Original Research Article

Association between HIV Status Disclosure and Adherence to Highly Active Antiretroviral Therapy among Adult People Living with HIV/AIDS Attending Antiretroviral Therapy Clinic of a Tertiary Hospital in North Central Nigeria

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Abstract: *Background*: In Nigeria, it is estimated that about 1.9 million people were living with HIV in 2019, with a national HIV prevalence of 1.4% among adults aged 15-49 years. HIV status disclosure and adherence to Highly Active Antiretroviral Therapy (HAART) medication is important for the prevention and control of HIV/AIDS. Several factors have been identified as being associated with increased adherence to HAART including HIV status disclosure. Disclosure of HIV status pose a great challenge in our society due to associated stigma and other negative consequences. The aim of this study was to explore the relationship between HIV status disclosure and adherence to HAART. *Methods*: The study was a cross-sectional analytical study involving 361 adults aged 18 years and above attending the Antiretroviral Therapy Clinic of the Federal Medical Centre Keffi. Subjects were randomly recruited by systematic random sampling. Informed consent was obtained and data on socio-demographic, HIV status disclosure, adherence to HAART and WHO clinical staging were collected using a structured pre-tested questionnaire. Data on viral load and CD4 cell count were determined through blood sample analysis. *Results*: Three hundred and sixty-one PLWHA were analysed, of whom 306(84.8%) had disclosed their HIV status. The mean age of the participants were 39.75 ± 10.00 years with majority aged between 30 to 39 (41.8%). Majority of the participants were female (301;83.4%) with male to female ratio of 1:5. Disclosure rate was more in males (54;90.0%) than females (252;82.4%). There was a significant association between HIV status disclosure and age (p-value=0.04), source of income (p-value= <0.001), use of contraceptive for females (p-value= <0.001), case manager (p-value= <0.001), perceived general state of health (p-value= <0.001) and plans for future pregnancy (p-value=0.030). Also, HIV status disclosure had a significant positive effect on adherence to HAART (p-value= <0.001). Participants who had disclosed their HIV status were six times as likely to have moderate/high adherence to HAART compared to non-disclosed group (OR=6.497, 95% CI=2.738-15.410). Furthermore, there was a significant association between virological status and HIV status disclosure (p-value= <0.001). Participants who had disclosed their HIV status were three times as likely to have viral suppression compared to non-disclosed group (OR=3.31, 95% CI=1.834-5.973). *Conclusion*: HIV status disclosure was a significant predictor of adherence to HAART in adult patients attending ART clinic in FMC, Keffi.

Keywords: HIV status disclosure, Nigeria, Viral suppression, CD4 count, Public health, PLWHA (People Living With HIV/AIDS).

INTRODUCTION

The human immune deficiency virus (HIV) infection epidemic continues to spread in the population thus making HIV one of the most important public health crises in the world [1].

In Nigeria, there are variations in HIV prevalence within states. The South-South zone has the highest prevalence at 3.1% amongst adults 15 to 49 years of age, followed by North central, 2.0% and South-East with 1.9%. The prevalence in South-West is 1.1% and that of North-East 1.1%, whilst the lowest prevalence is that of North- West zone at 0.6% [2].

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The HIV/AIDS prevention strategy which include abstinence, fidelity to one uninfected partner, consistent and correct condom use, establishment of HIV Counselling and Testing services (HCT), nutritional education, psychological support, and the prevention of mother-to-child transmission (PMTCT) has been promoted [3]. To fight against HIV/AIDS, the emphasis worldwide has been on adopting and scaling up the most effective strategies in order to prevent new infections and improving the quality of life of those who are already infected [3]. With the introduction of highly active antiretroviral therapies (HAART), HIV is increasingly becoming a manageable chronic condition, and adherence to highly active antiretroviral therapy is the focus of many researchers in combating the HIV/AIDS pandemic [4].

Adherence to antiretroviral therapy is defined as the extent to which patients take medications as prescribed by their health care providers [5]. This includes the initiation of the treatment, implementation of the prescribed regime and discontinuation of the therapy as at when due [5].

For HAART to be effective, it requires high levels of adherence (>95% adherence). Only when the adherence levels are high can the lives of people living with HIV/AIDS (PLWHA) be lengthened and the communities affected by the epidemic revitalised [6, 7].

Studies have shown that HAART adherence and the patients' social and psychological well-being can be affected by a number of factors such as the extent to which patients disclose their status and how patients cope with being HIV-positive [8]. In Nigeria adherence rate to HAART among PLWHA have been found to vary from 44% to 98% [8].

HIV status disclosure is defined as the voluntary revelation of one's status to another individual or group of individuals [9]. Disclosure of HIV sero-status is an important prevention goal emphasised by the United Nations Programme on HIV and AIDS (UNAIDS) protocol for HIV counselling and testing [1]. During adherence counselling sessions, HIV sero-positive patients are encouraged to disclose their status to their confidants who will serve as their treatment supporter [1].

