
STIGMATIZATION AND FORGETFULNESS AS PREDICTORS OF MEDICATION ADHERENCE AMONG HIV/AIDS PATIENTS IN MAKURDI, NIGERIA

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Abstract

Adhering to medication regimen is important in treatment Therefore, this study investigated stigmatization and forgetfulness as predictors of medication adherence among HIV/AIDS Patients in Makurdi, Nigeria. Purposive and convenience sampling techniques were used to sample 408 HIV/AIDS patients from two tertiary Hospitals in Makurdi. Participants included 135 (33.1%) males and 273 (66.9%) females with ages ranging from 20 to 60 years (Mean=33.79, SD=11.74). Short HIV stigma scale, forgetfulness scale and medication adherence scale were instruments used to collect data from respondents. Descriptive statistics and multiple linear regression, simple linear regression, and standard multiple regression were used to analyze the data collected on SPSS. The findings indicated that, stigmatization significantly predicted medication adherence among HIV/AIDS patients in Makurdi, Nigeria. Similarly, Forgetfulness showed a significant negative prediction on medication adherence among HIV/AIDS patients in Makurdi, Nigeria. Further findings showed that there was a significant joint prediction of stigmatization and forgetfulness on medication adherence among HIV/AIDS patients in Makurdi, Nigeria. It was concluded that, Stigmatization and Forgetfulness are significant independent and joint predictors of medication adherence among HIV/AIDS patients in Makurdi, Nigeria. The study recommends that medication adherence monitoring plans such as home visit, phone calls and use of caregivers to remind patients by health workers and NGOs in the field of HIV/AIDS treatment, provision of patient navigation services, peer pressure support, and mobile health applications to enhance communication and support. Also, improvement of awareness and education to reduce stigma should be encouraged to enhance medication adherence in the study area.

Key Words: Stigmatization, Forgetfulness, Medication Adherence, HIV/AIDS Patients

Introduction

Medication adherence has become a determinant of treatment outcomes particularly among individuals living with long-term conditions such as Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS). As the management of chronic illnesses relies on sustained treatment regimens, patient's ability to follow prescribed medications and related health recommendations has emerged as a component of effective care. Medication adherence involves how patients take their medications as prescribed for instance, twice daily, as well as whether they continue to take a prescribed medication (Jimmy & Jimmy, 2011). According to World Health Organization (WHO, 2001), drug or medication adherence is defined as the extent to which patient's behaviour (taking medication, following a diet, and/or executing lifestyle changes) corresponds with agreed recommendations from a health care provider. It signifies that the patient and physician work together to improve the patient's health by integrating the physician's medical opinion and the patient's lifestyle, values and preferences for care (Michael, 2009). Even though, it is commonly referred to as medication or drug adherence, it can also apply to other situations such as medical device use, self-care, self-directed exercises, or therapy sessions.

HIV/AIDS remains a global public health concern. Since its emergence in the 1980s, it has infected about 79 million people worldwide (National Institute of Mental Health, 2022). In 2020, 1.5 million individuals were newly infected with the virus (National Institute of Mental Health, 2022). It is considered the leading cause of morbidity and mortality in sub-Saharan Africa including Nigeria. Sub-Saharan Africa accounted for two-thirds (67%) of new infections globally (UNICEF, 2018). In Nigeria, an estimated 190,950 HIV/AIDS infections occur per year, the second highest rate in the world in 2015. The country has the highest HIV/AIDS burden with an estimated 3 million people living with HIV/AIDS (PLHIV) in 2015 (Bassey & Miteu, 2023) and in 2020, this figure increased to an estimated 206,139,589 people living with HIV/AIDS in the country (Bassey & Miteu, 2023). It is stated that HIV/AIDS epidemic in Nigeria ranks as the second highest across the world, with over 1.9 million people currently living with HIV/AIDS (De Cock et al., 2012). In Benue State, the prevalence of HIV/AIDS is 5.7% which is considered the highest prevalence in Nigeria, followed by Rivers with prevalence of 5.2% (Onovo et al., 2023). According to Jwanle et al. (2023) the number of newly diagnosed HIV/AIDS patients in Benue State increased by 467%, from 650 in 2019 to a peak of 3685 in August 2020. According to Benue State Agency for the Control of Aids (BENSACA, 2025), between January to June 2025 data indicated that a total of 24,751 HIV/AIDS patients in Makurdi were receiving treatment comprising of 7,569 males and 17,182 females. Within the same period, a total of 4,048 individuals were tested for HIV including 1,642 males and 2,406 females. Of those tested, 91 individuals were confirmed positive and newly enrolled for treatment with 44 males and 47 females making up this group. This shows that HIV/AIDS remains a serious public health concern given the burden it imposes on patients and the health care system.

