till 2016, 35.0 million people have died from AIDS-related illnesses, around 76.1 million people have become infected and 36.7 million People were living with HIV(PLWHIV), 34.5 million were adults and 17.8 million women (15+ years), large proportion 19.4 million people living with HIV were found in eastern and southern Africa [3]. In Ethiopia continues to be characterized by a low-intensity, a mixed epidemic with significant heterogeneity across geographic areas with adult HIV prevalence in 2016 was estimated to be 1.1% (6.6% in Gambella 5.0% in Addis Ababa) [4], in Oromiya, a total prevalence of 0.79% [5].

Despite the availability of antiretroviral drugs, globally HIV/AIDS has become among the top causes of morbidity and mortality [1]. HIV not only affects the health of individuals, but it also impacts households, communities, and the development and economic growth of nations. HIV also leads to increased mobility and unsafe migration in search of livelihoods opportunities and increased the risk of HIV in Women, and girls [6]. Studies show that HIV/AIDS continues to affect an individual's quality of life [2,7].

Quality of life (QoL) is, therefore, an important dimension of the medical outcome measurement of individuals receiving ART.WHO defines Quality of Life as an Individual's perception of their position in life affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs, and their relationship to salient features of their environment which is a disease-specific measure [8,9]. However, the other relevant to PLWHIV is the use of objective measures which include the severity of symptoms and level of functioning [10]. The use of individualized measures in research has been limited by difficulties in administering and scoring them, but in clinical practice they have immediate relevance for sharing clinical decision making between patients and clinicians, identifying patients' priorities for treatment, and facilitating the setting of realistic treatment goals [11].

The quality of life of PLWHIV is affected by several factors. A study conducted in India [2], in University teaching hospital Nigeria [12], studies in Ethiopia [13-16]showed that socio-demographic and economic factors like gender, educational status, employment status, participants' age's ranges, residence, and marital status and ever alcohol drinkers were significantly associated with a quality of life. Substance use was associated with ART non-adherence which on the other hand affects the quality of life in PLWHIV [17,18] (Table 1).

Table 1: Socio-demographic characteristics of respondents on the poor quality of life among PLWHIV.

Variables	Categories	Cases, N (%)	Controls, N (%)
Residence	Rural	17 (21)	85(35.1)
	Urban	64 (79)	157(64.9)
Sex	Male	33(40.7)	91(37.6)
	Female	48(59.3)	151(62.4)
Age	≤ 24	2(2.5)	8(3.3)
	25-34	20(24.7)	84(34.7)
	35-44	39(48.1)	101(41.7)
	≥ 45	20(24.7)	49(20.2)
Marital status	Married	6(7.4)	23(9.5)
	Single	45(55.6)	149(61.6)
	Separated	3(3.7)	10(4.1)
	Divorced	17(21.0)	23(9.5)
	Widowed	10(12.3)	37(15.3)
Religion	Orthodox	45(55.6)	85(35.1)
	Muslim	31(38.3)	120(49.6)
	Protestant	4(4.9)	35(14.5)
	Catholic	1 (1.2)	2(0.8)
Ethnicity	Oromo	37(45.7)	138(57.0)
	Amhara	23(28.4)	42(17.4)
	Keffa	10(12.3)	22(9.1)
	Dawro	4(4.9)	25(10.3)
	Others*	7(8.6)	15(6.2)
Employment status	Gov't employee	14(17.3)	39(16.1)
	Farmer/ student/retired	14(17.3)	54(22.3)

	Unemployed	3(3.7)	9(3.7)
	House wife	6(7.4)	36(14.9)
	Daily laborer	10(12.3)	43(17.8)
	Merchant/ private business	34(42)	61(25.2)
Educational status	≤ 4	36(44.4)	74(30.6)
	5-8(primary)	22(27.2)	84(34.7)
	9-12(secondary)	12(14.8)	49(20.2)
Wealth quintiles	1st quintile	28(34.6)	79(32.6)
	2nd quintile	24(29.6)	84(34.7)
	3rd quintile	29(35.8)	79(32.6)

Note: NB. Others*=Tigre, Gurage.

