

Quality of life and adherence to HAART in HIV-Infected patients in a primary healthcare setting in South Africa

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Received: 18-06-2020 / Revised: 10-07-2020 / Accepted: 15-08-2020

Abstract

The use of Antiretroviral therapy (ART) in HIV-infected patients has reduced HIV-associated morbidity and mortality increasing life-expectancy and expected improved quality of life (QoL). There is a need to assess QoL and adherence to ART in people with HIV. A cross-sectional study was performed on 100 patients of ≥ 18 years. A Standardized-Questionnaire with face-to-face interviews was used to collect sociodemographic data and ART-adherence determined using a pill-count method considering $\geq 90\%$ acceptable. QoL was assessed using a WHOQOL-HIV BREF questionnaire using a 5 point-Likert scale. Data were analysed using SPSS 22 calculating descriptive-statistics such as mean, standard-deviation, mean-scores. Correlations and ANOVA were performed to determine significant differences between domain-scores. Post-hoc analysis was performed using Tukey's to find out pairs contributing to the differences. Of 100 interviewed, 63% were females and 37% males with mean-age of 38.0 years (range 18-53 years). The highest (36%) were in age-range of 31-40 years, 47% obtained secondary-level of education, 20% employed on contracts and 32% received $< \text{ZAR}10000$ monthly and 55% living in rural-areas. Forty-two percent were singles. The majority (92%) reported good physical health-status. More than half (72%) had initial CD4^+ count ≥ 500 cells/ mm^3 , with 54% having initial viral-load of > 10000 copies/mL and 98% undetectable viral-load. Seventy-one percent reported being infected with men. Sixty-two percent were asymptomatic and (43%) WHO clinical-stage 2. Only 24% had acceptable adherence-rate of $\geq 90\%$. The highest mean-scores (77.00 ± 14.94) were in the environmental and lowest (26.25 ± 26.44) in spiritual/religious/personal beliefs domains (SRPB). The highest mean-scores of acceptable ART-adherence was in Social (81.25 ± 15.19) with least in SRPB (22.92 ± 26.49) domains. Statistical significances were between acceptable adherence-rates and level-of-independence and psychological domains with $F=5.823$, $p=0.018$ and $F=3.690$, $p=0.050$ respectively. Adherence to ART leads to improved QoL, key-determinant of patient's response to treatment. Measuring QoL gives guidance strategies to develop implementation interventions focusing on enhancing QoL, improving healthcare provider-patient-communication thus improving quality-of-care.

Key words: Quality of Life, Adherence, HAART, PLWHA.

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Introduction

Human immune deficiency virus (HIV) continues to be a major global public health issue. According to the Global HIV and AIDS Statistics, in 2018 an estimated 37.9 million people were living with HIV (including 1.7

million children) with a global HIV prevalence of 0.8% among adults. Around 21% of these same people do not know that they have the virus[1]. Globally, the acquired immune deficiency syndrome (AIDS) and human immunodeficiency virus (HIV) is a public health problem. There was a significant increase in life-expectancy after the advent of antiretroviral therapy (ART) and therefore, it is expected that that there should be improvement in quality of life (QoL). There is a need to assess QoL and adherence to ART in people with HIV. According to UNAIDS in 2019, South Africa (SA) had the biggest and highest-profile HIV epidemic