The introduction of antiretroviral therapy (ART) agents have revolutionized HIV/AIDS treatment and substantially lowered mortality and morbidity in HIV/AIDS patients (Lesko et al., 2016). ART is recommended for all HIV/AIDS patients with the primary goal of reducing HIV/AIDS-associated mortality and morbidity. Early initiation of ART and adherence to ART has several benefits. These include preventing the HIV/AIDS from multiplying (viral load suppression) which reduces the risk that HIV/AIDS will mutate and produce drug-resistant HIV/AIDS and eventual HIV/AIDS treatment failure, improved overall health and quality of life, and decrease risk of HIV/AIDS transmission (Kenneth & Schaeher, 2013). HIV/AIDS guidelines recommend initiating ART in treatment of naïve

patients. After treatment initiation, ART must be continued indefinitely as the effectiveness of treatment of HIV/AIDS depends on both the efficacy of the medication and patient adherence to the medication. Medication adherence among HIV/AIDS patients is considered to be one of the key factors in maintaining viral load suppression and reducing the risk of drug resistance.

However, it has been observed and reported that many patients experience interruptions in their ART treatment, leading to poor drug adherence (Bansi-Matharu et al., 2019). Patients' non-adherence with prescription medications is a very serious issue. Studies have suggested that many patients do not take their medications as prescribed: they may modify the regimen themselves, or they may not fill/refill their prescriptions at all (Osman, 2019). Persons with AIDS are very likely to modify or discontinue their drug therapy due to treatment fatigue, side effects, belief, and fear of disclosure.

A number of factors could play roles in HIV/AIDS patients' adherence or non-adherence to ART and one of them is stigmatization defined as the perception of individuals with certain diseases as being unworthy of social investment due to factors such as their behaviours or non-compliance with medical treatment (Paterson et al., 2007). It is the prejudice that comes with labelling an individual as part of a group that is believed to be socially unacceptable. HIV stigma and discrimination affect the emotional well-being and mental health of people living with HIV. People living with HIV/AIDS often internalize the stigma they experience and begin to develop a negative self-image. They may fear they will be discriminated against or judged negatively if their HIV status is revealed. HIV/AIDS stigma can negatively affect the health and well-being of people living with HIV/AIDS by discouraging some individuals from learning their HIV status, delays in diagnosis of high risk patients, accessing treatment, or staying in care. HIV stigma can also affect those at risk of HIV by discouraging them from seeking HIV prevention tools and testing, and from talking openly with their sex partners about safer sex options. This may contribute towards continuous spread of the disease within the community, impact on healthcare services in general and derail the curtailment of the global HIV-AIDS pandemic.

Another factor that play a role in medication adherence among HIV/AIDS patients is forgetfulness. Defined as the apparent loss or modification of information already encoded and stored in an individual's short or long term memory, it is usually the hallmark of cognitive problems. In fact, forgetfulness tends to be the more salient feature of cognition that patients complain about the most because it is more obvious and noticeable to the individual and his or her family, friends and co-workers (Simioni et al., 2010). Memory is but one of many cognitive domains adversely affected by HIV, including executive functioning (i.e., reasoning), speed of processing, attention, psychomotor ability, and language (Hardy & Vance, 2009). Declines in one domain such as speed of processing may adversely affect another domain such as memory. This means that if there is a cognitive problem in one area, a more subtle and less obvious decline in another cognitive domain may be likely (Vance et al., 2012).

Forgetting to take medication appears to be a setback of good medication adherence in HIV/AIDS patients. According to (Masika et al., 2024), forgetting to take medication increases chances of having a detectable viral load and a reason for poor adherence in HIV/AIDS patients. Uzochukwu, et al., 2020 stated that above half (66.7%) of the patients that were always forgetful missed their drugs. Some people may notice that it takes longer to learn new things; they don't remember information as they usually do, or they misplace things such as their medication. Forgetfulness hinders or interrupts a conversation or daily activities and is seen as a common cause of non-adherence to ART among People living with

HIV/AIDs (PLWHA). Besides the immune system, the brain and the nervous system are also affected by HIV leading to cognitive problems (disorders that affect mental health) and forgetfulness (Vance et al., 2019). This affects the patient's activities of daily living, ranging from a reduction in the person's quality of life, and can also affect his or her adherence to medication.