Concerning the psychosocial related factors, a higher level of depressive symptoms was strongly and consistently associated with a lower QoL across all the domains of both groups [19,20]. A study from Southern India revealed severe depression was associated with poor QOL [21], Zambia supported that HIV-related stigma was reported as the reason for discontinued or missed treatment dosages; which in turn affected their life [22]. The HIV group had a lower mean score of quality of life than the control groups associated with more symptoms of depression [23]. Among the Clinical, treatment, and dietary-related factors, presence of opportunistic infections and WHO stage 3 and 4 [24], Patients with chronic diseases or clinical symptoms of acute illness [21], CD4 count and duration in ART [25], treatment adherence [26,27]. A study from Korea revealed food-insecure household groups showed significantly adverse mental health status and lower QOL [28]. Similarly, obtaining sufficient nutritious food is essential for achieving and preserving health which can, therefore, improve the quality of life and help them live longer [29-31].

A commendable response to the HIV/AIDS has been provided by the Government of Ethiopia and stakeholders in terms of prevention, testing, counseling, and treatment (ART) [7,31-33]. Meanwhile, monitoring and following the status of ART patients have been part of the intervention packages. However, PLWHIV has continued to experience a deteriorated quality of life. Given that, previous studies have inclined on the magnitude, clinical, and treatment-related factors on quality of life [24,25, 31-35], with rare livelihood and nutritional factors [12,30]. Thus, this study was aimed to identify factors associated with poor quality of life among adult PLWHIV/AIDS on Highly Active Antiretroviral Therapy.

MATERIALS AND METHODS

Study area and period

The study was conducted in Jimma Zone public hospitals, Southwest Ethiopia. Jimma zone is located 357 Kms Southwest of Addis Ababa. Jimma zone is found in a region that accounted for the highest number of HIV-infected people from Ethiopia. It is found near the Gambella region, a region that accounted for the highest prevalence rate of HIV from Ethiopia. The presence of high emigration and immigration from and to the town put it at risk of high HIV transmission.

The study was taken place in four public hospitals called Jimma University Medical Center (JUMC), Shenen Gibe Hospital (SGH), Agaro hospital (AH), and Limu Genet Hospital (LGH). These hospitals were selected for the study due to the provision of ART services for a long period, have many patients on ART and their electronic medical records. These health institutions serve a catchment area of 3 million people. A total of 11,186 PLWHA were on follow-up HIV chronic care during the study (Table 2).

Table 2: Binary and multiple logistic regression models showing independently associated with poor quality of life among plwha on art in jimma zone public hospitals, south west ethiopia 2018.

Variables	Cases (N=81)(%)	Control (N=242)(%)	COR (95%CI)	AOR (95%CI)
Chat chewing				
Never	54(66.7)	190(78.7)	1.000	1.000
Occasionally	6(7.4)	14(5.8)	1.508((0.55, 4.11)	4.26(1.01, 17.83) **
Weakly	13(16)	25(10.3)	1.830(0.87, 3.81)	6.34(2.00, 20.07) **
Daily	8(9.9)	13(5.4)	2.165(0.853, 5.494)	
Stigma				
Stigmatized	42(51.9)	32(13.2)	7.06(3.985,12.534)*	9.23(3.50, 24.33)**
Not stigmatized	39(48.1)	210(86.8)	1.000	1.000
Depression				
Minimal	15(18.5)	101(41.7)	1.000	1.000
Mild	8(9.9)	39(16.1)	1.381(0.543, 3.516)	
Moderate	17(21.0)	52(21.5)	2.201(1.019, 4.751)*	

