ORIGINAL PAPER

Health-related quality of life and associated factors among HIV-positive individuals on antiretroviral therapy at Debre Markos Referral Hospital, Northwest Ethiopia

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Abstract

Introduction: Human immunodeficiency virus (HIV)-positive patients struggle with numerous social problems; they are vulnerable to repeated opportunistic infections that withdraw them from regular work, which further leads to economic problems and reducing their overall quality of life. Therefore, the aim of this study was to assess health-related quality of life (HR-QoL) and associated factors among HIV-positive individuals on antiretroviral therapy at Debre Markos Referral Hospital, Northwest Ethiopia.

Material and methods: An institution-based cross-sectional study was conducted among 428 randomly selected adult HIV-positive individuals on antiretroviral therapy. Data were entered into Epi-data software version 3.1 and then exported to STATA version 14 for analysis. Binary logistic regression was fitted, and adjusted odds ratio (AOR) with 95% confidence interval (CI) was computed. Variables with p-value < 0.05 in multi-variable logistic regression model were significantly associated with HR-QoL.

Results: The proportion of good HR-QoL was 46% (95% CI: 41.3-50.8%). The mean score of QoL was highest for independence domain (12.78%) and lowest for spiritual domain (11.63%). Variables, such male (AOR: 1.88; 95% CI: 1.15-3.07%), urban residence (AOR: 4.11; 95% CI: 1.44-11.73%), alcohol drinking (AOR: 3.04; 95% CI: 1.66-5.59%), attending counselling service (AOR: 2.62; 95% CI: 1.58-4.34%), working functional status (AOR: 4.03; 95% CI: 1.73-9.35%), viral load less than 1,000 copies (AOR: 2.27; 95% CI: 1.31-3.94%), and highest wealth quintile category (AOR: 1.26; 95% CI: 1.08-3.89%) were significantly associated with good HR-QoL.

Conclusions: In this study, HR-QoL for HIV patients on antiretroviral therapy was poor. Being male, urban residence, drinking alcohol, attending counseling service, working functional status, viral load, and wealth quintile were significantly associated with HR-QoL of HIV individuals on antiretroviral therapy.

Introduction

Globally, human immunodeficiency virus (HIV) continues to be a serious public health problem, and approximately 37.9 million people are living with HIV [1]. Two-thirds of the worldwide total number of new HIV infection occur in sub-Saharan Africa [2]. Antiretroviral therapy (ART) not

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only prolongs lives of HIV patients, but also provides better quality of life (QoL), allowing them to return to work, take care of their families, and contribute to their communities [3]. ART halts or reverse the disease progression and thereby, prolongs life by improving and strengthen QoL of people living with HIV [4]. Through understanding of achievable longer life-time among people using ART, QoL has emerged as a significant medical outcome measure and its' enhancement has a crucial goal [5].

QoL is a multidimensional concept, which commonly includes a subjective assessment of both favorable and unfavorable aspects of life [6]. The World Health Organization (WHO) define QoL as "individuals' insight of their situation in life within the context of the culture and value, in which they live and in reference to their goals, standards, expectations, and concerns" [7, 8]. During the past twenty years, QoL has become a significant outcome measure in medical and psychological research, and evaluations of latest treatments, and interventions to enhance healthcare require measurement of QoL [9]. QoL measures are becoming an integral part of patient follow-up, providing valuable feedback from patients' perspective on the disease and associated interventions [3]. Even though, there have been other domains of QoL, health is one of the foremost important domains of overall QoL [10].

Health-related quality of life (HR-QoL) is a term pertaining to the impact of disease and treatment on QoL, and it is a core concept that comprises mostly self-reported measures of physical, mental, and social domains [11]. Concepts, such as independence, spirituality, and environmental factors are also considered relevant [12]. Measuring HR-QoL is increasingly relevant to assess follow-up of individuals living with HIV, and an important indicator of the effectiveness of HIV treatment and care programs [13, 14]. It has become an increasingly popular subjective health evaluation method in chronic diseases [15], and assessment in HIV takes into account the impact of disease and ART on individual's physical, psychological, and social well-being, from patient's perspective [14]. ART care service can use HR-QoL to monitor patient needs, improve engagement and retention in care as well as it becomes increasingly clear that monitoring HR-QoL is important for sustainability of ART programs and assessment of burden of the disease [16].

Different studies across the world showed that residence, educational status, social support, employment status, duration of treatment, drug side effect, opportunistic infection, CD4+ count, WHO staging, viral load, sex, and marital status were factors associated with HR-QoL in HIV-positive patients on ART [4, 14, 17-20].

HIV patients struggle with numerous social problems, including stigma, depression, substance abuse, and cultural beliefs, which can affect their QoL not only in physical health aspect, but also in mental and social health aspects [21]. Due to their compromised immunological status, they are also vulnerable to repeated opportunistic infection depriving them of regular work, which further leads to economic problems and reducing their overall QoL [22]. Hence, HIV

patients on ART need to develop strategies to cope with these daily challenges, and measuring HR-QoL of HIV infection is more important due to the chronic nature of HIV and impact of ART [23, 24]. The improvement in HR-QoL after the introduction of ART is good, but this effect wear off dramatically with the development of drug resistance, treatment failure, and serious side effects that can adversely affect patients' HR-QoL [25, 26]. Therefore, this study aimed to assess HR-QoL and its' determinants among HIV-positive individuals at Debre Markos Referral Hospital, Northwest Ethiopia. The findings could be very helpful for policy-makers, healthcare providers, and governmental and non-governmental organizations in developing strategies to promote and maintain QoL of HIV-positive individuals.

Material and methods

Study design and setting

An institution-based cross-sectional study was conducted in triangulation with qualitative approach at Debre Markos Referral Hospital from March 3 to March 31, 2020. Debre Markos town is located 300 km from Addis Ababa, and 265 km from Bahir Dar, the capital city of Amhara regional state. The town has 11 urban kebeles with a total population of 132,361, and has four ART public health facilities sites, which provide ART services for the town and population. Debre Markos Referral Hospital had a total of 3,646 ART patients, out of these 3,505 ART patients were 15 years of age and above.

