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A Cross-Sectional Study on Health-Related Quality of Life and Productivity Loss in HIV/AIDS Patients on ART

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Abstract

This study evaluated health-related quality of life (HRQoL), productivity loss, and associated factors among HIV/AIDS patients on antiretroviral therapy at a tertiary-level hospital in Ilorin, Kwara State, Nigeria. A cross-sectional study was conducted among patients registered in the clinic during the preceding ten years. Data were collected using the World Health Organization Quality of Life HIV Brief (WHOQOL-HIV-BREF) and the Work Productivity and Activity Impairment Questionnaire: General Health (WPAI:GH). Of the 358 participants, 94 (26.3%) were male and 264 (73.7%) females. Majority age group were 39-55years 204 (56%). Most respondents were married at 216 (60.3%) and did not perceive themselves as ill 334 (93.2). The overall (HRQoL) score was 59.34%, with 71.34% and 75.05% observed in the psychological and physical domains. Single individuals had increased scores of 30,25, 10 and 20 across HRQoL domains. Work impairment and overall activity impairment scores, as outcomes of work productivity, were found to be 12.81% and 14.35%, respectively. The highest percentage of patients (86.2 %) were on a Dolutegravir (DTG) based regimen, while others were on Atazanavir boosted regimens. Overall HRQol scores showed that participants were coping moderately well but had unmet needs due to chronic nature of the disease. Advanced medical care positively impacts the physical and psychological domains of HRQoL. The disease exerts a mild to moderate impact on productivity. Notably, psychological status shows a stronger association with loss of productivity. Higher HRQoL scores are strongly linked to reduced activity impairment and productivity. Emphasis should be on comprehensive care addressing physical, psychological, environmental and social aspects of HIV.

Keywords: HIV/AIDS, HRQoL, Nigeria, WHOQOL-HIV-BREF, WPAI

1. Introduction

Quality of life (QoL) refers to how individuals perceive their overall well-being, taking into account the cultural and value systems they live within, as well as their personal goals, expectations, standards, and concerns (WHO, 2005). Quality is of life multiple domains: health, housing, employment, education, community, culture, personal values, and spirituality making it inherently difficult to quantify (O'Connell and Skevington, 2012). Health-related quality of life (HQoL) is a multidimensional component of the patient reported outcome which involves patient's evaluation of themselves based on perception of a disease and/or its treatments (Jia *et al.*, 2005) whole.' It emphasizes the effects of illness and the specific impact that medical treatments have on an individual's overall quality of life (Liping *et al.*, 2015).

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Work productivity on the other hand is a measure of how efficiently and effectively a worker or group of workers produce goods and services (Hubens *et al.*, 2021). There is limited comprehensive evidence on health-related quality of life (HRQoL), work productivity, and their determinants among patients with HIV/AIDS, particularly within the Nigerian healthcare setting (Sprangers, 2022).

HIV infection and AIDS continue to pose significant global public health concerns (UNAIDS, 2010). Beyond the direct health effects, HIV/AIDS affects multiple aspects of individuals' lives, leading to changes in productivity and (HRQoL) health-related quality of life (UNAIDS, 2023). Given the global nature of health-related quality of life and work productivity as a discipline, this research in Nigeria can contribute to international collaborations, allowing for the exchange of knowledge and best practices (Folasire *et al.*, 2012). Understanding the change in productivity and health-related quality of life of HIV/AIDS patients has multifaceted implications for healthcare, economics, policy development, and societal well-being (Milani & Lavie, 2015). It addresses both the medical and non-medical aspects of living with HIV/AIDS, promoting a holistic approach to patient care and support (Vo *et al.*, 2025). It helps in identifying trends, challenges, and areas for improvement in the care and support of HIV/AIDS patients (Bassey and
Miteu 2023).

