EFFECT OF COGNITIVE BEHAVIOURAL THERAPY ON KNOWLEDGE AND SELF-EFFICACY IN ANTI-RETROVIRAL DRUG ADHERENCE AMONG PEOPLE LIVING WITH HIV/AIDS IN LAGOS STATE, NIGERIA

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Abstract

Adherence to anti-retroviral therapy (ART) remains a critical challenge for people living with HIV/AIDS, with self-efficacy playing a crucial role in treatment success. This study examined the effect of cognitive behavioural therapy (CBT) on knowledge and self-efficacy in ART adherence among HIV-positive individuals in Lagos State, Nigeria. Specifically, the study assessed participants' knowledge levels before and after the intervention and determined the effect of CBT on self-efficacy in ART adherence. A pre-test, post-test, quasi-experimental design was employed, involving an experimental and control group. A multi-stage sampling technique was used to recruit 200 participants from selected primary health centres, with data collected using validated instruments, including the General Medication Adherence Scale and the Generalized Perceived Self-Efficacy Scale. Findings revealed that participants initially had below-average knowledge of ART adherence. However, post-intervention results demonstrated a significant increase in adherence knowledge and self-efficacy among the experimental group compared to the control group. The study confirmed the effectiveness of CBT in improving ART adherence knowledge and self-efficacy, highlighting the need for targeted behavioural interventions. It is recommended that CBT be integrated into routine HIV care, continuous educational programs be established, and structured adherence support systems be implemented to enhance adherence behaviours among people living with HIV/AIDS.

Keywords: Cognitive Behavioural Therapy, Anti-Retroviral Therapy Adherence, Knowledge, Self-Efficacy, HIV/AIDS Management

Introduction

HIV/AIDS remains one of the most devastating epidemics, with over 38 million people infected globally, 70% of whom reside in sub-Saharan Africa (UNAIDS, 2020). ART requires at least 95% adherence for effectiveness, yet various challenges hinder patients from maintaining this threshold (World Health Organization, 2019). Globally, 37.9 million people are living with HIV, with 23.3 million on ART, leading to a decline in AIDS-related mortality from 1.7 million in 2004 to 770,000 in 2018 (UNAIDS, 2020). However, disparities persist, with the African region recording the highest prevalence and mortality (World Health Organization, 2023). Africa has 25.7 million PLHIV, yet only 16.3 million access ART, and 470,000 deaths were reported in 2018 (UNAIDS, 2020). In Western and Central Africa, only 39% of ART recipients have viral suppression, indicating poor adherence (UNAIDS, 2020). In Nigeria, 1.9 million people aged 15–49 live with HIV, requiring lifelong ART (Chukwumah, et al., 2023). Despite advances in ART formulations with improved tolerability and fewer side effects, adherence remains crucial for achieving viral suppression and the UNAIDS "90–90–90" targets (UNAIDS, 2020)

Adherence to antiretroviral therapy (ART) is critical for attaining HIV viral suppression and increasing the well-being of HIV-positive individuals. Research results reveal that the efficacy of ART is dependent on a patient's compliance with recommended dosages, dosing intervals, and other medication recommendations. Even though adherence has been discovered to be a fundamental predictor of ART treatment success (Khalili et al., 2024), several patients are found to lapse on the prescribed treatment regimen, increasing the risk of transmitting HIV, deteriorating health conditions (Hernandez et al., 2020), therapy failure, production of new

resistant viral strains, progression to acquired immune deficiency syndrome (AIDS), more hospitalization, and death ((Hernandez et al., 2020).

Optimal ART adherence is fundamental to achieving HIV viral suppression and improving well-being of HIV-positive patients. Other benefits of ART adherence include decline in morbidity and mortality rates, decreased probability of transmitting the virus to sero-negative partners, and improved quality of life (Demessie et al., 2022). The effectiveness of ART, and even among those diagnosed and placed on therapy is reflected in the 18% surge in viral suppression among all HIV-positive patients globally between 2021 and 2019. However in 2019, only 59% of HIV-positive patients had suppressed viral loads, which indicated the unfeasibility of achieving the 90-90-90 target of 2020 (UNAIDS, 2020). The 90-90-90 target is a United Nations declaration to bring AIDS to an end by HIV testing, treatment, and viral suppression. Being the goal of HIV treatment, viral suppression to undetectable levels is a key strategy to ending the pandemic.