Participants and variables of the study

All adult HIV-positive individuals on ART and receiving services at Debre Markos Referral Hospital for at least six months were included. Ethical clearance was obtained from ethical review committee of Debre Markos University, Health Science College (approval number: Eth/0909/2020), and a permission letter was granted from zonal health office of Debre Markos town. Verbal consent was also obtained from all study participants for the purpose of this study. The name or any other identifying information was not recorded on the questionnaire, and all information obtained from the participants were kept securely in locked cabinets.

For qualitative part, those who were not included in a quantitative study and receiving services for at least six months were included. Patients who were seriously ill or unable to communicate during the data collection period were excluded from the study. HR-QoL was the dependent variable, whereas socio-demographic characteristics, such as age, sex, religion, marital status, educational level, occupation, residence, wealth index, history of alcohol and smoking, regimen type, adherence, and clinical characteristics, including WHO clinical stages, functional status, and opportunistic infection, i.e., TB, were collected.

Good QoL expressed as participants with mean scores of above 3 were classified as good QoL, whereas those with scores = 3 and below were considered as poor QoL [27]. In

our study, individuals having more than two drinks a day for men and more than one drink a day for women, and those who smoked any tobacco product either daily or occasionally, were considered alcohol users and smokers, respectively [28]. Body mass index (BMI) was defined as underweight (< 18.5 kg/m²), normal (18.5-24.9 kg/m²), and overweight (> 25 kg/m²) [29].

Sample size and sampling technique

According to previous study report [30], sample size was calculated as 32.75% as a proportion of QoL of HIV-positive people, using a single proportion formula by Epi info version 7, assuming 5% margin of error and 95% level of confidence. The largest sample size calculated for the second objective was 402 [4]. Hence by assuming a 10% non-response rate, the final calculated sample size was 443. For the qualitative part, participants were recruited based on homogeneity, convenience, and willingness to participate.

Systematic random sampling was applied to select study participants. The ART clinic provides services from Monday to Friday, every week. On average, 125 patients on ART are treated per day, 625 patients on average are treated per week, which yield an average total of 2,500 ART patients treated per month. Based on a decision to collect data over the course of one month, the sampling interval was determined by dividing the expected or average number of ART patients per month into sample size ($n = 443$), which provided approximately a sampling interval of six. The first sample was selected using a lottery method. Then, data were collected from each study participant with the interval of six, until the desired sample size was reached. In-depth interviews were taken from a sample of 15 participants (9 females and 6 males), and they continued until point of saturation. Study participants were selected using random purposive sampling technique used by principal investigator and ART clinic coordinator to ensure that there were sufficient understandings of QoL of HIV patients. To obtain focused and in-depth views of the target population, participants' selection was based on different ages, sex, and ART regimen.

Data collection and quality control

Data were collected using a structured interviewer-administered questionnaire, WHO's quality of life HIV short-form instrument questionnaire [6], and wealth index was assessed using a tool adopted from Ethiopian demographic and health survey (EDHS) wealth index assessment questionnaire [31]. WHO's QoL HIV short-form instrument (WHOQoL-HIV-BREF) questionnaire proved a valid measure of QoL for using in clinical settings among HIV-infected people in Ethiopia, with Cronbach's α for the final tool of 0.93 [32]. For each item, there was a five-point Likert scale, and these items contain six domains: physical health (4 items), psychological well-being (5 items), social relationship (4 items), environmental health (8 items), level of in-

dependence (4 items), and spiritual health (4 items) [33]. It was pretested on 5% of the sample size for three days using Amharic translated WHOQoL-HIV short-form instrument interview questionnaire at Dejen Primary Hospital. Three healthcare professionals were data collectors, who used face-to-face interviewing by administering locally translated into Amharic language questionnaire, and two ART trained supervisors who were working in ART treatment centers were recruited.

Three days of intensive training regarding the objective of the study, how to interview the participants, and how to fill the questionnaire based on prepared instruction/guidelines as well as on confidentiality of information was provided to data collectors and supervisors. For qualitative purpose, data were collected using in-depth interview method, and an interview guide was used as a data collection tool. The tool had six questions associated to HR-QoL domains (physical, psychological, social relationship, environmental, level of independence, and spiritual domain). The guide consisted of semi-structured open-ended questions, through which information regarding the research objectives could be extracted, and was developed by the researcher according to different literature. The principal investigator was interviewing all participants and only open-ended questions were used. The tool was originally prepared in English and then it was translated into local Amharic language to assure its' language and cultural appropriateness. Each interview was recorded with an audio device, and short notes of key points with a notebook during the interview were taken. Finally, the principal investigator was transcribing audio recording with translation and interpretation. Interviews were conducted in a private room in counseling centers and majority of the interviews lasted for 15 to 30 min. To ensure accuracy of the data, members checking of themes was conducted to test whether conclusions were trustworthy and transferable to population of the study. Moreover, all participants were contacted after having obtained their qualitative data and spoke with each of them separately to discuss and confirm the interpretation of their individual results. We expanded a comprehensive track record of the data collection process. Codes and interviews were forwarded to and settled by competent experts. Every day after data collection, filled questionnaires were reviewed and checked for completeness and relevance. In-depth interview data were coded according to thematic areas.