Disclosure to family and friends can lead to increased social support, which can facilitate the initiation and the adherence to HIV treatment [10]. These in turn will lower the risk of transmission to prospective sexual partners, leading to a better reproductive choice, reduced anxiety, depression, and beneficial effects on the individual's physical health and overall well-being [11,12].

In order to achieve optimal adherence and good treatment outcome, public awareness should be improved, family members and sex partners should be involved in the education, counselling and management of HIV patients [13].

HIV sero-status disclosure is a crucial step to implementing a range of prevention and care behaviours, that would improve adherence and treatment outcome of PLWHA and thus prevent the onward transmission of HIV to uninfected persons. This study explored the effect of HIV status disclosure on adherence to HAART among PLWHA attending the Antiretroviral (ART) clinic of Federal Medical Centre, Keffi, Nasarawa state, Nigeria.

SUBJECTS, MATERIALS AND METHODS

This study was a facility based cross-sectional analytical design, conducted from 1st July 2019 to 30th August 2019 at the adult Antiretroviral Therapy Clinic of FMC Keffi, Nasarawa State North central Nigeria. Adult PLWHA aged 18 years and above registered in the HIV/AIDS treatment and care program who had been on treatment for at least six months and gave a written informed consent were eligible to participate in the study. HIV-infected patients who were newly diagnosed and had not been on HAART for at least six months or those on their first appointment at the clinic were excluded to allow time for cognition and acceptance of their status before disclosing to someone and also give enough room before adherence to medication can be properly assessed. Ethical approval for this study was obtained from the institution's Health Research Ethics Committee. (FMC/KF/HREC/089/16).

The minimum sample size of 325 was calculated using the Cochrane's formula for proportions in large populations.

$$n = \frac{z^2 \, p \, (1-p)}{d^2}$$

Where n = minimum sample size

z = value of the standard distribution corresponding to a significant level of α (1.96 for a confidence level of 95%).

p = expected proportion in the population (prevalence of HIV disclosure)

d = absolute precision which is significant at 0.05.

The prevalence of HIV sero-status disclosure from a previous study in Niger Delta, Nigeria showed disclosure among PLWHA attending adult ART clinic to be 74%.[14]

Therefore, $n = \dfrac{1.96^2 \times 0.74 \times 0.26}{0.05^2}$

$n = \dfrac{3.8416 \times 0.74 \times 0.26}{0.0025}$

n = 295.65

Allowing for 10% non-respondents, 361 participants were recruited.

The 361 participants were recruited within four weeks using systematic random sampling techniques. The Adult ART clinic ran three days a week with an average of 150 clients booked per clinic day, giving a sampling frame of 3600 clients and a sampling interval

of eleven. From the booking register of each clinic day, the first participant was selected using simple balloting selection by choosing the first patient booked for clinic that day as the first participant. Thereafter, the next participant was selected after an interval of 11 numbers which was the eleventh patient from the first participant chosen.

The purpose of the study was explained to the participants by the researcher at the ART clinic as a group while waiting for the clinic to start on each clinic day after which informed consent was obtained. Data on socio-demographic and clinical parameters of the study participants were obtained using a structured questionnaire. Self-disclosure of HIV sero-status was measured using a modified version of a questionnaire developed by Stutterheim *et al*., for a study on the psychological and social correlates of HIV status disclosure [15]. It included a series of twelve structured questions which was used to determine how many people the patient had disclosed to since diagnosis, to whom, why and when the patient disclosed. If a patient did not disclose to anyone, the reasons for non-disclosure was sought. Adherence to anti-retroviral therapy was measured using Morisky Medication Adherence Scale [16]. Each question has a Yes =1 or No = 0 answer, designed to prevent bias of positive response from participants. Each item measured a specific adherence behaviour, with seven questions that must be answered negatively (2-4, 6-8) and two positively (1&5), with the last question being answered according to a scale of five options: never, occasionally, sometimes, usually and always. Scores were classified into low adherence (<6), moderate adherence (6-8) and high adherence (>8). The data was processed and analysed with the use of Statistical Package for Social Science (SPSS version 21). Categorical variables like sociodemographic data of the Participants, HIV status disclosure and medication adherence were summarised using proportions and percentages. Quantitative data like age, income etc. were further summarised using means and median as appropriate. Association between the outcome variables (Self-disclosure of HIV, adherence to Highly Active Antiretroviral Therapy); and socio-demographic data were assessed using the Chi-square and Fisher's exact test as appropriate.