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in the World, with an estimated 7.7 million people living with HIV in 2018[1]. South Africa accounts for a third of all new HIV infections in Southern Africa[2]. In 2018, according to UNAIDS data for 2019, there were 240,000 new HIV infections and 71,000 South Africans died from AIDS-related illnesses[1]. In the second half of 1990s, there were advances in pharmaceutical research and advent of antiretroviral (ARV) protease inhibitors, and a new phase of ART began internationally known as highly active antiretroviral therapy (HAART)[3]. In November 2003, the operational Plan for comprehensive HIV and AIDS Care, management and Treatment for South Africa was approved in SA[4]. The same plan was presented to and approved by cabinet in a statement presented in 2003 (The Operational Plan for Comprehensive Treatment and Care for HIV and AIDS Care, Management and Treatment for South Africa, 2003 and Statement of Cabinet on a Plan for comprehensive Treatment and Care of HIV and AIDS in South Africa, 2003). In SA the ART programme began by March 2005 to at least have one service point for AIDS-related care and treatment in at least the 35 districts in the country. The roll-out began 12 months later in all provinces starting largely in tertiary hospitals. By September 2005, 17 months after the start of roll-out, 85,000 people were enrolled on ART in the public sector. By then, 199 public healthcare facilities were providing ARVs for the treatment of HIV [5]. South Africa has the largest ART programme in the World. In 2018, UNAIDS reported that 4.8 million people were receiving treatment in SA. This equates to 62% of people living with HIV (PLWH) as reported by UNAIDS 'AIDS Info' (2019) in the country. In keeping with the WHO's changing guidelines, South Africa's ART services have undergone dramatic expansion in recent years. In 2016, SA implemented the 'test and treat' strategy, making everyone with a positive diagnosis eligible for treatment regardless of how advanced HIV is in their body. This has made the number of people eligible for treatment more than double from 3.39 million in 2015 to 7.7 million people in 2018[1]. According to the World Bank 'Data country profile in 2019, the success of South Africa's ART programme is evident in the increase in national life expectancy from 56 years in 2010 to 63 years in 2018. Adherence to medication has been defined as stated by Garcia and Cote (2003) as the degree of concurrence between the client's behaviour (taking medicine, sticking to diet, taking the right dose and at the right time) and following medical advice on medication

regimens. Adherence to ARV drugs has been frequently sub-therapeutic[18]. Poor adherence to ARV drugs as indicated by researchers Dohrn et al (2006) and Jelsma et al. (2005) in their studies, could lead to rapid replication of the HIV leading to generation of resistant mutant strains no longer responsive to available ARV drugs[19]. Quality of life is one of the most utilised subjective aspects in evaluating the impact of chronic diseases and is an aspect to be considered throughout the long therapeutic process of AIDS. According to Ruiz-Perez et al. (2005), [17] QoL can be used as a parameter for decision-making concerning treatment and approval of new therapeutic regimens. The concept of QoL, according to the World Health Organisation (WHO), is defined as 'an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation of their goals, expectations, standards and concerns.' [5]. According to Carr (2001), QoL is determined by the extent that ambitions and expectations corresponding to personal experience; by personal perception about one's position in life, considering the cultural context and value systems in which people live; and in relation to personal goals, expectations, standards and beliefs through the evaluation of the current state in relation to ideal, as well as to what people consider as important factors in their lives. Patrick & Erikson (1988), further states that it is not only health that is important for understanding the QoL for a person facing a disease, as represented by physical and functional attributes, but other social and emotional aspects carry equal value[6]. It is therefore relevant to understand the correlation that exist between the QoL of the HIV-infected patients and adherence to HAART. The relationship between these two factors has not been extensively studied especially in this region. It is known that adherence to HAART improves clinical results, controls the progression of the disease and reduces mortality rates, which should supposedly result in improved patient's QoL. Determining ARV medication adherence will lead to development of innovative, effective interventions needed to facilitate behaviour change, improve QoL and prevent resistance to ARV drugs among HIV positive persons. Therefore, the aim of this study was to analyse the relationship between ART adherence and QoL in HIV-infected who are on HAART in a public primary healthcare setting in South Africa.

Methods

Subjects and Ethical Considerations

Ethical approval for the study was obtained from Walter Sisulu University - Research Innovation, Higher degrees and Ethics Committees of the faculty of Health Sciences (approval # 031/2017). The sample size was calculated from the average and variance. The number in each group was calculated to be representative of the population at 95% confidence. The participants were recruited through convenience sampling, as they attended the primary healthcare centre. The participants were first explained the objectives of the study and therefore the benefit of the study through patient participant form. Then they were asked to sign written informed consent forms. One hundred HIV-infected adults who were 18 years of age or older were included in the study. These patients are attending the primary health care clinic on a monthly basis either for their repeat prescriptions or medical reviews.