Data processing and analysis

Data were checked for completeness, edited, coded, and entered into Epi-data version 3.1, and exported to STATA version 14 software for analysis. By taking the mean of dependent variables as a cut-off point, an average value of 3 and below was considered as 'poor quality of life' and above 3.00 was classified as 'good quality of life' [27]. WHOQoL-HIV BREF was used to produce QoL profile derived from six domain scores denoting

Table 1. Socio-demographic and clinical characteristics of adult HIV-positive individuals on antiretroviral therapy at Debre Markos Referral Hospital, Northwest Ethiopia, 2020 (*n* = 428)

Variables	*n* (%)
Sex	
Male	200 (46.7)
Female	228 (53.3)
Age group	
18-28	65 (15.2)
29-39	187 (43.7)
≥ 40	176 (41.1)
Educational status	
No formal education	147 (34.3)
Primary level	79 (18.5)
Secondary school	148 (34.6)
College and above	54 (12.6)
Marital status	
Single	109 (25.5)
Married	248 (57.9)
Divorced	5 (1.2)
Widowed	66 (15.4)
Religion	
Orthodox	383 (89.5)
Muslim	27 (6.3)
Protestant	18 (4.2)
Occupational status	
Employed	317 (74.1)
Unemployed	111 (25.9)
Residence	
Urban	252 (58.9)
Rural	176 (41.1)
Family size	
< 3	133 (31.1)
4-6	282 (65.9)
≥ 7	13 (3.0)
Current CD4+ count	
< 500	103 (24.6)
≥ 500	316 (75.4)
Current viral load	
< 1,000	301 (72.0)
≥ 1,000	117 (28.0)
ART duration	
≤ 59 months	202 (47.2)
> 59 months	226 (52.8)
Variables	*n* (%)
BMI (kg/m²)	
< 18.5	21 (4.9)
18.5-24.99	361 (84.3)
≥ 25	46 (10.8)

Table 1. Cont.

Recent WHO staging	
Stage I	156 (36.5)
Stage II	218 (50.9)
Stage III	54 (12.6)
ART regimen	
First-line	250 (58.4)
Second-line	178 (41.6)
Tuberculosis	
Yes	81 (18.9)
No	347 (81.1)

facts of an individual's perceived QoL. Domains' mean scores were computed with WHO user manual on how to score and code WHOQoL-HIV instruments [33]. Wealth index construction was performed by using principal component analysis; first separate analyses were done for urban and rural residence and finally, data were merged. Multicollinearity was examined. Step-wise backward selection was applied for variable selection and goodness of fitness of the final model was verified using Hosmer and Lemeshow statistic.

Categorical variables were summarized by counts and percentages, and binary logistic regression model was fitted by considering HR-QoL as outcome of interest. Bi-variable logistic regression model was initially fitted, and variables that were significant at $p < 0.2$ in bi-variable analysis were entered into the multi-variable logistic regression model. Crude and adjusted odds ratios with 95% confidence interval (CI) were used to determine the strength of association between dependent and independent variables. Variables with a p-value < 0.05 in multi-variable model were considered as statistically significant predictors of HR-QoL.

Qualitative data were analyzed manually. Interviews were read frequently to identify dominant themes and ideas. Consistency of ideas and experiences within individual transcripts were also examined. Then, detailed lists of categories were created to reflect major themes that emerged from the interviews, and the text from each interview transcript was coded into various categories. Data were analyzed thematically based on similarities, differences, and associations. Data were presented using tables, and relevant verbatim quotes were reported to aid in the interpretation of data.

Results

Socio-demographic and clinical characteristics

A total of 428 adult HIV patients on ART were included in the analysis. Of these, more than half (57.94%) of the participants were married and majority (89.49%) of the respondents were Orthodox. One hundred eighty-seven of the study

participants were between the age of 29 and 39 years, and the mean age of the respondents was 38.6 years (SD ± 9.85). More than one-third (34.58%) of HIV patients on ART had secondary school education, and more than half (58.88%) of the study participants were residing in urban areas. Three-fourth (75.42%) of the study participants had CD4+ count 500 and above. Nearly three-fourth (72.01%) of HIV patients on ART had a viral load less than 1,000 copies. More than half (58.41%) of the study participants were on first-line ART regimen and taking ART for more than five years and above. More than one-third (37.4%) of HIV patients' functional status were working (Table 1).

Wealth index status and domain mean score quality of HIV patients on antiretroviral therapy

Wealth quintile status of the HIV patients were second quintile 76 (17.8%), highest quintile 84 (19.6%), middle quintile 85 (19.9%), fourth quintile 87 (20.3%), and lowest quintile 96 (22.5%) (Figure 1). The mean (± SD) score of QoL was the highest for independence domain 12.78 (± 1.77), followed by physical domain 12.78 (± 1.77), and the lowest domain was a spiritual domain, with 11.63 (± 1.77). The overall mean (± SD) of QoL perception was 12.52 (± 2.69). Similarly, the mean (± SD) score for general health perception score was 12.81 (± 2.79). Overall, Cronbach's α was set as 0.90 (Table 2).

The mean score of domains of HR-QoL of HIV patients on ART on socio-demographic variables was checked. Males had a higher mean scores of all domains, except for spiritual domain, as compared to females. The educational status of HIV patients who presented with college and above education degree had the highest mean scores in physical, social, and spiritual domains; no formal education had the lowest mean scores in all six domains of QoL. Being urban residence had the higher mean score in all domains of QoL of HIV patients as compared to rural residents. HIV patients on ART, who had CD4+ count greater than or equal to 500 cells/mm^3, had a higher mean score in all domains of QoL as compared to HIV patients with CD4+ count less than 500 cells/mm^3. HIV patients on ART

with a viral load of less than 1,000 copies had higher mean scores in all domains of QoL as compared to HIV patients with a viral load greater than or equal to 1,000 copies. HIV-positive individuals on ART who had longer than 59 months duration of the disease had a higher mean score in all domains of QoL as compared to HIV patients who had less than or equal to 59 months duration of the disease (Table 3).

Socio-demographic characteristics of in-depth interviews of the participants

More than half (53.33%) of the participants were 40 years and above. The mean age of the participants was 40.8 years. One-third (33.33%) of in-depth interviews of the participants presented college and above as educational status (Table 4).