Given the clinical importance of proper adherence to ART among PLWHA, patient education and counselling on the therapeutic importance of adherence is paramount however, effective counselling interventions require empirical knowledge of the factors that facilitate or impede proper adherence (Rintamaki et al., 2019). It is against this background that the present study is conceived to empirically investigate stigmatization and forgetfulness as predictors of drug adherence among HIV/AIDS patients in Makurdi Metropolis with a view of finding solutions to the problems of stigmatization and forgetting as factors militating against antiretroviral medication adherence among adult HIV/AIDS patients.

Stigmatization and Medication Adherence

Martinez et al. (2014) explored whether HIV/AIDS stigma negatively impacts adherence to antiviral medications in HIV/AIDS-infected adolescent women the United States. Moderational analysis was conducted and factors identified that could alter said relationship. Study participants were 178 adolescent females age 15–24, enrolled between 2003–2005, from 5 different cities and 60 provided adherence information. Findings reported by this cohort of 60 adolescent women included: medication adherence, 64.3% reporting adherence at baseline and 45.0% at 12 months; HIV stigma score of 57.60 (standard deviation [SD], 11.83; range, 25–86). HIV/AIDS stigma was not found to be a significant predictor when binary logistic regression was run with medication adherence at 1 year. Using moderational analysis, factors that could moderate stigma's effect on medication adherence was still pursued and identified the following to be significant at 12 months: health care satisfaction, standard error and Coping (proactive coping strategies, turning to family spiritual coping, professional help and physical diversions. Factors that had no significant moderating effects included: social support measures (mean=74.9; median=74.0) and depression score greater than 16=43%. The study concluded that HIV/AIDS-infected adolescent women experienced HIV/AIDS stigma and poor adherence over time. Factors like health care satisfaction and coping may minimize stigma's effect on medication adherence. Findings of the study are limited by a small sample size and lack of a direct relationship between stigma and adherence on binary logistic regression analysis.

Rintamaki et al. (2019) to determine how social stigma affects HIV/AIDS treatment adherence. This study included 93 people living with HIV/AIDS in the United States who participated in focus groups or one-on-one interviews regarding how stigma might affect medication management. Latent content analysis and constant comparative techniques of participant responses that were analyzed produced three thematic groupings that described how participants (a) orient to HIV/AIDS stigma, (b) manage HIV/AIDS stigma in ways that directly impair treatment adherence, and (c) manage HIV/AIDS stigma in ways that may indirectly impair adherence. Findings revealed that many participants reported problems concerning HIV/AIDS stigma. Participants who show high concern over HIV/AIDS stigma were less likely to take their ART. Largely, these were through concealment strategies that impaired the receipt of adherence support, or that led them to forgo information that would aid in treatment adherence. Although some participants in the current study described little concern for stigma, other participants feared stigmatizing responses to HIV/AIDS disclosures and concealed their HIV/AIDS status, as a result. These concealment strategies, which involve altering treatment schedules, skipping doses, and taking pills in private, help to

preserve secrecy of one's HIV/AIDS status, but also directly threaten treatment adherence and efficacy. It was concluded from the study that there are different ways in which stigma management strategies may disrupt treatment adherence and that the efforts that were taken to conceal HIV/AIDS status to avoid stigma directly or indirectly impair treatment adherence among participants.

Forgetfulness and Medication Adherence

Chijioke-Nwauche and Akani (2021) studied the influencing factors of adherence to antiretroviral drugs among people living with HIV/AIDS in South-South Nigeria the aim of the study was to evaluate the factors that affect the adherence to their prescribed medications by people living with HIV/AIDS (PLWHIV). A descriptive cross-sectional study using pretested questionnaire was used to collect information on adherence among HIV adult patients. Socio-demographic factors were evaluated as possible factors associated with adherence. Reasons for missing medications were also obtained and described. Outcomes of the study showed a poor level (58%) of adherence among participants. Patient factors (forgetfulness, personal travels and work schedule), were major reasons given for missing their medications. Others are economic (lack of transport, poverty) and socio-cultural (stigma, spiritual) factors. Social support in the form of treatment supporter was found to be a significant ($p < 0.05$) positive influencing factor to adherence by patients as well as disclosure of status to spouse. The study recommended that strategies to improve adherence should be focused on the ways to address the negative influencing factors. Improved awareness in terms of counselling, education and orientation of the patients is strongly advocated. They also advocated social support systems (family, community, treatment supporter) and societal acceptance of PLWHIV should be put in place to encourage adherence.