Mafirakureva *et al.* (2016) observed that income, education, and employment were positively and significantly associated with health-related quality of life (HRQoL) among HIV/AIDS patients receiving antiretroviral therapy at a tertiary care facility in Zimbabwe. Similarly, Akinboro *et al.* (2014), in Southwestern Nigeria, found that high CD4 count, adherence to ART, being in a marital relationship, and absence of concomitant tuberculosis had a positive impact on the quality of life of their study participants. In line with this, Obrien *et al.* (2019) and Mweemba *et al.* (2009) suggested that periodic assessment of QoL is imperative for holistic care, helping to ameliorate the symptoms of ill health (Akinboro *et al.*, 2014). Such assessments are not only essential for documenting patients' perceived burden of chronic disease but also play a critical role in evaluating treatment outcomes (Ojelabi *et al.*, 2017).

This study aims to present an analysis of the HRQoL and work productivity of patients with HIV/AIDS that are on anti-retroviral therapy. Potential factors influencing HRQoL, work productivity and its economic impact were also examined.

2. Material and Method

Study Site

The study was conducted at a tertiary healthcare institution University of Ilorin Teaching Hospital (UITH), in Ilorin, Kwara State, Nigeria. The hospital operates three Comprehensive Health Centres, which are strategically located in Esie (Kwara State), Ihima (Kogi State), and Kishi (Oyo State).

University of Ilorin Teaching Hospital, a hospital with a vision to become the hub of quality and standard healthcare service delivery in Africa (uithilorin.org.ng), has achieved many notable breakthroughs, including the successful performance of open-heart surgery. It is a six hundred and fifty (650)-bed hospital with twenty-one (21) clinical service departments. The hospital maintains a dedicated outpatient highly active antiretroviral therapy (HAART) clinic for the management of patients, which operates from Monday to Thursday.
It also functions as a referral center for surrounding communities beyond Kwara State, including those in Oyo, Osun, and Kogi States, and attends to a high volume of patients.

Turnout is about 500 patients per Month. Its extensive catchment area, high patient turnout, and structured HIV/AIDS care program make it a highly relevant and representative site for assessing health-related quality of life (HRQoL) and work productivity among patients on antiretroviral therapy. The setting allows for meaningful insights into the lived experiences of individuals accessing care in a resource-limited yet specialized and well-utilized tertiary healthcare environment.

Study Population

The study participants consisted of individuals diagnosed with HIV/AIDS who had been enrolled in the HAART clinic at the University of Ilorin Teaching Hospital over the past decade. The study included patients aged 18 years and above who provided consent, while inpatients, individuals with severe disabilities, and those with long-term or temporary psychiatric conditions were excluded.

Ethical Approval and Informed Consent

Ethical approval was sought and obtained from the Ethics and Research Committee of University of Ilorin Teaching Hospital Ilorin (Approval ID:ERC/PAN2/024/06/0521). Informed consent was obtained for every Individual that participated in this study.

Sample size

Using Fisher's formula for calculating sample size with a population size of less than 10,000 (Araoye, 2003).

$$N_f = \frac{n}{1+\frac{n}{N}} \quad (1)$$

$$n = \frac{Z^2 P\,(1-P)}{d^2} \quad (2)$$

where

N = Total Population of HIV/AIDS patients registered at HAART Clinic = 2,193

Z = constant at 95% confidence interval (standard value of 1.96)

P = Proportions of HIV/AIDS patient assumed to have good health-related quality of life = 50%, Ahmed *et al.* (2018).

$1 - P = 0.5$, $D = degree\ of\ acurracy = 0.05$, Inserting the values of these variables in equation 2 gives $n = \frac{(1.96)^2 x 0.5 x 0.5}{(0.05)^2}$ and then $n = 384.16$.

The calculated sample size (n), representing an infinite population (>10,000), was 384.16.

Using Equation 1 to adjust for a finite population (N = 2,193), the corrected sample size (N_f) was calculated as: $N_f = \frac{384.16}{1+\frac{384}{2193}} \approx 326$.

