

# Pharmacist Intervention and Quality of Life of HIV-Infected Patients in Nigeria

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## Abstract

Assessment of quality of life of HIV-infected patients on combined antiretroviral therapy (cART) is imperative in the management of the disease. This study was done to assess the quality of life (QOL) of HIV-infected patients on cART before and after the pharmacist intervention. Consented HIV diagnosed outpatients in a tertiary health care facility in Benin City that met inclusion criteria were consecutively enrolled into the study. The QOL of these patients was determined in the four domains of WHOQOL-HIV BREF instrument. The raw scores for each domain in the WHOQOL-HIV BREF were calculated by adding values of single items. The scores were computed on the scale of 0 to 100. One way ANOVA and Student t-test were used to compare means. At baseline, mean QOL values were below 73. The lowest values were in the social domain and the best values in the physical domain. The QOL values increased steadily over the period of interventions with the highest mean QOL of 93.7 in the physical domain. The improvement in QOL was significant at 6 and 9 months following interventions ( $p < 0.001$ ). The values obtained are expressed in percentage. There was no statistically significant difference between male and female patients on cART in all domains of QOL following the intervention. Patients on Tenofovir + Emtricitabine + Efavirenz combination therapy had significantly higher scores in all the domains of QOL as compared with other drug combinations used in the management of the patients. The only educational level of the patients was significantly associated with the patients' QOL. The intervention in this prospective study was a success, as it led to increasing in QOL for the patients on cART from the baseline level to the end of the 9<sup>th</sup> month.

**Key words:** World Health Organization, quality of life, combined antiretroviral therapy, Benin City, Nigeria.

## Introduction

Quality of life (QOL) refers to people's emotional, social and physical well-being and their ability to function in the ordinary tasks of living. It could also mean the degree to which a person enjoys the important possibilities of her/his life (Campos *et al.*, 2009; Basavaraj *et al.*, 2010; Mafirakureva *et al.*, 2016). Several HIV-infected individuals are with copious social challenges including poverty, depression, stigma and cultural beliefs. These influenced their QOL physically, socially, and mentally. These caused numerous problems in useful activities and interests of the patients (Pellowski *et al.*, 2013; Akinboro *et al.*, 2014). Many people

living with HIV infection find it challenging to attend to daily tasks of living, participate in moderate to vigorous physical activities, or have sufficient energy or vitality to engage in an active social life while managing HIV infection (Osungbade, *et al.*, 2013; Mukund *et al.*, 2015). Fatigue or low energy has been associated with both physical and psychological morbidity and poor QOL in persons with HIV disease (Herrmann *et al.*, 2013). HIV-infected patients with no difficulty in taking medications, those using regimens with a lower number of pills, and those more adherent to combined antiretroviral therapy (cART) tend to have improved QOL following the start of treatment (Brothers *et al.*, 2014). Combined

ART is capable of improving survival, reducing the occurrence of HIV-related opportunistic infections and improving the patients' QOL ((Mafirakureva *et al.*, 2016; Shah *et al.*, 2016). In spite of this, it has been reported that cART causes symptoms that affect, to a greater or lesser degree, people living with HIV/AIDS and impacts on their QOL (Chen *et al.*, 2013). While improved QOL is the expected key outcomes in the management of patients with HIV infection, poor QOL had frequently been reported across countries and in different studies. Burgoyne *et al.* (2008) reported that QOL was generally stable or slightly improved among some patients over a period of 4 years. Mannheimer *et al.* (2005) reported significant improvements in QOL within one year of treatment with the antiretroviral therapy. In South Africa, the findings of Pitt *et al.* (2009) indicated declines in QOL in one-third of patients on HAART. Also, in Bangladesh, it was discovered that majority of the patients were with low QOL in all domains (Imam *et al.*, 2011). Studies in Nigeria by Fatiregun *et al.* (2009) in Kogi State, Odili *et al.* (2011) in Benin City, Folasire *et al.* (2012) in Ibadan and Bello *et al.* (2013) in Ilorin reported poor QOL in social and environmental domains of patients on cART. Most of these earlier studies were not followed with interventions to enhance patients' QOL. This study was conducted to assess QOL of HIV-infected patients on cART before and after the intervention.