Health-related quality of life of HIV patients on antiretroviral therapy

The proportion of good HR-QoL of HIV patients on ART was 46%, with a 95% CI of 41.3-50.8%. More than half of the participants had poor QoL, and there were gender differences among the participants who responded to their
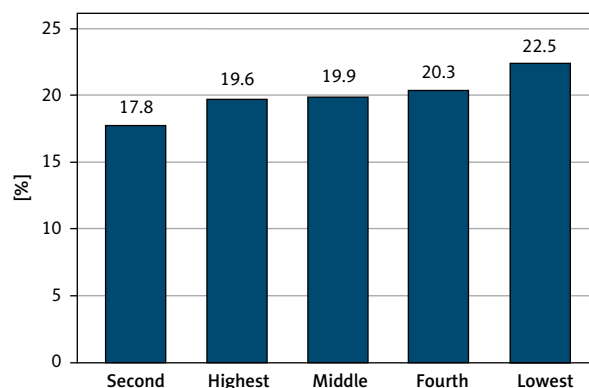

Figure 1. Wealth index status of HIV patients on antiretroviral therapy at Debre Markos Referral Hospital, Northwest Ethiopia, 2020

Table 2. Mean scores of domains quality of life (QoL) of adult individuals living with HIV on antiretroviral therapy at Debre Markos Referral Hospital, Northwest Ethiopia, 2020

Domains	Observation	Cronbach's α	Mean	SD	Minimum	Maximum
Physical	428	0.67	12.78	1.77	8.0	17.0
Psychological	428	0.79	11.78	1.76	8.0	16.8
Independence	428	0.83	12.88	1.75	9.0	18.0
Social	428	0.73	11.83	2.28	8.0	19.0
Environment	428	0.81	11.90	2.05	8.5	17.0
Spiritual	428	0.74	11.63	1.77	6.0	15.0
Overall QoL	428	0.90	12.52	2.69	4.0	20.0

Table 3. Quality of life domains scores by socio-demographic characteristics of HIV patients on antiretroviral therapy at Debre Markos Referral Hospital, Northwest Ethiopia, 2020

Variables	Domains of quality of life (mean ± SD)					
	Physical	Psychological	Independence	Social	Environment	Spiritual
Sex						
Male	13.3 ± 1.6	12.4 ± 1.7	13.4 ± 1.7	12.6 ± 2.4	12.6 ± 2.0	11.4 ± 1.5
Female	12.4 ± 1.8	11.3 ± 1.6	12.5 ± 1.7	11.1 ± 2.0	11.3 ± 1.8	11.8 ± 1.9
Educational status						
No formal education	12.6 ± 1.8	11.7 ± 1.9	12.6 ± 1.9	11.6 ± 2.2	11.7 ± 2.0	11.5 ± 1.9
Primary level	12.9 ± 1.7	12.0 ± 1.7	13.2 ± 1.6	12.2 ± 2.4	12.1 ± 2.1	11.7 ± 1.8
Secondary school	12.8 ± 1.8	11.7 ± 1.7	12.9 ± 1.7	11.8 ± 2.3	12.0 ± 2.1	11.6 ± 1.8
College and above	13.0 ± 1.6	11.9 ± 1.75	12.96 ± 1.72	12.22 ± 2.10	11.9 ± 2.0	11.9 ± 1.4
Marital status						
Single	12.8 ± 1.7	11.8 ± 1.6	13.0 ± 1.7	11.9 ± 2.4	11.9 ± 2.0	11.9 ± 1.7
Married	12.8 ± 1.8	11.7 ± 1.9	12.9 ± 1.8	11.8 ± 2.2	12.0 ± 2.1	11.5 ± 1.8
Divorced	14.0 ± 1.0	12.5 ± 2.6	13.4 ± 1.8	12.6 ± 1.5	12.7 ± 2.7	10.6 ± 1.1
Widowed	12.5 ± 1.6	11.9 ± 1.5	12.6 ± 1.6	11.5 ± 2.3	11.6 ± 2.0	11.8 ± 1.7
Age group						
18-28	12.9 ± 1.7	12.0 ± 1.8	13.1 ± 1.7	12.1 ± 2.2	12.2 ± 2.2	11.9 ± 1.6
29-39	12.7 ± 1.9	11.8 ± 1.8	12.9 ± 1.8	12.0 ± 2.4	12.0 ± 2.1	11.6 ± 1.9
≥ 40	12.8 ± 1.7	11.7 ± 1.7	12.8 ± 1.7	11.6 ± 2.2	11.7 ± 1.9	11.6 ± 1.8
Religion						
Orthodox	12.7 ± 1.8	11.7 ± 1.8	12.9 ± 1.8	11.8 ± 2.3	11.8 ± 2.1	11.6 ± 1.8
Muslim	13.3 ± 1.5	12.1 ± 1.9	13.2 ± 1.9	12.3 ± 2.1	12.5 ± 1.9	11.9 ± 1.9
Protestant	13.8 ± 1.3	12.0 ± 1.3	13.1 ± 1.6	12.2 ± 2.5	12.4 ± 1.9	11.6 ± 1.5
Residence						
Urban	13.0 ± 1.8	12.0 ± 1.7	13.1 ± 1.7	12.3 ± 2.4	12.3 ± 2.1	11.9 ± 1.7
Rural	12.5 ± 1.7	11.4 ± 1.7	12.5 ± 1.7	11.2 ± 2.0	11.3 ± 1.9	11.7 ± 1.9
Current CD4+ count						
< 500	12.0 ± 1.8	11.0 ± 1.5	12.3 ± 1.9	10.7 ± 1.8	10.9 ± 1.5	11.6 ± 2.0
≥ 500	13.0 ± 1.7	12.0 ± 1.8	13.1 ± 1.7	12.2 ± 2.3	12.2 ± 2.1	11.7 ± 1.7
Current viral load						
< 1,000	13.0 ± 1.8	12.0 ± 1.8	13.1 ± 1.7	12.3 ± 2.3	12.4 ± 2.1	11.8 ± 1.7
≥ 1,000	12.2 ± 1.8	11.2 ± 1.6	12.4 ± 1.9	10.6 ± 1.7	10.8 ± 1.5	11.7 ± 2.0
ART duration						
≤ 59 months	12.4 ± 1.8	11.3 ± 1.6	12.5 ± 1.7	11.2 ± 2.1	11.3 ± 1.7	11.8 ± 1.9
> 59 months	13.1 ± 1.7	12.2 ± 1.8	13.2 ± 1.7	12.4 ± 2.3	12.4 ± 2.2	11.9 ± 1.7

level of QoL. One-third of the respondents who had poor QoL included women. In addition, almost all the respondents said that their main reason for their poor QoL were lack of money.