Nurses play a pivotal role in enhancing patients' knowledge about medication adherence through structured interventions tailored to individual needs. While adherence is often viewed as a patient's responsibility, nurses support this process by addressing underlying causes of non-adherence through counselling, education, and structured medication regimens (Lelie-vander, 2020). Cognitive Behavioural Therapy (CBT) has been identified as an effective approach in modifying thought and behaviour patterns to improve health outcomes. However, many nurses lack the necessary knowledge and training to implement CBT effectively, limiting its integration into routine nursing care. The success of CBT in fostering medication adherence lies in its ability to challenge negative thought patterns and replace them with more adaptive behaviours, particularly for people living with chronic illnesses such as HIV/AIDS (Asaolu et al., 2023). Studies suggest that structured interventions, such as the teach-back method and motivational techniques, improve patient knowledge and compliance (Kini & Ho, 2020). Additionally, psychosocial interventions, including peer support and counselling, have been shown to enhance knowledge retention and adherence among patients managing long-term treatment regimens (Spaan et al., 2020).

Self-efficacy is another crucial determinant of medication adherence, as individuals with low self-efficacy often struggle with treatment-related anxiety and doubt (Iwalola, 2022). CBT directly targets these psychological barriers by fostering a sense of competence and control over one's health, leading to improved adherence outcomes (Atkinson et al., 2020). By restructuring negative beliefs and reinforcing a patient's ability to follow treatment plans, CBT enhances motivation and long-term behavioural change (Olatunji et al., 2020). Higher self-efficacy correlates with greater engagement in treatment strategies, while individuals with low self-efficacy are more likely to experience non-adherence due to perceived helplessness (Roebuck et al., 2022). In HIV care, interventions that address self-efficacy contribute to better retention and adherence to antiretroviral therapy (ART), ultimately improving health outcomes (Okonji et al., 2020). Despite its proven effectiveness, there remains a gap in the application of CBT within HIV treatment settings, necessitating further research into its role in strengthening self-efficacy and adherence behaviours (Sherr, 2022).

Studies assessing the knowledge of antiretroviral (ARV) drug adherence among people living with HIV/AIDS (PLWHA) highlight varying levels of awareness and factors influencing adherence. Van-Nguyen et al. (2021) found that 62% of HIV-infected patients in Vietnam

demonstrated general knowledge of ARV treatment, with education level, self-reminders, and stress influencing knowledge levels. Similarly, Moraes et al. (2022) in Brazil observed that age, education, and family income significantly affected ART knowledge, with misconceptions such as 27.7% believing ART eradicates HIV and 25% assuming any medication can be taken without medical advice. Gastrointestinal and psychiatric adverse effects were the most commonly reported concerns. Martiana, et al. (2022) examined ART knowledge among men who have sex with men (MSM), revealing a significant correlation between higher ART knowledge and improved adherence, with stigma negatively affecting adherence levels. Likewise, Abadiga et al. (2020) highlighted that strong family support, absence of adverse drug reactions, and disclosure of HIV status contributed to higher adherence. In Ethiopia, Demessie et al. (2022) found that only 33% of participants had good knowledge of ART, though self-reported adherence reached 79.1%, indicating gaps between awareness and practice. Younger individuals were less likely to adhere to ART, emphasizing the need for targeted educational interventions to enhance adherence among this demographic.