To account for a 10% non-response (attrition) rate, 32.6 participants were added to the adjusted sample *Size;* A 10% attrition rate is widely regarded as an acceptable threshold in clinical and observational research. It reflects a minimal risk of attrition bias, helps maintain statistical power, and supports the internal validity and generalizability of study findings (Dettori, 2011). The sample size is N_f plus $10\%\ of\ N_f$ ($10\%\ of\ N_f = 32.6$), which is $32.6 + 325.6 = 358.2 \approx 358$.

Thus, the final sample size was approximated to 358 respondents. Here, n represents the sample size for an assumed infinite population, while N_f represents the adjusted sample size for a finite population (<10,000).

Study design, sampling technique and data collection tools

The study employed a cross-sectional design and recruited participants using convenience sampling. Data were collected through the administration of self-administered questionnaires, specifically the WHO's Quality of Life HIV brief (WHOQOL-HIV-BREF) and the Work Productivity and Activity Impairment Questionnaire: General Health version (WPAI:GH). The instruments measure Health related quality of life and work productivity respectively.

Data Collection Procedure

The WHOQOL-HIV-BREF and (WPAI: GH) were self-completed questionnaires. Data were collected on every clinic day (Mondays to Thursdays) for six weeks. Fifteen (15) Patients were selected randomly per clinic day. Participants with limited literacy were administered the questionnaire through interviewer-led sessions, while literate participants independently completed the questionnaires under the direct supervision of the researcher.

Data Analysis

Statistics Package for Social Sciences (SPSS) version 22.0 was used for data analysis. The data obtained were analyzed according to the specific objectives using descriptive and inferential statistics. The data collected were entered into SPSS version 22.0 computer software packages using numeric codes.

Descriptive statistics for all variables were generated. Continuous variables were summarized using means and standard deviations. Categorical data were summarized using frequencies and percentages. Spearman's correlation coefficient was applied to examine the relationship between health-related quality of life and work productivity impairment outcomes. All analyses were conducted at a 95% confidence interval with a significance level set at $p < 0.05$.

3. Results

Socio-demographic and Clinical Profile of the Study Population

The study cohort consisted of 358 patients including 94(26.3%) males and 264 (73.7%) females. Age group 39-59 years had the highest frequencies of 204 (56.9%) followed by age group 18-38 years 86 (24.0%). One hundred and twenty four (34.6%) of the participants had secondary while 121 (33.8%) had tertiary education. Most of the respondents are married 216(60.3%) and did not perceive themselves as ill 334(93.2%), currently employed 182(60.0%), asymptomatic 333(94.6%). Regarding self-assessment of health status, 229 (83.5%) rated their health as very good, 45 (12.5%) as good, 15 (3.7%) as neither good nor bad, and 8 (1.7%) accordingly, as presented in Table 1.

Table 1: Socio-demographic and Clinical Profile of the Study Population.

Variables	Numbers of Participant (%)	Mean ± Std	*F/T-Tests	P-Value
Gender				
Female	264(73.7)	61.4 ± 11.9	T = -3.8	0.0002
Male	94(26.3)	66.7 ± 11.0		
Age Groups				
39-59	204(56.9)	62.4 ± 10.9	F = 3.5	0.03
18-38	86(24.0)	65.4 ± 12.9		
60-80	68(19.9)	60.5 ± 12.9		
Education				
Secondary	124(34.6)	62.9 ± 11.1	F = 41.9	0.00000000003
Tertiary	121(33.8)	69.9 ± 9.5		
Primary	68(18.9)	56.6± 10.0		
None	45(12.6)	52.8 ± 9.7		
Marital Status				
Married	216(60.3)	65.1 ± 10.6	F = 10.5	0.000000004
Widowed	92(25.6)	52.3 ± 11.9		
Single	29(8.1)	65.5 ± 14.0		
Separated	16(4.4)	55.8 ± 11.9		
Divorced	5(1.4)	71.9 ± 7.5		
Do you perceive yourself as ill				
No	334(93.2)	63.3 ± 11.5	T = 3.2	0.002
Yes	24(6.8)	55.4 ± 14.2		
HIV Status				
Asymptomatic	333(94.6)		T = -2.3	0.02
Symptomatic	25(5.4)			
Your Health				
Very Good	229(83.5)	63.5 ± 11.4	F = 6.6	0.002
Good	45(12.5)	61.7 ± 12.5		
Bad	15(3.7)	52.1 ± 14.1		