A 45-year-old woman said that: "Money is everything. If I had enough money, my life would be good. However, we HIV patients had no money for daily need, which made HIV patients pass the poor quality of life".

A 30-year-old woman also said: "I am living poor quality of life. I am suffering from a financial problem. I don't have

my own house and live in a rental house. (…) Now I am living a monotonous life".

Another participant, a 32-year-old man said: "I am living poor quality of life. (…) I am suffering and struggling with many problems too live. (…) It is very difficult for me how to get my daily meal need". However, some in-depth interview participants said that they had a good QoL, and taking a single-injection might improve their QoL.

A 45-year-old man said: "…almost all of HIV patients were on one-pill per day. However, in our daily activity, we

face many problems, loss of family, fire accident, sickness in the family, and other problems. Such problems make us to forget to take pills daily and to have a poor quality of life. To have improved quality of life, I recommend taking single-injection for 3 months or 6 months; [it] should improve quality of life".

Reasons for poor quality of life

The majority of the respondents said that the main reasons for poor quality were anxiety, depression, drug side effect, and living alone. Some female participants said that being female was another reason for poor QoL.

A 56-year-old woman side: "Being female and living alone were the main reasons for poor quality of life. Anxiety, depression, drug side effect, and living without any person were additional reasons for poor quality of life". In addition, a 34-year-old man said: "(…) depression, anxiety, ART drug side effects and living lonely were reasons for poor quality of life".

However, some participants reported that money was their main reason for poor QoL. A 42-year-old man said: "(…) main reason is money. Money is everything. If I had enough money, my life would be good". Another respondent, a 36-year-old woman also said that "(…) reasons for poor quality of life were low economic status, stigma, and discrimination".

Antiretroviral therapy response and side effects

The participants that had been prepared to initiate ART at baseline said that their main concern was the potential side effects.

A 24-year-old woman said: "Since I started taking antiretroviral therapy, I had some health problems, such as depression, vomiting, diarrhea, and headache for not more than 4 weeks duration. However, now I have not any health problem, and I am okay with ART drug".

Yet another respondent, a 61-year-old woman said: "The first four or five years were good, now I feel a lot of drug side effects and additionally I suffer from hypertension disease".

However, some of the participants said that they were good with ART. A 41-year-old man stated: "I have had no problem with ART drugs. I am comfortable with them. The ART drugs have helped me to have improved health status". Similarly, a 38-year-old female said: "I have no problem with ART drugs. They have really helped me. I took them everywhere without any hesitation whether persons looked at me or not".

Factors associated with health-related quality of life

Findings from the bi-variable logistic regression analysis showed that sex, residence, drinking alcohol, getting counseling, functional status, recent WHO staging, presence of current opportunistic infection, drug side effect, duration of ART, recent CD4+ count, and recent viral load were significantly asso-

Table 4. Socio-demographic characteristics of in-depth interviews of participants living with HIV on antiretroviral therapy at Debre Markos Referral Hospital, Northwest Ethiopia, 2020 (n = 15)

Variables	n (%)
Sex	
Male	6 (40.0)
Female	9 (60.0)
Age group	
18-28	1 (6.7)
29-39	6 (40.0)
≥ 40	8 (53.3)
Educational status	
No formal education	5 (33.3)
Primary level	2 (13.4)
Secondary school	3 (20.0)
College and above	5 (33.3)
Marital status	
Single	3 (20.0)
Married	9 (60.0)
Divorced	1 (6.7)
Widowed	2 (13.3)

ciated with HR-QoL of HIV patients on ART. In the multi-variable logistic regression analysis, only sex of the participant, residence, drinking alcohol, getting counseling, functional status, recent viral load, and wealth quintile were significantly associated with HR-QoL. However, WHO clinical stage, CD4+ count, educational status, age, marital status, occupational status, ART regimen, and BMI were not significantly associated with QoL of HIV patients on ART (Table 5).

The odds of HR-QoL among patients on ART who were living in urban areas were 4 times higher (AOR: 4.11; 95% CI: 1.44-11.73%) as compared to patients from rural regions. Being male was 1.9 times (AOR: 1.88; 95% CI: 1.15-3.07%) more likely to have a better QoL as compared to female gender of HIV patients on ART. HIV patients on ART, who were not drinking alcohol were 3 times (AOR: 3.04; 95% CI: 1.66-5.59%) more likely to have a better QoL as compared to HIV patients on ART who were drinking alcohol. Similarly, from the in-depth interview, a 41-year-old man HIV client on ART said: "(…) when I was drinking alcohol, I suffered from ART drug side effects and lived a very complicated life. However, since I have stopped taking alcohol, I am now comfortable with ART and my quality of life became improved". HIV patients on ART who attended counseling services were 2.6 times (AOR: 2.62; 95% CI: 1.58-4.34%) more likely to have a better QoL as compared to HIV patients on ART who were not attended counseling service. This finding was also supported by an in-depth interview of a 38-year-old woman HIV patient on ART who

Table 5. Bi-variable and multivariable binary logistic regression analysis for factors associated with quality of life of HIV patients on antiretroviral therapy at Debre Markos Referral Hospital, Northwest Ethiopia (*n* = 428)