Self-efficacy has been established as a critical determinant of medication adherence, particularly in chronic disease management, including HIV treatment. Khalili et al. (2024) demonstrated that self-efficacy significantly mediated the relationship between social support and medication adherence in diabetic patients, with income and education levels playing crucial roles. Similarly, Abdisa, Gindaba, and Zerihun (2024) assessed self-efficacy for self-management among PLWHA in Ethiopia, reporting that lower self-efficacy was associated with older age, female gender, longer HIV duration, and drug side effects, while higher schooling, urban residence, and reminder usage positively influenced self-efficacy. In Iran, Hosseini et al. (2024) found a positive correlation between self-efficacy and adherence to ART, with every unit increase in self-efficacy improving medication adherence (MA) by 0.85 units. Socioeconomic status was also found to significantly impact adherence, with higher SES improving MA, while alcohol consumption reduced adherence.

In view of the above, the study investigated the effect of cognitive behavioural therapy on knowledge and self-efficacy in anti-retroviral drug adherence among people living with HIV/AIDS in Lagos State, Nigeria. The specific objectives are to:

1. assess the level of knowledge of anti-retroviral drug adherence among people living with HIV/AIDS at the pre and post intervention levels; and

2. determine the effect of pre and post intervention cognitive behavioural therapy on self-efficacy of participants' anti-retroviral drug adherence.

Research Hypotheses

Ho1: There is no significant difference in the mean level of knowledge of anti-retroviral drug adherence among people living with HIV/AIDS in the experimental and control groups.

Ho2: There is no significant effect of self-efficacy on pre and post intervention cognitive behavioural therapy on people living with HIV/AIDS anti-retroviral drug adherence in the experimental and control groups.

Methodology

This study employed a pre-test, post-test, quasi-experimental research design to assess the effectiveness of cognitive behavioural therapy (CBT) interventions on medication adherence among HIV patients. The study included two levels of CBT as treatment groups and a control group. The study population comprised HIV patients receiving treatment in selected primary health centres across Lagos State, Nigeria. To be included in the study, patients had to be diagnosed with HIV, registered in a primary health facility within the research area, and have been on ART for at least three months. They also had to be mentally stable and free from any comorbid conditions. Exclusion criteria included refusal to provide consent, being on therapy for less than three months, or being critically ill. The study determined the sample size using the normal approximation to the hypergeometric distribution. Given that the estimated prevalence of self-reported adherence in Nigeria is 58%, and considering a 5% margin of error, the sample size was initially calculated at 167. To account for a 20% attrition rate, the final sample size was increased to 200.

A multi-stage sampling procedure was used to select participants. First, Lagos State was stratified into three senatorial districts. Then, Lagos Central and Lagos West were randomly selected for the study. Within these districts, the LGAs with the highest number of PHCs offering ART services were chosen: Alimosho LGA in Lagos West and Surulere LGA in Lagos Central. Convenience sampling was used to select these LGAs based on the availability of PHCs. Simple random sampling was then applied to select participants from each PHC using a lottery method. Participants who picked slips marked "IN" were included in the study. To ensure equal representation, the number of selected participants corresponded to the total number of ART patients in each PHC. Finally, participants were randomly assigned to the two treatment groups using another lottery system, where those who picked slips marked "A" were assigned to CBT intervention, while those who picked "B" were placed in the control group.

The study utilized one instrument to collect data for the study and it is divided into 3 parts The first part was the Biographical Data Sheet, which collected demographic information such as age, gender, marital status, and religion. The second part was the General Medication Adherence Scale (GMAS), and the third part was the Generalized Perceived Self-Efficacy Scale (GPSS), developed by Jerusalem and Schwarzer. This 10-item scale assessed participants' confidence in handling difficulties and overcoming obstacles.

To ensure the validity of the instruments, face and content validity was established through expert reviews by professionals in nursing and mental health. Internal consistency was evaluated using Cronbach's Alpha, with results indicating strong reliability: 0.788 for the knowledge section and 0.857 for the self-efficacy scale. The researcher recruited and trained three research assistants for data collection. Data were collected in two phases: pre-test (before the intervention) and post-test (after six weeks of intervention). In the pre-intervention phase, the researcher visited the PHCs, sought approval from management, and distributed copies of the instruments for review. During the intervention phase, participants in the experimental groups received CBT sessions over six weeks, while the control group did not receive any psychological intervention. The demographic data of the participants was analyzed by means of frequency counts and percentage. The hypotheses formulated for this study was tested using analysis of covariance (ANCOVA) at the .05 level of significance. All the hypotheses stated in this study were tested at 0.05 alpha level.