Severe	41(50.6)	50(20.7)	5.521(2.79, 10.91)*	16.13(5.24, 49.64) **
Baseline drug adherence				
Good	58(71.6)	221(91.3)	1.000	1.000
Fair	9(11.1)	8(3.3)	4.287(1.58, 11.59)*	10.37(2.40, 44.82) **
Poor	14(17.3)	13(5.4)	4.103(1.828, 9.209)*	6.35(1.95, 20.66) **
Duration on ART				
<36 months	10(12.3)	63(26.0)	0.400(0.194, 0.823)*	0.34(0.12, 0.93) **
>=36 months	71(87.7)	179(74.0)	1.000	1.000
Baseline WHO				
I, II	19(23.5)	128(52.9)	1.000	1.000
III, IV	62(76.5)	114(47.1)	3.664(2.067, 6.495)*	4.88(2.07, 11.50) **
Current WHO				
I, II	64(79.0)	230(95.0)	1.000	1.000
III, IV	17(21.0)	12(5.0)	5.091(2.312, 11.209)*	3.86(1.10, 13.52) **
Current BMI				
<18.5 kg/m^2	25(30.9)	47(19.4)	1.852(1.049, 3.272)*	2.37(1.00, 5.62) **
>=18.5 kg/m^2	56(69.1)	195(80.6)	1.000	1.000
Most recent HGB level				
<12.8 mg/dl	34(42.0)	54(22.3)	2.519(1.475, 4.300)*	4.11(1.73, 9.74) **
>=12.8 mg/dl	47(58.0)	188(77.7)	1.000	1.000

Note: COR: Crude Odds Ratio, CI: Confidence Interval, AOR: Adjusted Odds Ratio.
* Variables which shown significant association during the bivariate analysis.
** Variables which shown significant association during the multivariate analysis.

Study design

Institution based case control design triangulated with qualitative study was employed.

Population

Definition of cases and controls: Case: An individual patient living with HIV/AIDS aged ≥ 15 years enrolled into ART clinic with defined poor quality of life using WHO brief score below the mean value.

Control: An individual patient living with HIV/AIDS and aged ≥ 15 years enrolled to ART clinic with defined good quality of life using WHO brief score above the mean value in the study settings of Jimma zone.

Source population

All adult people living with HIV/AIDS age ≥ 15 years on ART found in Jimma zone public hospitals.

Inclusion criteria

Adult People living with HIV aged ≥ 15 years and started ART treatment and at all stages of HIV disease for quantitative and purposely selected key informants for qualitative.

Sample size determination and sampling technique

The sample size was calculated by using (statistical EPI info 7.1.1) software package considering the percent of controls exposed (being unemployed) among socio-demographic factor among controls is 54% and among cases 73.1% with AOR of 2.32 by considering the following parameters: 95% CL, 80% power, a case to control the ratio of 1:3 with 10% of non –response rate. Accordingly, the final sample size, required was 323(81 cases and 242 controls) the largest sample size is taken by considering all objectives which give a more representative sample than other predictors for quantitative data [25]. For qualitative key informants were purposely selected from each hospital composed of patient participants of local language speakers, including adherence supporters, health professionals, and case managers of both sexes.

First hospitals were selected due to the presence of ART services for a minimum of three years, have many patients on ART and their electronic medical records. After the screening was conducted using census, then, all cases with apparently a random sampling technique of controls were enrolled in the study.

Data collection instruments and procedures

Quantitative part: Interviewer-administered structured questionnaire was used as a data collection tool that was adapted according to local context and objectives of the study [7,24,25].

The questionnaires contain a screening part that contains six dimensions of the WHO-HIV quality of life assessment tool. The main section of the tool contains socio-demographic, economic information, behavioral factors, and psychosocial related and, clinical and treatment related factors.

Qualitative part: Open-ended in-depth interview guide was used among purposely selected participants.

Data collection procedure

For the quantitative part, face to face interview using a short interviewer-administered structured questionnaire was employed. Screened using census into eligible and none eligible participants who were classified those eligible clients as cases and controls by the facilitator. After the screening of cases and controls, respondents were sent to two data collection rooms; then, face to face interview was implemented to collect the necessary information.

Data collection was done by two nurses in each hospital who work in respective ART clinics.

One supervisor was assigned to each site to oversee the process. Data on patients' characteristics were collected. Then, clinical and treatment-related data were retrieved from the registry using unique identification numbers. Note-taking and tape recording was used for the qualitative part.

Data were collected until saturation of the idea. Then data were thoroughly checked and kept by the principal investigator after the quantitative data were collected.