Isika et al. (2022) explored a cross-sectional study of factors influencing adherence to antiretroviral therapy among HIV/AIDS-infected adults in Cross River State. The aim of the study was to assess predictors of adherence to ART among adult patients in Cross River State (CRS), a cross-sectional survey was conducted among 999 adult patients on ART in selected secondary and tertiary health facilities in CRS from January to June 2017. Respondents were recruited using multistage technique. Data were collected using a pre-tested interviewer-administered questionnaire. Adherence was defined as clients taking at least 95% of their pills in the last seven days. Multivariate analysis was performed to determine predictors of adherence at 5% level of significance. Results showed that self-reported adherence rate was 60.1%. The commonest reasons for non-adherence were client travelling out of home, being busy, forgetting and lack of food. The significant predictor identified in this study was being on first-line drugs (were 3 times more likely to have good adherence. Predictors of poor-adherence were alcohol intake, dosing medications, CD4 cell count ≥ 500 , poor attitude to HIV status and medication and family support. It was concluded from the study that adherence to ART among clients in this study was fair. Majority of the reasons for poor-adherence were client-related. They recommended targeting counselling to improve adherence.

In another similar study in Southern Nigeria, Odili et al., (2017) carried out a study to investigate the level of adherence and factors affecting adherence to antiretroviral treatment (ART). The study sample consisted of 300 HIV-infected patients who received ART in the Antiretroviral Clinic of Central Hospital, Agbor, Delta State, Nigeria. Self-reported adherence to ART in the previous 1 month prior to the study as well as determinants of adherence was assessed using a questionnaire. Results indicated that most frequently used ART regimen was zidovudine + lamivudine + nevirapine. On the whole, a total of 33 (11%) respondents missed 3 doses or less in the previous month prior to the survey. There was a

statistically significant association between adherence to ART and marital status, source of income, and occupation ($P < .05$). The most commonly reported reasons for missed doses were forgetfulness (60.4%), busy daily task (18.3%), and avoiding being seen while taking medications (11%). Odili et al., (2017) concluded that the prevalence of adherence among the participants was high. They however recommended that more serious efforts are needed to reduce the number of in-adherent patients and that intervention to improve adherence to ART should address challenges such as forgetfulness among the patients and frequent occurrence of adverse effects and consider specific patient-related factors such as daily tasks.

Research Hypotheses

- i. Stigmatization will significantly predict Medication Adherence among HIV/AIDS patients in Makurdi, Nigeria.
- ii. Forgetfulness will significantly predict Medication Adherence among HIV/AIDS patients in Makurdi, Nigeria.
- iii. Stigmatization and forgetfulness will jointly predict Medication Adherence significantly among HIV/ AIDS patients in Makurdi, Nigeria.

Design

This study employed a cross- sectional survey design. It is a type of design in which data is collected from a representative sample of participants at one point in time and is best used to describe the status of phenomena and or the relationships among phenomena or variables (Shindi, 2017).

Population of the Study

The population for this study was HIV/AIDS Patients assessing Anti-Retroviral Therapy (ART) at Benue State University Teaching Hospital Makurdi (BSUTH) and Federal Medical Centre (FMC) Makurdi. According to anecdotal data provided by AIDS Prevention Initiative in Nigeria (APIN), FMC has a total of 9,588 HIV/AIDS patients receiving ART under its care while 963 patients are receiving care at BSUTH. This brings the population ($9,588 + 963 = 10,551$) of this study to be 10,551 persons living with HIV/AIDS.

Sample Size Determination

Sample size for this study was determined using the Raosoft online sample size calculator (<http://www.raosoft.com/samplesize.html>). With a proportion of 50%, a 95% confidence interval, and a 5% margin of error, the sample size for this study is 371. This tool (Raosoft online sample size calculator) has been used in previous literature (Olowofela & Isah, 2017; Osei-Yeboah et al., 2021). To address potential missing data, 10% of the sample size will be added, providing a needed sample size of 408.