Results

Table 1:   **Participants' Socio-demographic Data**

SN	Variable		Control (N = 50)		Experimental (N = 150)	
			Frequency	Percent	Frequency	Percent
1	Age	18-25yrs	14	28.0	12	8.0
		26-33yrs	14	28.0	30	20.0
		34-41yrs	10	20.0	30	20.0
		42-49yrs	12	24.0	48	32.0
		50-57yrs	-	-	18	12.0
		58yrs and above	-	-	12	8.0
2	Gender	Male	44	88.0	42	28.0
		Female	6	12.0	102	68.0
3	Marital status	Single	14	28.0	48	32.0
		Married	16	32.0	72	48.0
		Widowed	2	4.0	12	8.0
		separated/divorced	18	36.0	12	8.0
4	Educational level	No formal education	-	-	12	8.0
		primary education	-	-	6	4.0
		secondary education	20	40.0	72	48.0
		Tertiary education	30	60.0	54	36.0
5	Occupation	Unemployed	2	4.0	-	-
		Farming	12	24.0	16	32.7
		self employed	18	36.0	18	36.7
		Housewife	2	4.0	2	4.1
		private employee	2	4.0	2	4.1
		Govt employee	14	28.0	11	22.4
		Islam	12	24.0	24	16.0
		Traditional	18	36.0	6	4.0
		with family	26	52.0	108	72.0
6	Phase of Treatment	Intensive phase	6	12.0	12	8.0
		Continuation phase	44	88.0	126	84.0

Table 1 presents the socio-demographic characteristics of participants in both the control (N = 50) and experimental (N = 150) groups. The age distribution reveals that the experimental group had a broader age range, with 12% aged 50-57 years and 8% aged 58 years and above, while the control group had no participants in these age brackets. Gender distribution shows a stark contrast, as males dominated the control group (88.0%) while females comprised the majority (68.0%) in the experimental group. Marital status varied, with 36.0% of the control group being separated or divorced, whereas only 8.0% of the experimental group fell into this category. Educational levels indicate that 60.0% of the control group had tertiary education compared to 36.0% in the experimental group, which had a higher percentage of participants with secondary education (48.0%) and some with no formal education (8.0%). Occupationally, the experimental

group had more farmers (32.7%) compared to the control group (24.0%), while self-employment rates were nearly similar. In terms of living arrangements, a higher proportion of the experimental group (72.0%) lived with family compared to the control group (52.0%). Lastly, most participants in both groups were in the continuation phase of treatment, with 88.0% in the control and 84.0% in the experimental group.

Table 2: Pre and post intervention participants' level of knowledge on anti-retroviral drug adherence in the control and experimental group

	Level of Knowledge	Control (N = 50)				Experimental (N = 150)			
		Pre		Post		Pre		Post	
		Yes	No	Yes	No	Yes	No	Yes	No
1	Anti HIV drugs are used in managing and controlling HIV/AIDS	50 (100.0)	-	50 (100.0)	-	150 (100.0)	-	150 (100.0)	-
2	ARDs have some manageable side effects	33 (66.0)	17 (34.0)	35 (70.0)	15 (30.0)	102 (68.0)	48 (32.0)	150 (100.0)	-
3	Drug Treatment is started as soon as a person is diagnosed with HIV	29 (58.0)	21 (42.0)	33 (66.0)	17 (34.0)	93 (62.0)	57 (38.0)	140 (93.3)	10 (6.7)
4	Do you take your drugs immediately after remembering you hadn't taken it as at when due?	40 (80.0)	10 (20.0)	35 (70.0)	15 (30.0)	140 (93.3)	10 (6.7)	150 (100.0)	-
5	ARV can prevent mother to child transmission of HIV	22 (44.0)	28 (56.0)	28 (56.0)	22 (44.0)	67 (44.7)	83 (55.3)	150 (100.0)	-
6	HIV positive patient placed on ARV drugs can give birth to a child without HIV infection	25 (50.0)	25 (50.0)	20 (40.0)	30 (60.0)	73 (48.7)	77 (51.3)	145 (96.7)	5 (3.3)
7	Percentage of ART adherence required is less than 95%	12 (24.0)	38 (76.0)	13 (26.0)	37 (74.0)	62 (41.3)	88 (58.7)	150 (100.0)	-
8	Missing ARV doses can lead to disease progression	41 (82.0)	9 (18.0)	40 (80.0)	10 (20.0)	120 (80.0)	30 (20.0)	150 (100.0)	-