Variable	Quality of life		COR (95% CI)	AOR (95% CI)	*p*-value
	Good	Poor			
Sex					
Male	122	78	3.19 (2.15-4.74%)	1.88 (1.15-3.07%)	0.012
Female	75	153	1.00	1.00	
Residence					
Urban	140	112	2.61 (1.75-3.90%)	4.11 (1.44-11.73%)	0.008
Rural	57	119	1.00	1.00	
Alcohol drinking					
No	168	164	2.37 (1.45-3.85%)	3.04 (1.66-5.59%)	0.0001
Yes	29	67	1.00	1.00	
Counseling					
Yes	138	108	2.66 (1.79-3.97%)	2.62 (1.58-4.34%)	0.0001
No	59	123	1.00	1.00	
Functional status					
Working	115	45	4.63 (2.30-9.34%)	4.03 (1.73-9.35%)	0.001
Ambulatory	66	157	0.76 (0.39-1.50%)	1.08 (0.47-2.47%)	0.854
Bedridden	16	29	1.00	1.00	
Recent viral load					
< 1,000 copies	167	134	3.96 (2.45-6.41%)	2.27(1.31-3.94%)	0.004
≥ 1,000 copies	28	89	1.00	1.00	
Wealth quintile					
Lowest	39	57	1.00	1.00	
Second	28	48	0.85 (0.46-1.60%)	0.77 (0.36-1.65%)	0.508
Middle	46	39	1.72 (0.69-3.11%)	0.66 (0.21-2.10%)	0.480
Fourth	48	39	1.80 (1.00-3.23%)	0.57 (0.17-1.91%)	0.360
Highest	36	48	1.10 (0.61-1.96%)	1.26 (1.08-3.89%)	0.031

said: "(…) attending counseling service of health professional might improve quality of life. I feel good and healthy because I practiced the counseling of health professional".

The odds of HR-QoL among HIV patients on ART whose functional status was working were 4 times higher (AOR: 4.03; 95% CI: 1.73-9.35%) as compared to HIV patients on ART whose functional status were bedridden HIV patients. HIV patients on ART with less than 1,000 copies of viral load were 2.3 times (AOR: 2.27; 95% CI: 1.31-3.94%) more likely to have a better QoL as compared to HIV patients on ART with greater than or equal to 1,000 copies of viral load. HIV patients on ART in the highest wealth quintile category were 1.3 times (AOR: 1.26; 95% CI: 1.08-3.89%) more likely to have a better QoL as compared to HIV patients on ART in the lowest wealth quintile category.

Discussion

In this study, the proportion of patients with good QoL was 46%. Being male, residence, drinking alcohol, attending

counseling service, functional status, and viral load were significantly associated with HR-QoL of HIV clients on ART. The proportion of patients with good QoL in this study was in line with studies conducted in other parts of Ethiopia, Jimma (43.3%) [20], Gondar (37.5%) [30], and studies from Uganda (47.2%) [34] and Nigeria (33.7%) [24]. On the contrary, it was lower than studies conducted in Burkina Faso (82.4%) [11], India (72.43%) [35], Thailand (72%) [36], and Zimbabwe (58%) [14]. This might be due to differences in sample sizes, study areas, and healthcare systems. Moreover, socio-economic differences of participants might contribute to another possible explanation, resulting from variation in tools used to assess QoL. For example, in this study, the domain of QoL was the highest in the level of independence domains, with mean score of 12.88, whereas in a study done in Jimma, Ethiopia, the level of independence domain was the highest with mean of 14.08 [20]; a study conducted in India showed that the level of independence was the lowest, with mean score of 11.44 [35].

Being male were two times more likely to have a better QoL as compared to female HIV-patient on ART. This study

was supported by previous reports from Gondar, Ethiopia, Zimbabwe, Nigeria, and Brazil [14, 24, 30, 37]. This difference might be because women report poorer QoL due to their illnesses, which may be taken less seriously, and many women living with HIV are burdened by responsibility of child-raising and other social responsibilities; they receive less empathy and social support comparing with men. There have been reports of worse HR-QoL among women in developed countries [38]. A study done in low- and middle-income countries showed also that male older adults reported a better QoL compared to female older adults across all the countries [39].

HIV patients on ART, who were living in urban residences were 4 times more likely to experience a better QoL as compared to HIV individuals on ART living in rural residences. A similar finding was observed in studies from Jimma Ethiopia, Botswana, Zimbabwe, and Uganda [4, 9, 14, 18, 20]. This might be associated with the presence of poor infrastructures, financial limitations as well as social stigma and bias in rural areas. In addition, HIV patients in rural areas are engaged in more physically demanding work, such as farming, as compared to urban areas, which could limit access to better healthcare services. A study conducted in Poland indicated that there was a worse physical health and mental health among women living in rural areas compared to those from urban settings [40]. However, in contrast to our findings, a study done in Mekele, Ethiopia, Thailand, Brazil, and Nepal demonstrated that the place of residence of HIV patients were not significantly associated with HR-QoL [19, 36, 40, 41]. This discrepancy may be attributed to differences in study areas and periods as well as socio-cultural disparities across studies populations.

HIV patients on ART, who were not drinking alcohol were 3 times more likely to have a better QoL as compared to HIV patients on ART who were drinking alcohol. This finding is similar to a study done in Vietnam [42]. This is also explained by a meta-analysis, which showed that QoL has been significantly impaired in those with alcohol abuse and dependence, particularly in domains of mental health and social functioning [43]. HIV patients on ART, who were attending counseling services were two-and-half times more likely to have a better QoL as compared to HIV patients on ART, who did not attend counseling services. This finding is supported by a study done in Botswana [9]. The possible explanation might be counseling is a process of talking about and working through personal problems with a counselor. The counselor helps HIV patients to address their problems in a positive way, help them to clarify issues, explore options, develop strategies, and increase self-awareness, which could have a good impact on QoL of HIV patients on ART. HIV individuals on ART, whose functional status was working, were 4 times more likely to have a better QoL as compared to HIV patients on ART with bedridden as functional status. A similar finding was observed in a study from Bahir Dar, Ethiopia [3]. This might be explained because lifestyle of patients with poor daily living activities lead to poor income-generating, which could affect their HR-QoL. The other reason might also be that having a clear and concise measure of function-

al status enable clinicians to implement an effective treatment plan that would lead to a faster recovery, higher level of functional status, and greater well-being [44]. Patients on ART with less than 1,000 copies of viral load were 2.3 times more likely to have a better QoL as compared to their counterparts. This finding was supported by a study done in Indonesia [45]. This could be due to the fact that, since virological suppression or low level of viral load reduce sign and symptoms of HIV-positive individuals on ART, which in turn lead to improvement of clinical/immunological profile, indicating better QoL of patients on ART. A study conducted in South Carolina showed that undetected viral load had a significant impact on perceiving QoL beyond socio-demographic factors among people living with HIV [46].