*F/T Test: F-Test-To compare means across 3 or more groups, T-test-To compare means between 2 groups

Health-Related Quality of Life Domain Scores Reported by Participants

Participants recorded the least mean scores in the social (51.81%) and environmental (52.39%) domains. The physical and psychological domains had the highest mean scores, at 75.05% and 71.34%, respectively (Table 2).

Table 2: Health-related quality of life domain scores of respondents

Domain	Mean (Transformed 1-100) %	Minimum domain	Maximum domain
Overall HRQoL	59.34	9.25	70
Physical	75.05	38	100
Psychological	71.34	44	100
Social	51.81	19	100
Environment	52.39	0	88

Marital status and quality of life among 358 evaluated HIV/AIDS patients

In Table 3, HIV-seropositive respondents that are singles had the highest HRQoL scores in all the domains. Considering a score range of 1–50, they scored 30 in the physical domain, 25 in the psychological domain, 10 in the social domain, and 29 in the environmental domain.

Table 3: Marital status and quality of life among 358 evaluated HIV/AIDS patients

Domain	Single	Married	Divorced	Widowed	Separated	P value
Physical	30	29	26	28	27	<0.001
Psychological	25	24	20.5	24	23	0.002
Social	10	9	8	9	8	<0.001
Environment	29	24	22	28	22	<0.001

*Score range 1-50

Work productivity Impairment Activity Score

The study showed that time missed was 8.5%, activity impairment was 12.10%, and the overall activity impairment score was 14.35%, as presented in Table 4

Table 4: Work productivity Impairment Activity Score

Work Productivity Activity impairment (WPAI) outcome	Mean	Standard Deviation
Time missed (%)	8.50	24.27
Work impairment (%)	12.81	29.67
Activity impairment (%)	12.10	26.63
Over all activity impairment (%)	14.35	31.50

Matrix of Inter-Domain Correlations within the WHOQOL-BREF Questionnaire

Table 5 presents the inter-domain correlations, highlighting significant associations among all domains of the WHOQOL-BREF and overall activity impairment (percentage), which serves as an indicator of productivity loss. Strong correlations were identified between the psychological and physical domains ($r = 0.616$, $p < 0.001$), whereas the weakest correlation was observed between the social and physical domains ($r = -0.382$, $p < 0.001$). Among the domains, the strongest correlation with loss of productivity was observed in the psychological domain ($r = -0.221$, $p < 0.001$), whereas the weakest correlation was found in the environmental domain ($r = -0.064$, $p < 0.001$).

Table 5: Matrix of Inter-Domain Correlations within the WHOQOL-BREF Questionnaire

	Physical	Psychological	Social	Environment	Change In Productivity	p value
Physical	1					p=<0.001
Psychological	0.61655	1				p=<0.001
Social	0.38222	0.38763	1			p=<0.001
Environment	0.52106	0.56697	0.47345	1		p=<0.001
Change In Productivity	-0.21166	-0.22130	-0.12797	-0.06359	1	p=<0.001

Correlation coefficient between HRQoL and change in work productivity is - 0.11,p=<0.001

Antiretroviral regimen taken by 358 Patients.

The findings of this study indicate that the majority of patients (86.2%) are receiving a Dolutegravir (DTG)-based regimen.