At the pre-intervention stage, all respondents in both groups agreed that Anti-HIV drugs manage and control HIV/AIDS. In the control group, 66% acknowledged manageable ARD side effects, 58% started treatment upon diagnosis, and 80% took their drugs immediately after remembering. Additionally, 44% believed ARV prevents mother-to-child transmission, 50% affirmed that HIV-positive patients on ARV can give birth to HIV-negative children, 24% believed adherence below 95% is acceptable, and 82% recognised that missing doses could lead to disease progression. The experimental group had similar responses, with 68% agreeing on manageable ARD side effects, 62% starting treatment immediately, and 93.3% taking their drugs as soon as they remembered. About 44.7% affirmed ARV prevents mother-to-child transmission, 48.7%

believed ARV ensures HIV-negative childbirth, 41.3% accepted adherence below 95%, and 80% recognised missing doses could cause disease progression.

At post-intervention, the control group showed slight improvements: 70% acknowledged manageable ARD side effects, 66% started treatment immediately, 70% took drugs upon remembering, and 56% affirmed ARV prevents mother-to-child transmission. In contrast, all experimental group respondents affirmed key ARV benefits, with 93.3% starting treatment immediately and 96.7% believing ARV ensures HIV-negative childbirth. These findings suggest improved adherence and knowledge in the experimental group post-intervention.\

Testing of Hypotheses

Hypothesis 1: There is no significant difference in the mean level of knowledge of anti-retroviral drug adherence among people living with HIV/AIDS in the experimental and control groups.

Table 3: T-test showing the difference in the mean level of knowledge of anti-retroviral drug adherence among people living with HIV/AIDS in the experimental and control groups

Group	N	Mean	Std. dev	Df	t-value	p-value	Mean diff	Remark
Control	50	3.93	0.85	193	3.821	.013	3.50	S**
Experimental	145	7.43	0.59					

S** = Significant

Table 3 presents the result of hypothesis one postulated in this study. It is indicated that there is no significant difference in the mean level of knowledge of anti-retroviral drug adherence among people living with HIV/AIDS in the experimental and control groups (mean difference = 3.50, $t_{(193)}$ = 3.821, p = .013 < .05). Based on this, the earlier set hypothesis cannot be accepted. Therefore, there is a significant difference in the post intervention knowledge mean score of participants on the anti-retroviral drug adherence in the control and experimental groups.

Hypothesis 2: There is no significant effect of self-efficacy on cognitive behavioural therapy of people living with HIV/AIDS anti-retroviral drug adherence

Table 4:   Univariate Test of self-efficacy on Participants' Cognitive Behavioural Therapy

	Sum of Squares	Df	Mean Square	F	Sig.
Contrast	211.003	1	211.003	2.674	.021
Error	11363.328	144	78.912		

The results in Table 4 revealed that there was a significant difference in the effect of self-efficacy ($F_{(1,144)}$ = 2.674; p = .021 < 0.05) of the people living with HIV/AIDS anti-retroviral drug adherence exposed to cognitive behavioural therapy. The null hypothesis which stated that "There is no significant effect of self-efficacy on cognitive behavioural therapy of people living with HIV/AIDS anti-retroviral drug adherence" was rejected by this finding. The implication of this result was that self-efficacy will influence participants' anti-retroviral drug adherence.