In order to determine the proportion of the health workers to sample from each public hospital in Makurdi, the Halleck's (2001) formula for proportional distribution below was used:

$$\sum \left(\frac{n}{N} \right) N_i$$

n = population size per stratum

N = total population

N_i = determined sample size

$$\text{Federal Medical Centre, Makurdi: } \frac{9588}{10551} \times 408 = 371$$

$$\text{Benue State University Teaching Hospital: } \frac{963}{10551} \times 408 = 37$$

Sampling Technique

Purposive and convenience sampling techniques were adopted for this study. The purposive sampling technique simply means the researcher samples with a purpose in mind. With purposive sampling, the researcher selected the two tertiary health institutions with most numbers of HIV/AIDS patients attending the clinics. This technique allowed the researcher to select the hospitals of interest only. The researcher purposively selected Federal Medical Center, Makurdi and Benue State University Teaching Hospital, Makurdi. The convenience sampling technique was used to sample patients from the two selected Tertiary Health Institutions based on their availability at the clinics during the time of researcher's visit, with only participants who are willing to participate in the study were sampled for the study.

Participants

The participants for the study were representative sample of HIV/AIDS patients from the two Tertiary Health Institutions within the study area. A total of four hundred and eight (408) patients with HIV/AIDS were drawn from both Benue State University Teaching Hospital and Federal Medical Center, Makurdi. They were made up 135 (31.1%) males and 273 (66.9%) within the age range of between 20-60 years. 295 (72.3%) were Christians while 113 (27.7%) were Islam. Majority of the participants 77 (43.4%) were married while 52(12.7%) were divorced. In terms of occupation, 120 (29.4%) were Civil Servants while 58 (14.2%) were house wives. 288 (70.6%) had secondary education while 08(24.0%) had secondary education with 22(5.4%) having primary education. Duration of illness revealed that majority of the participants 85 (20.8%) had been sick with HIV/AIDS for between 2-27 years.

Inclusion Criteria

The Eligibility criteria for patients include one who had been diagnosed of HIV/AIDS, attending clinic in BSUTH or FMC, physically strong to respond to questionnaire, and both males and females.

Exclusion Criteria

Exclusion criteria include HIV/AIDS patients who were attending clinic in other health facilities apart from BSUTH or FMC, a visually impaired, deaf or physically challenged patients that cannot read, understand and comprehend a sentence and patient who are psychically or mentally unstable to complete the study questionnaire.

Instruments

Short HIV Stigma Scale (SHSS)

The 12-item HIV/AIDS Stigma Scale Short Version, developed by Reinius et al. (2017) and adapted from the original 40-item scale by Berger et al. (2001), measures anticipated and internalized stigma among people living with HIV/AIDS. It uses a 4-point Likert response format and contains four subscales: personalized stigma, disclosure concerns, concerns with public attitudes, and negative self-image. Total scores range from 12 to 48, with higher scores indicating greater stigma. Psychometric evaluation by Gonçalves et al. (2022) using a Portuguese sample demonstrated acceptable reliability across the subscales ($\alpha = .59-.81$) and adequate convergent validity, with AVE values ranging from .46 to .71. The scale also showed significant concurrent validity with the Brief Symptom Inventory and the Suicide Ideation Questionnaire. Overall, the short version exhibits strong psychometric properties and is considered a reliable and valid instrument for assessing perceived HIV-related stigma.

Forgetfulness Scale (FS)

This scale was developed by Troyer and Rich (2002), is a self-report instrument designed to assess individuals' satisfaction, concern, and overall appraisal of their memory functioning. The scale consists of 19 items describing different situations in which memory lapses may occur, and respondents rate how frequently they experience each situation using a 5-point Likert format ranging from 1 ("none of the time"), 2 ("almost none of the time"), 3 ("sometimes"), 4 ("almost all of the time"), to 5 ("all of the time"). Scoring involves summing the values of all item responses to obtain a total score, which ranges from 0 to 95, with higher scores indicating a greater degree of subjective forgetfulness. Where one to three items are missing, the total score may still be computed based on the completed items. The Forgetfulness Scale demonstrates strong psychometric qualities. Troyer and Rich (2002) reported excellent four-week test-retest reliability of .93 in a subgroup of 24 participants, indicating high stability over time. The instrument also possesses strong content validity, as evidenced by the development process in which 12 memory experts evaluated the original 20 items; 19 items achieved 100% agreement, whereas one item that failed to meet the minimum criterion of 70% agreement was removed from the final version.