Table 6: Antiretroviral regimen taken by 358 Patients

Regimen	**Number of participants (%)**	**Mean ± std**	**F-statistics**	**p-value**
TDF+ 3TC +DTG	255(71.2)	59.53 ± 8.00	0.55	0.65
ABC+3TC+DTG	50(14.0)	59.79 ± 9.21		
AZT+3TC+ATC/r	31(9.05)	58.54 ± 9.48		

****TDF** – Tenofovir, **3TC** – Lamivudine, **DTG** – Dolutegravir, **ABC** – Abacavir, **AZT** – Zidovudine, **ATC/r** – Atazanavir boosted with Ritonavir.

Drug Regimen and HRQoL scores

No statistically significant differences were observed in the health-related quality of life (HRQoL) across the various domains when compared by ART regimens, as shown on Table 7.

Table 7: Drug Regimen and HRQoL scores

Domain	**TDF+ 3TC +DTG**	**ABC+3TC+DTG**	**AZT+3TC+ATC/r**	**TDF+3TC+ATC/r**	**p- value**
Physical	75	75	75	81	0.96
Psychological	81	69	81	75	0.41
Social	28.5	28	28	30	0.18
Environment	63	63	63	69	0.95

***TDF** – Tenofovir, **3TC** – Lamivudine, **DTG** – Dolutegravir, **ABC** – Abacavir, **AZT** – Zidovudine, **ATC/r** – Atazanavir boosted with Ritonavir.

4. Discussion

The predominance of females in the study population (74%) is consistent with various reports from sub-Saharan Africa. Saidu, Awofala, Ogundele, and Azuka (2009, 2018, 2013) similarly reported higher female representation in their studies conducted in Benin City, Edo State, Nigeria, all of which demonstrate a higher burden of HIV/AIDS among females. This disparity may be attributed to the generally better health-seeking behavior of women compared to men, as well as their greater availability to attend clinic appointments. In contrast, men are often preoccupied with meeting the economic demands of their families, which may limit their engagement with healthcare services (Das et al., 2018).

The educational distribution of the respondents in this study reveals that the majority possess a secondary level of education, this is in alignment with (Fatiregun et al., 2009). The age groups of 39 to 59 and 18 to 38, which collectively represent the largest segment of the workforce, exhibited the highest prevalence of HIV infection, aligning with, CDC (2021) and Nafula et al. (2021).

Findings that the mean overall HRQoL of HIV-infected patients was above average (59.3%), suggests that while patients are functioning relatively well, but there are still significant impairments or unmet needs affecting their well-being. The fact that they are functioning relatively well might be a resultant effect of availability and accessibility of HAART to HIV-infected patients at the study site. Unmet needs may be due to chronicity of the illness, causing ongoing challenges of managing long-term symptoms, treatment side effects, stigma, or socio-economic stressors**.**

Mean HRQoL scores were lowest in the environmental and social domains, this aligns with previously published studies and may be explained by the challenges commonly faced by people living with HIV/AIDS (PLWHA), including social isolation, stigmatization, discrimination, strained relationships, cultural attitudes, financial burdens, and poor living conditions (Akinboro *et al.*, 2014).

The highest HRQoL ratings were recorded in the Physical and Psychological domain, implies that patients perceive better well-being in their physical health (e.g., pain, energy, mobility) and psychological state (e.g., mood, self-esteem, anxiety) this can be as a result of advanced medical care, access to mental health care; including therapy and counselling, Increased awareness and education, adherence, increased advocacy and community initiatives, coping skills (Defar *et al.*, 2023).

Unlike many reports (Bello and Bello, 2008; Nojomi *et al.*, 2008) that documented better QoL among married individuals, this study found that unmarried participants had significantly higher HRQoL scores across all domains. This may be due to the greater autonomy, reduced relationship-related stress, broader social support networks, and fewer economic pressures experienced by single individuals. This finding is consistent with Han *et al.* (2014), who stated that the QoL is higher in single men and women than the married.