The wealth index of HIV patient was significantly associated with HR-QoL. HIV patients on ART, who were in the highest wealth quintile category were 1.3 times more likely to have a better QoL as compared to HIV clients on ART in the lowest wealth quintile category. This finding was similar to a study from Jimma, Ethiopia [20]. This might be due to the fact that money is everything for every HIV patient to improve QoL. In the present study, socio demographic variables, including educational status, age of the respondent, marital status, occupational status, and clinical characteristics of HIV patients, such as WHO clinical staging, CD4+ count, ART regimen, and drug side effects, were not significantly associated with HR-QoL of HIV individuals on ART. In contrast to this finding, studies from Zimbabwe and Nigeria indicated that educational status and occupation of HIV patients [14, 47], WHO clinical stage [17, 19, 30], and CD4+ count [9, 41] of HIV patients were significantly associated with their HR-QoL.

Limitation

Since a cross-sectional study design was used, the causality of the associations between the outcome variables and independent variables could not be established. The WHO-QoL-BREF instrument, which relies on self-reported QoL prior to an interview, might have introduced recall bias, and administering the questionnaires during a face-to-face interview could introduce social desirability bias.

Conclusions

In general, HR-QoL of HIV patients on ART was poor. HR-QoL of HIV individuals on ART was significantly associated with sex of the respondent, residence, drinking alcohol, attending counseling service, functional status, viral load, and wealth quintile of the participants. This suggests the need for routine assessment and appropriate interventions at each visit to improve HR-QoL of HIV patients on ART.

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Conflict of interest

The authors declare no conflict of interest.

Reference

1. Federal Ministry of Health of Ethiopia. National Comprehensive HIV Prevention, Care and Treatment. Training for Health Care Providers; 2018. Available from: https://www.humanitarianresponse.info/en/operations/ethiopia/document/national-comprehensive-hiv-care-guideline-2018.

2. WHO. Update of recommendations on first- and second-line antiretroviral regimens; 2019. Available from: https://www.who.int/publications/i/item/WHO-CDS-HIV-19.15.

3. Alemu A, Yenealem A, Feleke A, Meseret S. Health related quality of life assessment and associated factors among people on highly active antiretroviral therapy at Felege Hiwot Referral Hospital, Bahir Dar, North West Ethiopia. J AIDS Clin Res 2013; 5: 272.

4. Gebremichael DY, Hadush KT, Kebede EM, Zegeye RT. Gender difference in health related quality of life and associated factors among people living with HIV/AIDS attending anti-retroviral therapy at public health facilities, western Ethiopia: comparative cross sectional study. BMC Public Health 2018; 18: 537.

5. Vishnupriya V. A study on prevalence of psychiatric co-morbidity, alcohol abuse, personality factors in tuberculosis default patients. Madras Medical College, Chennai; 2018.

6. The World Health Organization Quality of Life Assessment (WHOQOL): development and general psychometric properties. Soc Sci Med 1998; 46: 1569-1585.

7. Development of the World Health Organization WHOQOL-BREF quality of life assessment. WHOQOL Group. Psychol Med 1998; 28: 551-558.

8. Basavaraj K, Navya M, Rashmi R. Quality of life in HIV/AIDS. Indian J Sex Transm Dis AIDS 2010; 31: 75-80.

9. Ndubuka NO, Lim HJ, Ehlers VJ, van der Wal DM. Health-related quality of life of patients on antiretroviral treatment in Botswana: a cross-sectional study. Palliat Support Care 2017; 15: 214-222.

10. CDC. Health-Related Quality of Life. Why is quality of life of important? 2020.

11. Bakiono F, Ouédraogo L, Sanou M, et al. Quality of life in people living with HIV: a cross-sectional study in Ouagadougou, Burkina Faso. Springer Open Journal 2014; 3: 372.

12. McHorney CA. Health status assessment methods for adults: past accomplishments and future challenges. Annu Rev Public Health 1999; 20: 309-335.

13. O'Connell KA, Skevington SM. An international quality of life instrument to assess wellbeing in adults who are HIV-positive: a short form of the WHOQOL-HIV (31 items). AIDS Behav 2012; 16: 452-460.

14. Mafirakureva N, Dzingirai B, Postma MJ, van Hulst M, Khoza S. Health-related quality of life in HIV/AIDS patients on antiretroviral therapy at a tertiary care facility in Zimbabwe. AIDS Care 2016; 28: 904-912.

15. Biraguma J, Mutimura E, Frantz JM. Health-related quality of life and associated factors in adults living with HIV in Rwanda. SAHARA J 2018; 15: 110-120.

16. Vo QT, Hoffman S, Nash D, et al. Gender differences and psychosocial factors associated with quality of life among ART initiators in Oromia, Ethiopia. AIDS Behav 2016; 20: 1682-1691.

17. Mekuria LA, Sprangers MA, Prins JM, Yalew AW, Nieuwkerk PT. Health-related quality of life of HIV-infected adults receiving combination antiretroviral therapy in Addis Ababa. AIDS Care 2015; 27: 934-945.

18. Mutabazi-Mwesigire D, Katamba A, Martin F, Seeley J, Wu AW. Factors that affect quality of life among people living with HIV attending an urban clinic in Uganda: a cohort study. PLoS One 2015; 10: e0126810.