Medication Adherence Reasons Scale (MAR-Scale)

Medication Adherence Reasons Scale was developed by Unni et al. (2009) to measure reasons for non-adherence to medication. The scale consists of five domains and 15 items. These are Managing issues (item 15, 9, 2, 4), Multiple medication issues (item 14, 7, 3), Belief issues with medications (item 10, 11, 12, 13), Availability issues (item 1, 6), as well as forgetfulness and convenience issues (item 5, 8). Participants are asked to indicate how often they had been non-adherent to their medications for each of the reasons, using a 5-point Likert scale (1 = none of the time, 5 = all of the time). All the items in the MAR-Scale are scored on the same rating scale by adding up the score to obtain the total. Higher scores indicate a higher degree of non-adherence to antiretroviral therapy. Shima and Majid (2015) established the reliability and validity of MAR-Scale among hypertensive patients in Malaysian primary health care settings. They found a test-retest reliability coefficient of 0.51 to 0.90 (managing issues: 0.90; multiple medication issues: 0.70; belief issues with the medication: 0.72; availability issues: 0.51; forgetfulness and convenience issues: 0.78), indicating an acceptable to good level of agreement across the four measurements (namely managing issues, multiple medication issues, belief issues with the medication and forgetfulness and convenience issues). Cronbach's alpha coefficient of > 0.7 was obtained, indicating good internal consistency of the items in the construct. The results suggest that the MAR-Scale has good internal consistencies and construct validity.

Pilot Study

The instruments used in this study were tested in a pilot study among HIV/AIDS patients receiving medication at Madona Hospital, Makurdi Benue State under the official permission of the Benue State Hospital Management Board, Makurdi. Pilot study was carried out to validate all the three instruments that were to be used in the main study, using 46 HIV/AIDS patients from Madona Hospital, Makurdi Benue State. Descriptive analysis of their demographic characteristics shows that 20 (43.5%) respondents were males and 26 (56.5%) respondents were females. Considering their marital status, 23 (50.0%) were married, 7 (15.2%) were widowed, 5 (10.9%) were separated, 9 (19.6%) were single and 2 (4.3%) were divorced. For their religion, 41 (89.1%) were Christians and 5 (10.9%) were Islam. Regarding their educational qualification, 25 (54.3%) had tertiary education, 17 (39.0%) had secondary education and 4 (8.7%) had primary education.

As for the psychometric properties, the HIV Stigma Scale-12-Item Short Version for showed a reliability coefficient of .88. According to de Vaus (2004), items total correlations of .30 to .70 is considered acceptable. The item total correlation for each of the 12-items in this scale was above the minimum set norm of .30 except item 12 with total item correlation of .296. For items 12 whose value was below .30, the words were reframed or restated such that respondents will understand it better in the main study. Based on this, all the 12 items of the HIV stigma scale-12-Item short version were retained and the scale is considered fit to be used in the main study.

As for Medication Adherence Reason Scale (MAR-Scale), the reliability coefficient of .755 was obtained. In this study, the item total correlation for each of the items in this scale was above the minimum set norm of .30, except for item 1, 5, 6, 9, 12 and 13 that has total item correlations of .110, .235, .205, .277, .257 and .273 respectively. Item 4 have the highest value of .593, while item 14 have the lowest value of .344. For items 1, 5, 6, 9, 12 and 13 whose value were below .30, the words were reframed or restated such that respondents will understand it better in the main study. Based on this, all the 15 items of the HIV stigma scale-12-Item short version were retained and the scale is considered fit to be used in the main study.

Similarly, the Forgetfulness Scale also yielded the reliability coefficient of .85. In this pilot study, the item total correlation for each of the items in this scale was reported to be above the minimum set norm of .30 except for item 15 and 19 whose values were .124 and .283 respectively and later rephrased for better understanding. Item 18 has the highest value of .60 while item 14 has the lowest value of .36. All the 19-items were retained and this shows that, the proposed scale is suitable to be used in the main study.