Study Design and Data collection

An observational cross-sectional study was conducted on 100 patients of ≥ 18 years, during the month of July 2019. These patients attend the primary healthcare that serves a population of 45,600. Of this population, 3800 are HIV-positive who attend the AIDS clinic. A convenient sampling method was used to select the participants. A standardized Questionnaire with face-to-face interviews was used to collect sociodemographic data. These variables were: gender, age, educational level, marital status, employment type, personal income, residential area, health status, category of exposure to the virus, HIV status, presence or not of other chronic diseases and HIV serostatus. Clinical data of the patients were extracted from the patient's files and these were: initial and current viral load, initial and current CD4⁺ count, WHO staging, ART adherence was determined using a pill-count method and a formula was used to calculate adherence rates considering $\geq 90\%$ acceptable. Quality of life was assessed using a WHOQoL-HIV BREF questionnaire using a 5 point Likert scale. WHOQOL-HIV was developed and validated by the WHO specifically for PLWHA; it evaluates QoL based on six domains and includes questions specific to HIV/AIDS. WHOQOL-HIV BREF is a short version containing 31 questions/ items/ facets distributed among one overall perception component and six QoL assessment domains, these being: physical health; psychological health; level of dependence; social relationships; environmental health; and spiritual/religious/personal beliefs (SRPB). These questions were distributed among six domains as already stated. The physical health domain measures the following facets: pain and discomfort, energy and

fatigue, sleep and rest. The psychological health domain measures facets like positive feelings, thinking, learning, memory and concentration, self-esteem, bodily image and appearance and negative feelings. The level of independence domain measures facets of mobility, daily life activities, dependence on medications or treatments, and work capacity. The social relationships domain includes facets of personal relationships, social support, social inclusion and sexual activity. The environmental domain measures physical safety and security, home environment, quality of health and social care, opportunities for acquiring new information and skills. Lastly SRPB domain describes the following facets: personal beliefs, forgiveness and blame, concerns about their future, death and dying. The questions of the WHOQoL HIV-BREF are structured in a Likert type scale with the grades depending on the nature of the domains and facets. Each item is rated on a 5-point Likert scale with 1 indicating a negative perception and 5 indicating a positive perception. Thus, final scores are scaled in a positive direction where higher scores indicate better QoL. To make the QoL score comparable to WHOQOL-100 score, the mean domain scores of each domain was added to 25, so that scores ranged from 00 (minimum) to 100 (maximum) with highest scores indicating a better quality of life. The scores of the questions within each QoL domain are used to calculate the domain score, this being the mean of the scores of the questions.

Data entry and analysis

Data collected were entered into and analysed using Statistical Package for Social Science (SPSS) version 22 software for Windows calculating descriptive statistics such as frequencies, mean, standard-deviation, domains meanscores. Cronbach's alphacoefficient was used to determine the internal consistency of the instrument as well as its domains. The difference between the mean scores of HRQoL domains and the socio-demographic characteristics was determined by using test of significance of variation (Independent sample *t* tests). Test of significance of variation (One-way ANOVA test) was also used on some socio-demographics to determine significance differences between domain scores. Post-hoc analysis was performed using Tukey's to find out pairs contributing to the differences. The different analysis of 95% CL and a *P*-value of less than or equal to 0.05 was taken as cutoff value for statistical significance.

Results

Socio-demographic characteristics

Of 100 interviewed, 63% were females and 37% males with mean age of 38.0years (range 18-53 years). The highest (36%) were in age-range of 31-40 years, 47% obtained secondary-level of education, 20% were employed on contracts and 32% received <R10000 monthly and 55% were living in rural-areas. Forty-two percent were singles. The majority (92%) of respondents reported good physical-health-status. More than half (72%) had initial CD4⁺count \geq 500 cells/mm³, with 54% having initial viral-load of >10000 copies/mL and 98% had undetectable viral-load. Seventy-one percent reported being infected with men. Sixty-two percent were asymptomatic and (43%) had WHO clinical-stage 2. Only 24% had acceptable adherence-rate (Table 1).