19. Tesfay A, Gebremariam A, Gerbaba M, Abrha H. Gender differences in health related quality of life among people living with HIV on highly active antiretroviral therapy in Mekelle Town, Northern Ethiopia. Biomed Res Int 2015; 2015: 516369.

20. Abebe Weldsilase Y, Likka MH, Wakayo T, Gerbaba M. Health-related quality of life and associated factors among women on antiretroviral therapy in health facilities of Jimma Town, Southwest Ethiopia. Adv Public Health 2018; 2018: 5965343.

21. Clayson DJ, Wild DJ, Quarterman P, Duprat-Lomon I, Kubin M, Coons SJ. A comparative review of health-related quality-of-life measures for use in HIV/AIDS clinical trials. Pharmacoeconomics 2006; 24: 751-765.

22. O'Connell K, Skevington S, Saxena S; WHOQOL HIV Group. Preliminary development of the World Health Organsiation's Quality of Life HIV instrument (WHOQOL-HIV): analysis of the pilot version. Soc Sci Med 2003; 57: 1259-1275.

23. Mohammed SA, Yitafr MG, Workneh BD, Hailu AD. Health-related quality of life and associated factors among people living with human immunodeficiency virus on highly active antiretroviral therapy in North East Ethiopia: cross-sectional study. PLoS One 2021; 16: e0247777.

24. Biambo AA, Adibe MO, Liman HM, Ukwe CV. Health-related quality of life of HIV-infected patients taking different antiretroviral regimens at a tertiary healthcare facility in northern Nigeria. Trop J Pharma Res 2018; 17: 549-557.

25. Shan D, Ge Z, Ming S, et al. Quality of life and related factors among HIV-positive spouses from serodiscordant couples under antiretroviral therapy in Henan Province, China. PLoS One 2011; 6: e21839.

26. Kittikraisak W, Kingkaew P, Teerawattananon Y, et al. Health related quality of life among patients with tuberculosis and HIV in Thailand. PLoS One 2012; 7: e29775.

27. Silva PAB, Soares SM, Santos JFG, Silva LB. Cut-off point for WHOQOL-bref as a measure of quality of life of older adults. Rev Saude Publica 2014; 48: 390-397.

28. CDC. Alcohol and public health. Frequently asked questions about alcohol; 2020.

29. CDC. Defining Adult Overweight & Obesity; 2020.

30. Surur AS, Teni FS, Wale W, Ayalew Y, Tesfaye BJ. Health related quality of life of HIV/AIDS patients on highly active anti-retroviral therapy at a university referral hospital in Ethiopia. BMC Health Serv Res 2017; 17: 737.

31. EDHS. Ethiopia Demographic and Health Survey Addis Ababa; 2016.

32. Tesfaye M, Olsen MF, Medhin G, Friis H, Hanlon C, Holm L. Adaptation and validation of the short version WHOQOL-HIV in Ethiopia. Int J Ment Health Syst 2016; 10: 29.

33. WHO. WHOQOL-HIV instrument: scoring and coding for the WHOQOL-HIV instruments: users manual, 2012 revision. World Health Organization; 2002.

34. Palermo T, Rawat R, Weiser SD, Kadiyala S. Food access and diet quality are associated with quality of life outcomes among HIV-infected individuals in Uganda. PLoS One 2013; 8: e62353.

35. Gopakumar KG, Bhat KG, Joseph N, Shetty AK. Health-related quality of life in children with HIV infection – a cross-sectional study from South India. J Pediatr Infect Dis 2017; 12: 104-109.

36. Bunjoungmanee P, Chunloy K, Tangsathapornpong A, Khawcharoenporn T, Apisarnthanarak A. Quality of life assessment among patients living with HIV/AIDS at a tertiary care hospital in Thailand. Southeast Asian J Trop Med Public Health 2014; 45: 834-842.

37. Müller Klug Passos S, Dias de Mattos Souza L. An evaluation of quality of life and its determinants among people living with HIV/AIDS from Southern Brazil. Cad Saude Publica 2015; 31: 800-814.

38. Molzahn A, Skevington SM, Kalfoss M, Makaroff KS. The importance of facets of quality of life to older adults: an international investigation. Qual Life Res 2010; 19: 293-298.

39. Lee KH, Xu H, Wu BJ. Gender differences in quality of life among community-dwelling older adults in low-and middle-income countries: results from the Study on global AGEing and adult health (SAGE). BMC Public Health 2020; 20: 114.

40. Zagozdzon P, Kolarczyk E, Marcinkowski JT. Quality of life and rural place of residence in Polish women – population based study. Ann Agric Environ Med 2011; 18: 429-432.

41. Timilsina S, Regmi K. Assessing quality of life and depression among people living with HIV/AIDS and TB-HIV coinfection in Kathmandu, Nepal. SAARC Journal of Tuberculosis, Lung Diseases and HIV/AIDS 2014; 11: 7-14.

42. Tran BX. Quality of life outcomes of antiretroviral treatment for HIV/AIDS patients in Vietnam. PLoS One 2012; 7: e41062.

43. Ugochukwu C, Bagot KS, Delaloye S, et al. The importance of quality of life in patients with alcohol abuse and dependence. Harv Rev Psychiatry 2013; 21: 1-17.

44. Whitcomb JJ. Functional status versus quality of life: where does the evidence lead us? ANS Adv Nurs Sci 2011; 34: 97-105.

45. Handajani YS, Djoerban Z, Irawan H. Quality of life people living with HIV/AIDS: outpatient in Kramat 128 Hospital Jakarta. Acta Med Indones 2012; 44: 310-316.

46. Cho H, Jiang Y, Li X, Deming M. The relationship between self-reported viral load suppression and quality of life among people living with HIV in South Carolina. AIDS Care 2020; 32: 1198-1205.

47. Bello SI, Bello IK. Quality of life of HIV/AIDS patients in a secondary health care facility, Ilorin, Nigeria. Proc (Bayl Univ Med Cent) 2013; 26: 116-119.