## Methods

*Ethical statement:* Ethical approval to conduct the study was granted by Ethics and Research Committee of University of Benin Teaching Hospital. Permission to work with the patients was obtained from the consultant and coordinator in charge of the Infectious Diseases Clinic. Oral and written informed consent was obtained from all subjects after a clear explanation of the study was made.

*Study setting:* The study was carried out in the Infectious Disease Clinic of University of Benin Teaching Hospital (UBTH), Benin City, Edo State, Nigeria. UBTH was established in 1973 with 72 departments and 3,585 staff. The clinic days for the

patients are Monday through Friday with a daily turnout rate of 642 patients.

*Study design and subjects:* This is a longitudinal study conducted on QOL of patients on cART and evaluated at 0, 3, 6 and 9 months following the intervention. Consented HIV outpatients between 20 and 70 years, receiving combined antiretroviral therapy and attending UBTH during the period of 15<sup>th</sup> October, 2012 to 3rd October 2013, were consecutively enrolled into the study. Two hundred and sixty-nine patients were recruited within the targeted schedule. Excluded from the study were children and pregnant women.

*Data collection instrument:* WHOQOL-HIV BREF instrument was used to assess the patients' QOL (WHO, 2003). This instrument was developed for HIV-infected patients and its validity has been tested in the heterogeneous population including developing countries such as Africa (Hsiung *et al.*, 2011). The questionnaire contains 26 items with four specific domains which include: (a) physical health (7 items); (b) psychological well-being (8 items) (c) social relationships (3 items) and (d) environment (8 items). A 5 point Likert-type scale rated all items for the patients. The patients select the number that best represents their opinion, based on their life over the previous four weeks. The 5-point Likert scale ranges from 1 through 5 with higher scores indicating a better QOL. The raw scores for each domain of WHOQOL-HIV BREF were calculated by adding values of single items and transformed on the scale ranging from 0 to 100, where 100 is the highest and 0 the lowest health-related QOL. The values obtained were expressed in percentage.

*Determination of quality of life:* The questions in the WHOQOL-HIV BREF form appropriate for each patient were read to him/her and the respondent selected the number on a 5-point Likert-type scale that best represented his/her opinion. These answers provided were then filled into the form. The interaction with each respondent lasted for an average of 25 minutes. The raw scores for each domain in the WHOQOL-HIV-BREF were calculated by adding values of single items. To transform the data so that

they were equivalent to those used for the WHOQOL-100, two steps were used; first, scores were converted to a range between 4 and 20. Second, these scores were multiplied by 5 so that the scores were converted to a scale of 0 to 100, where 100 was the highest health-related QOL. All the patients in the study group were counseled on the importance of cART, the authenticity of unbranded cART, benefits of adhering to cART regimen, appropriate time of cART administration, awareness of cART toxicities, the likelihood of drug-disease, drug-food and drug-drug interactions and probability of developing resistance to cART. Also, the patients' level of adherence to cART was assessed with pill counting method. The socio-demographic variables of the patients were captured by personal history form.

**Data analysis:** The data collected were analyzed using software program version 9.2 (SAS, 2012). One way ANOVA and Student t-test were used to compare two means. Logistic regression analysis was done to assess the relationship between patient factors and QOL. At 95% confidence interval, p-value < 0.05 was considered to be statistically significant.

## Results

At baseline, mean QOL values were below 73. The lowest values were in the social domain and the best values in the physical domain. Overall, the QOL values increased steadily over the period of interventions with the highest mean QOL of 93.7 in the physical domain. The improvement in QOL was significant at 6 and 9 months following interventions ( $p < 0.001$ ) (Table 1).

At the 9<sup>th</sup> month of intervention, TEE combination therapy had significantly higher scores in all the domains of QOL as compared with other drug combinations used in the management of the patients (Table 2).

There was no statistically significant difference between male and female patients on cART in all domains of QOL following the intervention (Table 3).

Pill counting adherence among HIV-infected patients had statistically significant effect on physical domain of QOL at  $P < 0.005$ . Patients who adhered strictly ( $\geq 95\%$ ) to their medications had highest scores in physical and physiological domains as compared with non-adherent patients (Table 4).