Procedure

The researcher sought permission from the management of the selected health institutions (FMC and BSUTH) to administer research questionnaire. In administering the research questionnaire, the researcher recruited and trained two research assistants who visited the HIVAIDS treatment units which operate Monday to Friday weekly. Upon reaching any of the selected treatment centres, the researcher obtained the permission of the doctor or nurse in charge to administer the questionnaires on identified patients based on their availability and willingness to respond to the items of the questionnaire. A criterion for identification of patients was the doctors' diagnosis of HIV/AIDS patients and attendance at the ART clinic. Before giving out the copies of the questionnaire, a proper introduction was made to patients and the purpose for the exercise was explained to them. Those who voluntarily consented to participate in the study were administered copies of the research questionnaires. After the administration process, all the copies of the questionnaire were retrieved and considered for data analysis.

Data Analysis

The data collected or this study were analyzed using both descriptive and inferential statistics. The researcher used mean, standard deviation, frequencies and percentages to describe the attributes of the participants. On the other hand, multiple linear regression was used to test hypothesis I. Hypothesis two was tested using simple linear regression while hypothesis three was tested using standard multiple regression. All the hypotheses were tested at 0.05 alpha level of significance using Statistical Product and Service Solutions (SPSS), previously known as Statistical Package for the Social Sciences version 20.0.

Results

The hypotheses formulated for this study were tested using regression analysis and the results are presented as follows:

Table 1: Multiple Linear regression showing the prediction of stigmatization on medication adherence among HIV/AIDS patients in Makurdi, Nigeria

Predictor Variables	R	R ²	df	F	β	t
Sig						
Constant	.584	.341	4,383	49.990	16.140	.000
Personal stigma				-.505	-10.394	.000
Disclosure concerns				-.184	-2.884	.004
Concerns with public attitudes				-.447	-6.699	.000
Self-image				-.269	-4.948	.000

The result in Table 1 indicated that stigmatization significantly predicted medication adherence among HIV/AIDS patients [$R = .584$, $R^2 = .341$, $[F (4,383) = 49.990, P < .001]$. Furthermore, the result shows that stigmatization accounts for 34.1% of the variance in medication adherence among HIV/AIDS patients in Makurdi metropolis. Independently, personal stigma ($\beta = -.505$, $t = -10.394$, $p < .001$), disclosure concerns ($\beta = -.184$, $t = -2.884$, $p < .004$), concerns with public attitudes ($\beta = -.447$, $t = -6.699$, $p < .001$), and ($\beta = -.269$, $t = -4.948$, $p < .001$), have made a significant negative contribution to the model, implying that increase in the independent dimensions leads to decrease in medication adherence of patients. Based on this finding, hypothesis one was accepted.

Table 2: Simple Linear regression analysis showing the prediction of forgetfulness on medication adherence among HIV/AIDS patients in Makurdi, Nigeria

Predictor Variables	R	R ²	df	F	β	t
Sig						
Constant	.790	.624	1,400	663.462	6.541	.000
Forgetfulness					-.790	-25.758
.000						

The result in Table 2 revealed that forgetfulness significantly and negatively predicted medication adherence among HIV/AIDS patients in Makurdi metropolis $R = -.790$, $R^2 = .624$, $[F (1,400) = 663.462, P < .001]$, this means that increased forgetfulness result to likely decrease in medication adherence among HIV patients in Makurdi metropolis. Additionally, the result shows that forgetfulness account for 62.4 % of the variance in medication adherence among HIV/AIDS patients in Makurdi metropolis. With this result, hypothesis two was accepted.

Table 3: Standard Multiple regression analysis showing result for the joint prediction of medication adherence by stigmatization and forgetfulness among HIV patients in Makurdi metropolis

Predictor Variables	R	R ²	df	F	β	t
Sig						
Constant	.818	.670	2,383	386.325	.373	.000
Stigmatization				-.214	-7.200	.000
Forgetfulness					-.765	-25.785
.000						

The result in Table 3 shows that there was a significant joint prediction of stigmatization and forgetfulness on medication adherence among HIV/AIDS patients in Makurdi, Nigeria [$R = .818$, $R^2 = .670$, $[F(2,383) = 386.325, P < .001]$]. Further observation revealed that stigmatization and forgetfulness jointly accounted for 67.0% of the variance in medication adherence among HIV patients in Makurdi, Nigeria. With this result, hypothesis three was accepted.