The overall HRQoL

The highest mean-scores(77.00 \pm 14.94)of HRQoL were for the environmental health and lowest (26.25 \pm 26.44) in Spiritual/religious/personal (SRPB) domains. The psychological health with 74.00 \pm 12.77, physical health with 48.25 \pm 25.09, level of independence (64.50 \pm 19.84) and social relations (74.25 \pm 22.88) domains (Table 2). The internal consistency of the instrument as well as its domains was determined by using Cronbach's alpha. The following results of the Cronbach's alpha coefficient in the domains were adequate and as follows: physical health (0.268), level of independence (0.369), social relations (0.346), psychological health (0.298),environmental health (0.294) and SRPB (0.669).

Differences in HRQoL among respondents

The association between the mean scores of HRQoL domains and socio-demographics were determined by performing independent sample t -test. As observed in Table 3, gender was significantly associated with

physical health ($P = 0.029$). There was no association between age of the patients and any of the HRQoL domains. However, patients who had primary level of education were significantly associated with physical health($P= 0.019$), social relations ($P = 0.002$) and psychological health ($P = 0.034$) domains. Almost all HRQoL domains were significantly associated with singles in terms of marital status except for physical health, psychological health and SRPB domains. Patients who had acceptable adherence rates were significantly associated with social relations and environmental health domains (Table 3). In one-way ANOVA that was performed between HRQoL domains and some socio-demographic variables patients in the age group revealed the following results. Patients in age group 18-30 years were significantly associated with psychological health and social relations domainwith values of F-Tests 2.902 and 3.024 respectively. Patients who are single showed significant associations in the Level of independence domain ($F = 3.311$), patients with initial CD4-count \geq 500 were associated with psychological domain ($F = 4.936$), undetectable viral load with physical domain ($F = 3.664$). Patients with acceptable adherence rate had a strong association in the level of independence domain ($F = 5.823$) and those with unacceptable adherence rate were significantly associated with psychological health of the respondents (Table 4).

Differences in adherence rates among HRQoL domains

The highest mean-scores of acceptable ART-adherence was in social domain (81.25 \pm 15.19) with the least in SRPB (22.92 \pm 26.49) domain (Table 5).

Statistical significances were observed between adherence rates and level of independence and psychological domains with $F=5.823$, $P=0.018$ and $F=3.690$, $P=0.050$ respectively (Table 6).

Table 1: Sociodemographic and Clinical Characteristics of the HIV-infected patients (n = 100)

Characteristic	n	%
Gender		
Female	63	63
Male	37	37
Age group (years)		
18 – 30	30	30
31 – 40	36	36
41 – 50	24	24
> 50	10	10
Educational level		

Illiterate	2	2
Primary	24	24
Secondary	47	47
Tertiary	27	27
Marital Status		
Single	42	42
Married	37	37
Co-habiting	7	7
Separated	8	8
Divorced	1	1
Widowed	5	5
Employment type		
Permanent	12	12
Contract	20	20
Unemployed	33	33
Self-employed	15	15
Income earned		
≥5000	12	12
5000-10000	20	20
>10000	32	32
Residence Area		
Urban	45	45
Rural	55	55
Health Status		
Neither poor nor good	3	3
Good	92	92
Very good	5	5
Initial CD4 count		
>500	72	72
<500	27	27
Initial Viral Load		
>10000	54	54
<10000	45	45
Current Viral Load		
>10000	2	2
<10000	98	98
Adherence rate		
Acceptable	24	24
Unacceptable	76	76
WHO Staging		
Asymptomatic (Stage 1)	34	34
Mild Symptomatic (Stage 2)	43	43
Advanced (Stage 3)	23	23

Table 2: Mean Quality of Life Scores in Domains of Health-related Quality of Life

Dependent Variables	Study Participants (N=100)		
	Mean (\pm SD)	Minimum	Maximum
Environmental health	77.00(\pm 14.94)	25	100
Social relations	74.25(\pm 22.88)	00	100
Psychological health	74.00(\pm 12.77)	25	100
Level of Independence	64.50(\pm 19.84)	00	100
Physical health	43.25(\pm 25.09)	00	75
Spiritual/Religious/ _Personal Beliefs	26.25(\pm 26.44)	25	100