Discussion of the Findings

The outcome of the first research question on the pre and post intervention knowledge mean score of participants on the anti-retroviral drug adherence in the control and experimental group moderate knowledge for the two groups. The implication of this finding is that people living with HIV/AIDS still lack adequate knowledge of the anti-retroviral drug adherence. Thus, knowledge is the key to understanding a phenomena. This result corroborate the findings of Moraes et al. (2022) found that the poor knowledge on therapy is an aspect that can contribute to poor adherence and that it represents an issue to be worked by health professionals working in the SCSs. Also, the study of Demessie et al. (2022) that assessed knowledge and adherence to antiretroviral therapy among adult people living with HIV/AIDS at Tikur Anbessa Specialized Hospital, Ethiopia. The results indicated that 33% of the participants had good knowledge on the treatment plan and regimen.

Additionally, it was observed at the post-intervention stage that the knowledge level of anti-retroviral drug adherence among people living with HIV/AIDS exposed to CBT is better compared to those who were not exposed to CBT. The improvement in knowledge mean score observed between the control and the experimental group could be as a result of the educational intervention. This study lend credence from the findings of Van-Nguyen et al (2021) who in their findings reported that education programs for patients, as well as the quality of medical services and support are key factors in the promotion of the knowledge of antiretroviral (ARV) treatment.

Also, the study of Martiana, et al. (2022) reported that ART knowledge correlated positively with adherence to ART while ART knowledge was found to be an important factor influencing ART adherence. They concluded that as the level of ART knowledge increased, self-motivation and attitudes toward adherence to treatment increased.

The results of the second hypothesis indicated that a significant effect of self-efficacy on cognitive behavioural therapy of people living with HIV/AIDS anti-retroviral drug adherence. The implication of this result was that self-efficacy will influence participants' anti-retroviral drug adherence. CBT increases self-efficacy, which in turn leads to more consistent adherence to ART (Dube et al., 2022). Studies have found that people who received CBT interventions reported feeling more confident in their ability to manage both the psychological and physical aspects of their illness, leading to better adherence (Hernández et al., 2020). This corroborates the findings of Hernández et al. (2020) who explored the impact of CBT on self-efficacy and ART adherence among HIV-positive individuals and found significant improvements in both areas. Participants who engaged in CBT reported higher levels of confidence in their ability to follow their ART regimen, and this boost in self-efficacy was linked to better adherence rates. Similarly, Dube et al. (2022) conducted a review that reinforced the finding that CBT

interventions focused on increasing self-efficacy were effective in improving ART adherence. The study concluded that CBT helps individuals overcome psychological barriers, which in turn enhances their self-efficacy and supports better adherence to treatment.

Conclusion

The findings indicate that participants in both groups initially had below-average knowledge of anti-retroviral drug adherence. However, post-intervention results revealed a significant improvement in the experimental group, demonstrating the effectiveness of cognitive behavioural therapy in enhancing adherence knowledge. The substantial mean difference between the experimental and control groups underscores the intervention's impact. Additionally, self-efficacy played a significant role in improving adherence, further validating the effectiveness of cognitive behavioural therapy. These results highlight the importance of targeted interventions in promoting better adherence behaviours among people living with HIV/AIDS.

Recommendations

1. Given the significant improvement in adherence knowledge observed in the experimental group, healthcare providers should integrate CBT into routine HIV care and treatment programs. This approach can enhance self-efficacy and promote better adherence to anti-retroviral therapy among people living with HIV/AIDS.

2. Since both groups initially had below-average knowledge of anti-retroviral drug adherence, continuous education and awareness campaigns should be implemented in healthcare facilities and community settings. These programs should focus on the benefits of adherence, managing side effects, and addressing misconceptions about HIV treatment.

3. Policymakers and stakeholders in the health sector should develop structured adherence support systems that incorporate psychological and behavioural interventions. This could include counselling, peer support groups, and digital reminders to reinforce adherence behaviours among individuals on anti-retroviral therapy.

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