Data processing and analysis

For quantitative-Collected data were first checked manually for completeness and consistency by supervisors during the time of data collection and rechecked at the office by the principal investigator before data entry. Then, data were entered into Epi Data version 3.1 and exported to SPSS version 20 for analysis. Quality of life was measured using the mean value of the WHOHIV brief measurement. Then, the higher total score denotes higher/good quality of life and the lower score denotes the low/poor quality of life. The tool has been used in Ethiopia and these study settings. [7,24,25].

Descriptive statistics were done along with principal component analysis for the wealth index.

Both bivariable and multivariable logistic regression analyses were fitted to identify factors associated with poor quality of life. Variables with a P-value of <=0.25 in the bivariable analysis were transformed into the multivariable analysis. In multivariable analysis, variables with a pvalue of less than 0.05 were considered statistically significant. Adjusted odds ratio (AOR) with the corresponding 95% confidence interval (CI) was used to show the strength of association.

The final model was constructed using a backward logistic regression method. Model fitness was checked by Hosmer and Lemeshow test statistics. The recorded Interviews were transcribed carefully and different colors were used to indicate different responses to categorize into the main responses were described indirect quotation.

RESULTS

Socio-demographic data of study participants

A total of 81(25.1%) cases and two hundred forty-two (74.9%) controls were enrolled in the study. The mean age of cases was 38.67 (SD ± 8.22) years and 37.55 (SD ± 8.92) for controls. Thirty-eight (46.9%) of cases and 118(48.8%) controls had experienced any kind of substance ever. HIV/AIDS status disclosure was almost similar in both cases and controls with about 74.1% and 76% respectively.

Predictors of quality of life

To assess the socio-economic predictors' wealth index was determined by computing Principal Component Analysis (PCA). Out of a total of 24 variables used the wealth index score was made by 8 variables with 3 components that explained a total variance of 66.862% and Kaiser Meyer Olkin measure of sampling adequacy 0.755 with Bartlett's test of sphericity at a significant level of 0.001.

The PCA result showed that three variables were highly loaded on the first and second PCA components namely own mobile, bed with a sponge, fuel charcoal, household farmland, own household, sheep, goats, and two variables in the third component namely having refrigerator and fuel electricity. The final rotated components were converged in four iterations using Varimax with Kaiser Normalization. These standardized scores were then used to create points that define the wealth index from lowest quintile (poorest) to highest quintile (wealthiest). These index variables were run in the bivariate logistic regression but were not considered a statistically significant candidate for multivariate logistic regression analysis. However, it was speculated by (36 years old female from an urban area) in the interview.

"You better leave asking such a question! Because my body is wasted thinking of food. e.g. I frequently encounter missing powder for injera; due to high cost and low capacity to accommodate for the demand family." you know, my husband is employed as a guard for 1000 birr. It can't pay for the cost of food, house rent, and other demands for the family. Therefore missing meal frequency patterns is a common pattern in our house due to poor socioeconomic status. It also leads to free sex work and other problems."

Multivariate analysis in the final model showed that the odds of poor quality of life was almost 4.3 times more likely among participants who chew Khat occasionally AOR 4.26, 95% CI(1.01, 17.83) and those chewing at weekly intervals were nearly 6.4 times more likely than those who never chew AOR 6.348, 95% CI(2.00, 20.07). An interview supports that the use of stimulates is a common problem, particularly in urban settings.

"Some individuals say no HIV transmission after 4 o" clock at night. It's a means to expose themselves to risky sexual activity; after once they had been excited by different stimulants and substances such as chat, shisha, alcohol, and cigar-ate" (34 years old female patient).

The odds of poor quality of life were almost 9.2 times more likely among stigmatized respondents than not stigmatized AOR 9.23, 95%, CI (3.50, 24.33). Stigma and discrimination still exist even in a church which was explored from the qualitative finding as speculated by, 42 years old, female urban participants.

"Last week, I and my friend went to church to follow a program. Eventually, she took her ART treatment while on the way to sleep. Later on, those who were beside moved away and left us alone." At the same time,

"About 85% of the participants reported that they had experienced at least one type of stigma and discrimination." Severely depressed were about 16 times more likely to ha have a poor quality of life than those with mild depression [AOR 16.13, 95% CI (5.24, 49.64)].