SD = Standard Deviation

Table 3: Test of significance of variation (Independent sample t-test) in HRQoL by socio-demographic characteristics and diseases variables

Variables	Physical health	Psychological health	Level of independence	Social relations	Environmental health	SRPB
Gender						
Female	68.025	59.639	66.449	76.813	72.708	26.277
Male	69.884	58.848	68.918	75.017	72.128	20.945
T-test	0.029	0.929	0.465	0.530	0.535	0.611
Age Range						
18-30	71.66	59.996	69.544	80.625	74.370	29.766
31-40	67.85	58.469	65.972	77.097	72.378	16.319
T-Test	0.971	0.827	0.600	0.541	0.216	0.624
Place of Residence						
Urban	69.127	60.555	67.288	77.638	72.138	28.333
Rural	68.374	58.358	67.424	74.927	72.784	21.009
T-Test	0.610	0.068	0.062	0.588	0.462	0.964
CD4 Count						
<500	68.252	58.226	67.288	76.222	71.822	24.902
\geq 500	69.709	62.311	67.424	75.527	73.611	23.148
T-Test	0.055	0.920	0.062	0.387	0.841	0.021
Adherence						
Acceptable	68.744	56.558	72.222	79.708	73.046	20.020
Unacceptable	68.703	60.227	65.825	75.623	72.319	25.657
T-Test	0.263	0.970	0.761	0.032	0.013	0.734

SRPB = spiritual/religious/personal beliefs health domain, HRQoL= health related quality of life , P < 0.05

Table 4: Test of significance of variation (one-way ANOVA test) in HRQoL by socio-demographic characteristics and disease variables.

Variables	Physical health	Psychological health	Level of independence	Social Relations	Environmental Health	SRPB
Age group						
18-30	71.661	59.996	69.544	80.625	74.375	29.766
31-40	67.857	58.469	65.972	77.097	72.378	16.319
41-50	68.750	60.833	67.361	72.687	72.395	26.041
>50	62.872	56.990	65.833	67.600	67.500	32.500

F-Test	2.902	0.720	0.578	3.024	1.077	2.110
Education Level						
Illiterate	48.214	48.700	58.333	56.250	60.937	38.500
Primary	70.089	56.875	66.319	73.456	70.833	21.354
Secondary	69.297	61.272	67.730	76.085	73.058	28.308
Tertiary	67.989	58.915	68.321	80.120	73.842	18.981
F-Test	4.399	2.839	0.539	2.510	1.206	1.080
Marital Status						
Single	69.299	57.792	72.293	78.309	73.794	23.940
Married	68.243	59.591	63.964	75.168	70.861	29.723
C0-habiting	68.877	63.214	66.666	75.168	71.750	21.428
Separated	66.964	60.000	59.375	68.780	71.484	10.937
Divorced	75.000	62.520	66.666	87.500	68.750	25.000
Widowed	68.772	63.500	65.000	75.150	76.870	12.500
F-Test	0.218	0.513	3.311	0.777	0.513	1.022
Initial CD4 Count						
>500	68.252	58.226	67.750	76.222	71.822	24.902
<500	69.709	62.311	66.975	75.527	73.611	23.148
F-Test	0.539	4.936	0.088	0.048	0.577	0.093
Adherence rate						
Acceptable	68.744	56.558	72.222	79.708	73.046	20.020
Unacceptable	68.703	60.227	65.828	75.023	72.319	25.657
F-Test	0.000	3.690	5.823	2.095	0.087	0.901
WHO Staging						
Asymptomatic	69.432	59.705	65.196	78.705	72.683	29.779
Mild Symptoms	67.189	59.588	65.961	74.593	71.511	21.058
Advanced stage	70.496	58.365	73.188	75.271	74.048	22.282
F-Test	1.251	0.209	4.050	0.888	0.440	1.225
Current Viral Load						
>10000	57.142	60.000	62.500	78.125	75.000	25.000
Undetectable	68.949	59.337	67.462	76.107	72.442	24.290
F-Test	3.664	0.115	0.357	0.041	0.115	0.002