**Table 1. Quality of life of HIV-infected patients on cART before and after interventions.**

| Quality of life domain | baseline <sup>a</sup> | 3 months <sup>b</sup> | 6 months <sup>c</sup> | 9 month <sup>d</sup> | P-value                                     |
|------------------------|-----------------------|-----------------------|-----------------------|----------------------|---|
| Physical               | 76.7 ± 7.1            | 77.6 ± 7.3            | 86.2 ± 7.9            | 93.7 ± 8.2           | <0.001 <sup>ac</sup> , <0.001 <sup>ad</sup> |
| Psychological          | 76.3 ± 6.8            | 76.9 ± 6.4            | 77.8 ± 7.3            | 89.3 ± 7.1           | <0.001 <sup>ac</sup> , <0.001 <sup>ad</sup> |
| Social                 | 61.3 ± 8.5            | 62.1 ± 7.1            | 67.5 ± 9.2            | 72.3 ± 6.7           | <0.001 <sup>ac</sup> , <0.001 <sup>ad</sup> |
| Environmental          | 70.9 ± 6.3            | 72.6 ± 8.7            | 77.7 ± 7.5            | 84.9 ± 6.4           | <0.001 <sup>ac</sup> , <0.001 <sup>ad</sup> |

**Table 2. Combined antiretroviral drugs and quality of life of HIV-infected patients.**

| Domain        | TEN                     | ZLE                     | ZLN                     | ZLA                     | TEA                     | TEE                     | p-value             |
|---------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|---------------------|
| Physical      | 71.2 ± 6.8 <sup>a</sup> | 74.5 ± 8.8 <sup>a</sup> | 72.3 ± 5.6 <sup>a</sup> | 70.9 ± 6.2 <sup>a</sup> | 70.4 ± 5.8 <sup>a</sup> | 84.9 ± 9.3 <sup>b</sup> | 0.001 <sup>ab</sup> |
| Psychological | 78.7 ± 7.3 <sup>a</sup> | 79.5 ± 8.2 <sup>a</sup> | 79.1 ± 8.7 <sup>a</sup> | 81.6 ± 6.3 <sup>a</sup> | 78.8 ± 7.0 <sup>a</sup> | 92.5 ± 6.8 <sup>b</sup> | 0.004 <sup>ab</sup> |
| Social        | 48.6 ± 3.7 <sup>a</sup> | 49.7 ± 4.7 <sup>a</sup> | 50.1 ± 3.8 <sup>a</sup> | 50.0 ± 4.2 <sup>a</sup> | 50.7 ± 5.2 <sup>a</sup> | 61.9 ± 4.7 <sup>b</sup> | 0.029 <sup>ab</sup> |
| Environmental | 64.8 ± 5.3 <sup>a</sup> | 69.6 ± 6.3 <sup>a</sup> | 67.7 ± 6.1 <sup>a</sup> | 68.1 ± 7.4 <sup>a</sup> | 67.2 ± 5.4 <sup>a</sup> | 78.8 ± 6.6 <sup>b</sup> | 0.002 <sup>ab</sup> |

Z=Zidovudine, L=Lamivudine, N=Nevirapine, E=Efavirenz, E=Emtricitabine, A=Lopinavir/ritonavir, T=Tenofovir

**Table 3. Quality of life and gender of HIV/AIDS patients on cART following interventions.**

| Domain        | Female n=183<br>Mean ± SD | Male n=86<br>Mean ± SD | p-value |
|---------------|---------------------------|------------------------|---------|
| Physical      | 72.27 ± 6.92              | 72.62 ± 6.68           | 0.681   |
| Psychological | 79.36 ± 6.77              | 79.37 ± 6.86           | 0.990   |
| Social        | 51.72 ± 14.25             | 49.14 ± 13.56          | 0.134   |
| Environmental | 67.29 ± 6.13              | 68.14 ± 6.31           | 0.273   |

**Table 4. Quality of life and pill counting adherence of HIV/AIDS patients on cART.**

| Domains of QOL | Good adherence<br>(= / > 95%) | Fair adherence<br>(85-94%) | Poor adherence<br>(<85%) | p-value |
|----------------|-------------------------------|----------------------------|--------------------------|---------|
| Physical       | 73.25 <sup>b</sup>            | 71.23 <sup>b</sup>         | 65.00 <sup>a</sup>       | 0.005   |
| Psychological  | 79.31 <sup>a</sup>            | 70.65 <sup>a</sup>         | 75.83 <sup>a</sup>       | 0.560   |
| Social         | 49.80 <sup>a</sup>            | 50.81 <sup>a</sup>         | 38.33 <sup>a</sup>       | 0.200   |
| Environmental  | 67.64 <sup>ab</sup>           | 68.59 <sup>b</sup>         | 62.50 <sup>a</sup>       | 0.109   |

Means having the same letter(s) are not significantly different at 0.05 level of significance.