Of the clinical and treatment-related factors, the odds of poor quality of life was about 10.4 times more likely among fair baseline ART adherence [AOR 10.37(2.40, 44.82)], and baseline line ART adherence about 6.4 times AOR6.35, CI(1.95, 20.66) than good baseline ART adherence. This idea is supported by the qualitative finding speculated from a 36 years old female. "Previously, my husband has discontinued the drug for about 8 months including rarely after. Due to this, we have conflicted and finally, divorced each other. After I told him repeatedly, he sustained to follow."

Likewise, the likely hood of poor quality of life among participants of less than 36 months of duration on ART was nearly 65% less likely as compared to those greater than or equal to 36 months of duration on ART AOR 0.34, 95%CI (0.12, 0.9 Baseline line WHO stage III, IV were nearly 5 times AOR 4.88 95% CI (2.07, 11.50), and current WHO stage III, IV nearly 4 times

AOR 3.86, 95% CI (1.10, 13.52) more likely poor quality than respondents baseline and current

WHO stage I, II. "The majority of patients did, however, take their ART regardless of the trepidations due to adverse effects and insufficient food right that time, getting drugs easily was highly valued and patients described ART as „ a new hope for the future." (Male health care provider).

The presence of ART has brought bright future for PLWHIV during their stay at bed for several weeks of admission. The interview from 42 years old man confirmed that, "My happiest moment was when I heard about the drug on my way to die. I used to think that I wouldn't get up from that bed; rather, I would have died. "

The likelihood of poor quality of life was 2.4 times higher among individuals of being underweight in the current body mass index AOR 2.37, 95% CI (1.01, 5.62), whereas almost 4 times among low most recent hemoglobin level AOR 4.11, 95% CI(1.73, 9.74).

DISCUSSION

This study aimed to identify predictors of poor quality of life among adult HIV patients on ART at public hospitals of Jimma zone, Southwest Ethiopia. Unlike many other studies, this study presented multiple predictors corresponding to socio-demographic and economic, clinical, and treatment-related, behavioral, psychosocial factors, and livelihood factors. Accordingly, from the behavioral factors, participants who chew Khat occasionally were almost 4 times and weakly nearly 6 times

more likely poor quality of life than those who never chew at all [36-38]. This was also speculated by the interviewee that other types of behavioral factors including Shisha lead to poor quality of life by increasing risky sexual behavior.

Regarding psychosocial predictors of poor quality of life, the odds of poor quality of life among stigmatized respondents were almost 9 times more likely than participants who were not stigmatized. This study is supported by the finding conducted in Mekele town Northern Ethiopia, Southern India and the United Kingdom presented that high perceived stigma, severe self-stigma, and those with severe disclosure concerns were strongly associated with poor quality of life [20,23,29]. Likewise, forty-eight percent of women and 35% of men thought that children living with HIV should not be able to attend school with children who are HIV negative; 55% of women and 47% of men would not buy fresh vegetables from a shopkeeper with HIV [31,39]. It is supported by the interview from female adherence supporters that PLWHIV still suffers during their contact with their neighbors/communities.

The odds of poor quality of life among severely depressed PLWHIV were about 16 times more likely than participants with mild depression. This is supported by the studies done in Addis Ababa and else were stated that the higher level depressive symptoms were most strongly and consistently associated with a lower QoL, followed by high levels of HIV stigma [24,36-39].

This is also supported by the majority of respondents during the interview session. The odds of poor quality of life among baseline line ART adherent participants were almost ten times and baseline line ART adherent nearly 6 times more likely than those with baseline line ART adherents. The finding was buttressed by studies Northwestern Ethiopia, Bahirdar, and Mekele which revealed that drug adherence of people on HAART was found to be a significant predictor of poor health-related quality of life. People who had poor drug adherence were 3.2 times more likely to be room for poor QoL than good drug adherence [3,24-25].

This could be explained that since drug adherence is associated with CD4 level and viral loads this intern exacerbates the outcome of patients, hence poor ART adherence leads to poor quality of life [6, 19,22].