Table 5: Mean scores of Health Related Quality of life domains and adherence rates

Domain	Adherence	
	Acceptable	Un-acceptable
Social	81.25(±15.19)	72.04(±24.48)
Psychological	76.04(±11.61)	73.35(±13.12)
Environmental	73.96(±8.97)	77.96(±16.31)
Level of Independence	68.75(±19.85)	63.16(±19.78)
Physical	47.91(±29.41)	41.78(±23.59)
SRPB	22.92(±26.49)	27.30(±26.51)

Table 6: Correlation between Quality of life Domains and acceptable adherence rates

Domain	F-Test	P	r
Social	2.095	0.151	-0.145
Psychological	3.690	0.050	0.191

Environmental	0.087	0.769	0.265
Level of Independence	5.823	0.018	-0.231
Physical	0.000	0.984	-0.002
SRPB	0.901	0.345	0.095

Discussion

The study accessed Quality of life and adherence to HAART in HIV-Infected patients in a primary healthcare setting in South Africa. In this study as observed in Table 1 there was a predominance of females aged 31-40 years. These results concur with the results performed by Surur et al (2017) in Ethiopia who reported predominance of females (54.7%) as compared to 45.3% males[7]. However as compared to a study by Galvão et al. (2015) in Brazil, their results revealed a predominance of males of 18-39 years[8]. In this clinic there is a great number of females attending the clinic as compared to males. As is the norm that females take care of themselves in as far as their health is concerned. With regards to the educational level, in this study, it was observed that the majority (47%) had secondary level education (Table 1). This is contrary to a study by Münene and Ekman (2014) performed in Kenya who observed their majority of patients with incomplete primary education[9]. Therefore, participants in this study with a secondary level of education may have greater access to information related to HIV infection and, therefore better internal and external resources to live with their HIV status. And this is also confirmed by results of this study, with the highest mean-scores (77.00 ± 14.94) in the environmental domain which has one of the facets as *availability of the information needed in the daily life* (Table 2). A study performed by Campos et al. (2009) in Brazil got similar results and also is in agreement that 8 years of education is associated with better quality of life[9].

The results of this study are also demonstrated by the negative Pearson's r correlation coefficient between environmental domain and adherence rate ($r = -0.030$) [10].

This shows there is an inverse linear relationship between environmental domain quality of life with adherence to ART. One of the facets of environmental domain that can be mentioned here is: *satisfaction with access to health care services, availability of the information needed in day to day life*. A study performed in Chile by Varela and Galmames in 2014, showed that most of the people living with HIV in Chile and on ARV medication had inadequate levels of adherence, namely 68.0% were nonadherent to therapy

[20]. Their results concur with results of this study that obtained 76% with unacceptable adherent rate. In this study, the majority (55%) of the patients stay in rural areas as opposed to patients who reside in urban areas and all showed higher values in all domain of HRQoL than PLWHA those live in rural areas. Patients residing in urban areas have a relatively better financial status, infrastructure and increased support and therefore this contributes to high adherence rates to their treatment and therefore good quality of life. Results from this study revealed 33% of patients are unemployed. These results concur with a study performed in Kenya that revealed that a significant portion of PLWHA is in a socially vulnerable condition, living in poverty, with low income and education[10]. As stated by Mutabazi-Mwesigire et al. (2014) in his research performed among Ugandan patients living in HIV, low family income has an impact on extreme poverty situations[11]. This is associated with the patients having difficulty accessing their treatments, and missing their doses, making it harder to live with HIV, therefore having a negative impact on their quality of life. This is demonstrated in this study with only 24% of the patients adhering to ART treatment. Although the income of the participants in this study was slightly higher each earning more ZAR10000 per month, the individuals are still financially limited considering the high cost of living. Results from this study on marital status revealed a percentage (42) of patients to be single. A qualitative study performed on perceptions of quality of life in HIV-infected revealed that PLWHA and in a common relationship had a better quality of life related to satisfactory social support [11]. This supports the results of this study with the below average QoL in the HIV mainstay. This is also demonstrated by the negative Pearson's r correlation coefficient between social relationship and adherence rate (-0.145). This shows there is an inverse linear relationship between social relationship domain and adherence rates. *Satisfaction with personal relationship* is one of the facets of social relationship HRQoL domain. In this study, psychological health domain revealed relatively high mean scores of $74.00 (\pm 12.77)$. One of the facets of this domain are: *people blaming the infected people for their HIV status, negative feelings like blue moods, despair, anxiety and depression*. This is considered as one of the