**Table 5. Regression analysis for determinants of better quality of life of patients on cART.**

| Factor                | Odd ratio (95% CI) | p-value |
|-----------------------|--------------------|---------|
| Age (years)           | 2.7 (0.4-14.8)     | 0.265   |
| Gender                | 1.7 (0.5-6.3)      | 0.445   |
| Marital status        | 1.5 (0.1-15.7)     | 0.714   |
| Education             |                    |         |
| Secondary school      | 5.8 (1.0-25.9)     | 0.047*  |
| Occupation            | 0.5 (0.1-3.2)      | 0.493   |
| Type of HAART regimen |                    |         |
| ZLN                   | 1.1 (0.1-11.4)     | 0.915   |
| ZLE                   | 3.6 (0.2-86.3)     | 0.430   |
| TEE                   | 8.7 (1.5-76.1)     | 0.998   |
| TEN                   | 0.6 (0.1-13.3)     | 0.764   |
| TEA                   | 1.7 (0.1-39.9)     | 0.749   |
| ZLA                   | 1.0 (0.1-10.1)     | 0.755   |
| Duration on HAART     | 1.8 (0.6-1.1)      | 0.193   |

\*Statistically significant; Z=Zidovudine, L=Lamivudine, N=Nevirapine, E=Efavirenz, E=Emtricitabine, T=Tenofovir, A=Lopinavir/ritonavir

Patients with secondary school education or less had better QOL than those with higher education attainment. Though, the only educational level of the patients was significantly associated with better QOL of the patients (Table 5).

## Discussion

The findings of this study indicated that all the domains of QOL significantly increased after 9 months follow-up with interventions. The improvement could be attributed to the impact of the pharmaceutical counseling to the patients as well as

improvement in the quality of care as provided in the new treatment guideline (Campos *et al.*, 2009; WHO, 2013; Osungbade, *et al.*, 2013; Akinboro *et al.*, 2014). The quality of care includes pharmacist's intervention, free antiretroviral drugs, free laboratory services, free household materials and financial assistance rendered during support group meeting. A similar study conducted in Ethiopia by Deribew *et al.* (2013), documented significant improvement in QOL after 6 months of follow-up. Contrarily, the study of Burgoyne *et al.* (2008) reported a little change or modest improvement in QOL of HIV-infected patients on cART for less than 2 years. Furthermore, Abrogoua *et al.* (2012) encouraged improvement in adherence so as to enhance patients' QOL. Patients on Tenofovir + Emtricitabine + Efavirenz (TEE) had best scores in all the domains of QOL. The possible explanation was that TEE has minimal effect on daily activities of life of the patients as a result of its greater simplicity of one pill daily regimen. The therapeutic outcomes of patients on TEE were better drug adherence and enhanced QOL. WHO (2014) supported the use of Tenofovir-based regimen because of its mild toxicity profiles and lower number of pills which tend to have improved QOL among the patients.

Adherent patients were found to have improved physical domain of QOL at baseline in the present study because the patients had been on long-term cART and therefore clinically stable with minimal drug effects. This was in agreement with the work of Kolk *et al.* (2010) and Mafirakureva *et al.* (2016) who reported that QOL may influence survival in HIV-infected patients through adherence to cART, and physical QOL predicts survival in HIV-infected patients on cART. Gender had no significant effect on all domains of QOL as found in present study. The findings of this study highlight the importance of interventions offered by pharmacists which improved the QOL of both male and female HIV-infected patients. The studies of Mrus *et al.* (2005) reported that females showed lower QOL scores than males in all of the domains except social functioning, and also Tran *et al.* (2012) found that women had higher scores in physical dimension while men had better

scores in psychological, environment and morbidity dimensions. The odds of having better QOL among those who had secondary or less education was three times higher compared to those with higher educational attainment. This study was inconsistent with findings of Oparah *et al.* (2013) in Benin City, Nigeria who reported a strong association between patients' QOL and higher educational level.

## Conclusion

The intervention in this prospective study was a success, as it led to increasing in QOL for the patients on cART from the baseline level to the end of the 9th month.

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