Time missed (8.5%), work impairments (12.81%), Overall Activity Impairment score (14.35%) indicate that the respondents are experiencing moderate health-related difficulties that affect both their presence at work, overall productivity when at work and daily activities due to their health, but these difficulties are relatively moderate and may not hinder their ability to perform most daily tasks.

Published studies have demonstrated that individuals undergoing HAART exhibit significant improvements in physical health, emotional well-being, and mental health. Additionally, they experience reduced absenteeism from work, along with enhanced productivity and job performance, in comparison to those not receiving treatment (Halkitis et al., 2005).

Approximately 86.2 % of the respondents are on Fixed-dose (DTG-based regimen). This is consistent with the findings of Hurbans et al. (2024), who demonstrated the effectiveness, safety, and tolerability of DTG-based ART in a study conducted among a population in South Africa. This study showed that the tendency for compliance is high with reduced pill burden, although this is contrary to Kim et al. (2019) findings that showed a higher adherence when the number of prescribed pills were much than when few.

When comparing drug regimens and HRQoL scores, the low rating observed in the social domain may be attributed to the lifelong nature of the condition which can cause emotional stress and negatively affect social interactions, thereby reducing motivation to participate in social or community activities. However, this contradicts the findings of Joulaei *et al.* (2021), who reported high scores across the four domains of HRQoL among the study population.

The study showed a correlation coefficient of -0.11 between HRQoL and work productivity indicates that there is a weak negative relationship. Improvements in HRQoL may lead to some decrease in loss of productivity, but the effect is relatively small. This suggests that HRQoL is a determinant loss of productivity.

Findings suggested that psychological health was a key factor that could directly affect work productivity, this echoes the findings by Ni *et al.* (2022). This might be due a favorable perception of one's psychological quality of life, which can lead to higher motivation levels, better engagement at work, and a greater sense of purpose.

In agreement with the current study, a broad consensus supports that better physical health and healthcare correlate with reduced productivity loss (Kowlessar et al., 2011). This study also revealed that the social domain had a direct negative impact on work productivity, which contrasts with the findings of Ni *et al.* (2022).

Lower correlation between environmental domain of Health-Related Quality of Life (HRQoL) and work productivity among people living with HIV (PLWH) compared to other HRQoL domains can be attributed to several factors. Access to healthcare and financial stability are important, however, there influence on productivity may not be as immediate or direct as physical or psychological health. They are more likely to affect long-term well-being rather than short-term productivity (Tesfaye *et al*., 2020).

Limitation

The reliance on self-reported data introduces the risk of recall bias, as participants may not accurately recall or report past symptoms or experiences, potentially affecting the reliability of HRQoL scores. The use of convenience sampling may limit the generalizability of the findings, as the sample may not be representative of the broader population of patients living with HIV/AIDS. The presence of unmeasured or uncontrolled confounding variables such as income level, psychosocial support, comorbidities, or adherence to ART may have influenced both HRQoL and work productivity, potentially biasing the observed associations.

5. Conclusion

This study found that individuals aged 18 to 59 years, the most productive age, had the highest prevalence of the HIV infection. At the University of Ilorin Teaching Hospital (UITH), despite high the provision of advanced medical care, the mean HRQoL score of 59.3 percent suggests that patients are coping moderately well but still face unmet needs, particularly due to the chronic nature of the disease. While patients scored relatively high in the psychological and physical domains of HRQoL, lower scores were recorded in the social and environmental domains.

A productivity loss of 14.35 percent was observed, indicating a mild to moderate disruption in daily functioning and work output. This loss was most strongly correlated with the psychological domain, emphasizing mental health, particularly conditions such as depression, anxiety, and low motivation, as a key determinant of productivity.

Additionally, unmarried individuals reported better HRQoL scores across domains compared to their married counterparts. The majority of patients, 86.2 percent, were receiving a Dolutegravir (DTG) based regimen, reflecting its widespread use in treatment.

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