compromised dimension of poor quality of life. However, there was a statistical significant difference between the psychological domain and acceptable adherence demonstrated by ANOVA ($F = 3.690$, $P = 0.050$) (Table 3,6). The study performed in Thailand, 34.4% of their participants had poor adherence to treatment, mainly due to neglect of the ART, fear of stigma, and the possibility of disclosure of their HIV status because they were using this treatment [12]. In this study the majority of the patients (90%) reported their health status good as contrary to other studies that reported a lower 32.75% of their overall HRQoL as good and were comparing to those who rated their overall perceived HRQoL as poor with 14.5% or very poor (2,75%). Accordingly, the overall perceived QoL by PLWHA is 62.50% [7] The test of significance (*t test*) performed in this study (Table 3) revealed that female participants showed a significantly higher psychological health domain scores than men with statistical significance of $P = 0.029$. This could be attributed to as stated by Oguntibeju (2012) in his study factors related to increased fertility desire of women following the use of HAART [13]. More supporting evidence are the following facets from this domain: *taking their lives to being more meaningful and being satisfied with themselves*. A case in point is that there was an association of statistical significance between females and adherence rate ($P = 0.005$). There were associations between adherence in terms of social relations domain ($P = 0.032$) due to the fact these patients do not have or experience any stigma for they are accepted by people they know and therefore do take their treatment. With environmental domain these patients are satisfied with their health in the physical environment and therefore accessibility with health services which include their ART. Thus there was an association of statistical significant between the environmental health domain and adherence with $P = 0.013$ (Table 3). Other sociodemographics of participants where there was statistical significance were between place of residence with psychological health and level of independence domains with $P = 0.068$ and 0.062 respectively and CD4 count with level of independence domain ($P = 0.062$) SRPB domain ($P = 0.021$). This is contrary to the study by Surur et al (2017) where CD-4 count didn't not show any statistically significant association with any of the domains of HRQoL. As observed in Table 3, tests of significance of variation (one-way ANOVA test) in HRQoL was performed between some socio-demographics characteristics and disease variables. Results from this test revealed that educational level of

the patients showed a significance association with three domains of HRQoL as compared with others: physical ($F = 4.399$), psychological (2.839) and social relations (2.510). On the contrary the Bahr dar and the Iran studies found no significant association between educational status and any domains of HRQoL [14,15,16]. Results in this study revealed that there was an association of statistical significance between psychological health domain and adherence rate with $F = 3.690$ (Table 6). This could be attributed to patients in this health domain having a high quality of life and are also satisfied with their health because they take their lives as meaningful and therefore do adhere to taking ART as instructed. There was a very strong association of statistical significance ($F = 5.823$) (Table 6) between level of independence health domain and adherence. The level of independence domain has facets of need for medical treatment of the patients to function and these patients being satisfaction with their capacity for work. Therefore, they are abridged to take their treatment as directed.

Conclusion

From the results obtained in this study it is imperative to explore the relationship between adherence to ART and quality of life. Antiretroviral adherence leads to improved quality of life and this is the determinant of the HIV-infected patient's response to ART treatment and it is important to measure it because it will help to guide strategies. Empirical evidence on quality of life and adherence to ART can be used to develop implementation interventions that are focused on enhancing quality of life with ultimate goal of influencing adherence to antiretroviral drugs. Patients could be closely followed up and monitored to enhance adherence to antiretroviral drugs. Another benefit of such a move include enhancing clinician-patient communication and promotion of quality of life.

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Source of Support: Nil

Conflict of Interest: Nil