Duration on ART less than 36 months is nearly 66 times less likely to be poor quality of life than those greater than or equal to 36 months. Similar to the study done in Mekele town and Keniya that the odds of poor physical, level of independence, and social-related quality of life were 52%, 48%, and 52% less likely than their counterparts[26,29]. But the other study from North West Ethiopia and Nigeria opposes in such a way that HIV-infected patients with a longer duration on ART were associated with a higher quality of life [24, 39, 40]. Therefore, the present study should because clients who started ART earlier and adhere to it might have developed good quality of life than three years of enrolment to the care.

Regarding the WHO stage, individuals baseline WHO stage III, IV was about 5 times and current WHO stage III, IV nearly 4 times more likely to experience poor quality of life than those of WHO stage I, II. This study is comparable with the study

conducted in Uganda that patients in stages 3 and 4 reported to have a poor quality of Life than their counterpart [21]. On the other hand, the Ho Municipality, Ghana study revealed that symptomatic patients significantly presented with a lower overall quality of life [41]. Similarly, HIV-Visceral Leishmaniasis, Severe cases of diabetic Mellitus, and hypertension co-infected symptomatic patients had a lower quality of life in all the domains as compared to HIV patients without co-infection [25, 35, 38-39,42].

Being under-weight participants were 2.3 times more likely to experience poor quality of life than the normal respondents. This finding is buttressed with the cohort of Irish that the likelihood of having lower Quality of Life in Individuals with abnormal BMI categories of WHO classification especially among underweight and overweight respondents than the normal one [42]. Likewise, the other study from Nepal showed the three parameters (height, weight, and BMI) were found to be significantly associated [19,27,35]. The discussants have portrayed that lack of access to different kinds of food was a major obstacle to adhere to the treatment which might lead to be underweight and finally rendering to poor quality of life. At the last, the likelihood of poor quality of life among participants whose hemoglobin level below 12.8 mg/dl was 4.11 times more likely than greater than 12.8 mg/dl. This might be because individuals with lower levels of hemoglobin are more likely to develop opportunistic infection in line with the severity of comorbidities [35,38-39,42]. A study in Northwest Ethiopia shows that there was a decline in the prevalence of anemia and increment of mean CD4 cell count among HIV-infected patients after HAART initiation. A study from Uganda reported that resolution of baseline anemia was associated with comparable immune recovery, QOL, and risk of hospitalization/death over 18 months relative to PLWHA anemia free throughout [42].

STRENGTH AND LIMITATIONS

A relatively strong design with qualitative triangulation has been used. Despite this strength, the respondents might over/under report some behavioral and psychosocial factors due to social desirability influenced patients to answer though efforts have been made to reduce the bias.

CONCLUSION AND RECOMMENDATION

Finally, Khat chewing frequency (occasionally and weekly), stigma, depression, baseline drug adherence, duration on ART(less than 36 months), baseline WHO stage III/IV, Current WHO III, IV, being underweight in the current BMI, most recent hemoglobin level below 12.8 mg/dl were independently associated with poor quality of life. Therefore, targeted behavior change programs and support on avoiding behavioral factors like khat chewing, alcohol, shisha should be ensuredby incorporating responsible bodies. Counseling and guidance on treatment adherence and follow-up should be done. Strict counseling and guidance on treatment adherence and follow-up, continuous awareness creation, dietary diversity and

modifications, and guide on income-generating activities should be done.

ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

Ethical clearance was obtained from Jimma University Research Ethics Review Committee. The formal written letter was obtained from the Population and Family health department, permission was obtained from the Jimma zone health office and respective hospitals. After providing information about the research, Informed consent was obtained from all subjects and/or their legal guardian(s). All methods were performed following the relevant guidelines and regulations.

CONSENT FOR PUBLICATION

Not applicable

AVAILABILITY OF DATA AND MATERIALS

The data sets used and/or analyzed during the current study are available from the author on reasonable request.

COMPETING INTERESTS

The author declares that they do not have competing interests.

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AUTHOR' CONTRIBUTIONS

The author was involved in the inception, design, data acquisition, analysis, and interpretation, and wrote the manuscript. Participated in design, data acquisition and analysis, administrative matters, and reviewing the manuscript. Participated in data acquisition, data management, and analysis as well as critically reviewing the manuscript.

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