Discussion

Hypothesis one of this study was tested to find out if stigmatization will significantly predict medication adherence among HIV/AIDS patients in Makurdi metropolis. Findings indicated a significant prediction among the variables. This means that, the more stigma patients experience, the less likely they will adhere to their medications. A further look at the results also revealed that personal stigma, disclosure concerns, concerns with public attitudes, and self-image, made a significant negative contribution to the model. This implies that increase in the independent dimensions leads to decrease in their scores on measure of medication adherence of HIV/AIDS patients. This finding is in support of the result of Rintamaki, et al., (2019) who found that participants who show high concern over HIV stigma were less likely to take their ART. The finding of the current study is also consistent with the findings of Martinez et al., (2014) who found that HIV-infected adolescent women experienced HIV stigma and poor adherence to medication over time. Patients with HIV/AIDS are called by their illness in a ridiculous way and are verbally abused which evoke feeling of shame and self-hatred that results in confidential use of medication and missing some doses of antiretroviral drugs.

The second Hypothesis which stated that forgetfulness will independently and significantly predict medication adherence among HIV patients in Makurdi metropolis was found to be significant. This means that, the more HIV/AIDS patients forget, the less likely they will adhere to their medications. In other words, the more patients score increases on forgetfulness, the less they will score on measure of medication adherence. This finding is consistent with the results of Odili et al., (2017) who found that the most commonly reported reasons for missed doses of ART was forgetfulness (60.4%). Similarly, Chijioke-Nwauche and Isika et al., (2022) and Akani (2021) all found that forgetfulness was a major reason for poor medications adherence among HIV/AIDS patients in the study area. Forgetfulness is a major contributing factor to poor medication adherence, meaning people often don't take their prescribed medications as directed because they simply forget to do so, which can significantly impact the effectiveness of their treatment and overall health outcomes; it is considered one of the most common unintentional reasons for not taking medications as prescribed.

The third hypothesis which stated that stigmatization and forgetfulness will jointly and significantly predict medication adherence among HIV/AIDS patients in Makurdi metropolis was found to be significant. That is to say that stigmatization and forgetfulness jointly and negatively predicted medication adherence among HIV/AIDS patients in Makurdi metropolis. HIV/AIDS patients who scored high on measures of stigmatization and forgetfulness are likely to score low on measure of medication adherence.

Recommendations

Based on the outcomes of the study, the following recommendations have been made:

- i. Adherence monitoring plans such as home visits and care by NGOs and other health workers in the field of HIV/AIDS treatment should be encouraged to improve medication adherence.
- ii. Strategies to improve adherence should be focused on the ways to address the negative influence of stigma. Improved awareness in terms of counselling, education and orientation of the patients is strongly advocated. Social support systems (family, community, treatment supporter) and societal acceptance of PLWHIV should be put in place to encourage adherence.
- iii. Employment of Clinical Psychologists at public hospitals in Makurdi to provide psychoeducation on advantages of medication adherence and other factors related to healthy living during HIV counselling will go a long way in reducing incidences of forgetting and improve medication adherence.
- iv. The fact that all the predictor variables (stigmatization and forgetfulness) predicted medication adherence in HIV/AIDS patients, reveals the need for regular assessment and screening for mental health challenges among these patient population.
- v. Provide patient navigation services, peer pressure support, and mobile health applications to enhance communication and support.

Contribution to Knowledge

The findings of this study have contributed to or expanded the frontier of knowledge regarding the association among HIV/AIDS stigma, forgetfulness and medication adherence among patients with HIV/AIDS in Makurdi, Nigeria. The findings of this study contributed to knowledge as it lends support to the idea that the social and cognitive components of patients with HIV/AIDS are as equally important as their physical health and should be given priority. Given that stigmatization independently and negatively predict medication adherence among HIV/AIDS patients in Makurdi, it suggests that most HIV/AIDS patients in Makurdi experience stigma and it is associated with their poor adherence to the ART.

The fact that forgetfulness negatively predicted medication adherence among HIV/AIDS patients, it also suggests that forgetfulness also play a major role in HIV/AIDS patients' ability to remember when to take their medication, dosage of medication and other relevant medication instructions. There have been few studies that looked at medication adherence in relation to stigmatization and forgetfulness among HIV/AIDS patients. Most of such previous studies were conducted without the three key variables in one study, the current study is an improvement and extension of these studies as it is a quantitative study conducted on a large population of HIV/AIDS patients.

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