RESULTS

The mean age and standard deviation of the participants was 39.75 ± 10.00 years, and they were within the age range of 18-79 years. The commonest age group of the participants (151;41.8%) was 30-39 years, (110;30.5%) were between the ages of 40-49 years. Only (3;0.8%) of the participants were between the age group of 70 years and above.

There were more females (301;83.4%) than males (60;16.6%), with a male to female ratio of 1:5. Majority of the participants were married (218;60.4%), while (1;0.3%) was co-habiting. A total of (34;9.4%) of the participants were single, while (78;21.6%) of the participants were widowed.

Majority of the participants were Christians (253;70.1%). and (107;29.6%) were Muslims. Only one participant was a traditionalist.

Majority of the study participants had no formal education (107;29.6%), while (92;25.5%) had senior secondary school education. A total of (75;20.8%) had primary school education, while (53;14.7%) had post-secondary school education. Only (34;9.4%) had junior secondary school education.

A total of 77 (21.3%) of the study participants were farmers, while (58;16.1%) were civil servants. The majority 164 (45.4%) of the study participants were traders. A total of (24;6.6%) of the study participants were housewives, (15;4.2%) were Artisan and (8;2.2%) were unemployed. Only (2;1.6%) were retiree.

Details of the socio-demographic characteristics of the study participants are presented in Table 1.

Table 1: Socio-demographic characteristics of the study participants N=361

Socio-demographic characteristics	Frequency	Percentage
Age (years)		
<20	2	0.6
20-29	38	10.5
30-39	151	41.8
40-49	110	30.5
50-59	48	13.3
60-69	9	2.5
70-79	3	0.8
Mean ± SD	39.75 ± 10.00	
Gender		
Male	60	16.6
Female	301	83.4
Sex ratio	1:5.02	

Relationship status		
Single, never married	34	9.4
In a relationship, not living with partner	4	1.1
Co-habiting	1	0.3
Married	218	60.4
Separated/divorced	26	7.2
Widowed	78	21.6
Educational Level		
No formal education	107	29.6
Primary	75	20.8
Junior Secondary	34	9.4
Senior Secondary	92	25.5
Post-secondary	53	14.7
Occupation		
Civil servant	58	16.1
Trading	164	45.4
Artisan	15	4.2
Farming	77	21.3
Housewife	24	6.6
Student	6	1.7
Unemployed	15	4.1
Retiree	2	1.6
Source of income		
Self	215	59.6
Spouse partner	74	20.5
Children	4	1.1
Family friends	68	18,8

Rate of HIV Status Disclosure among the Study Participants

A total of (306;84.8%) of the study participants had disclosed their HIV status, while (55;15.2%) had not disclosed their status. Details of self-disclosure of the study participants are presented in figure 1.
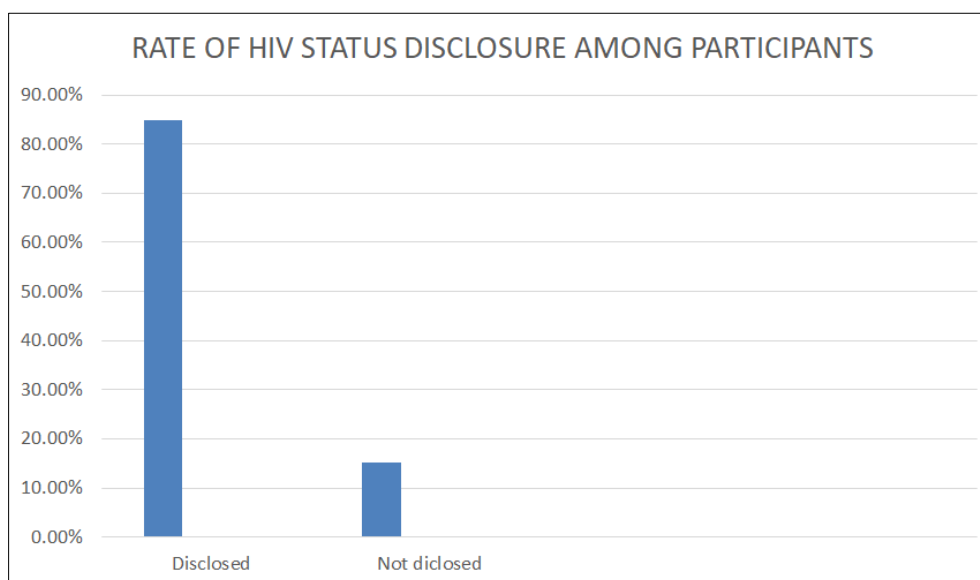

Figure 1: Self disclosure of the study participants

Adherence Status of the Study Participants

Majority of the study participants (195;54.0%) had moderate adherence to HAART while (116;32.1%) had high adherence to HAART and (50;13.9%) of the study participants had low adherence to HAART.

Details of adherence status among the study participants are presented in figure 2.
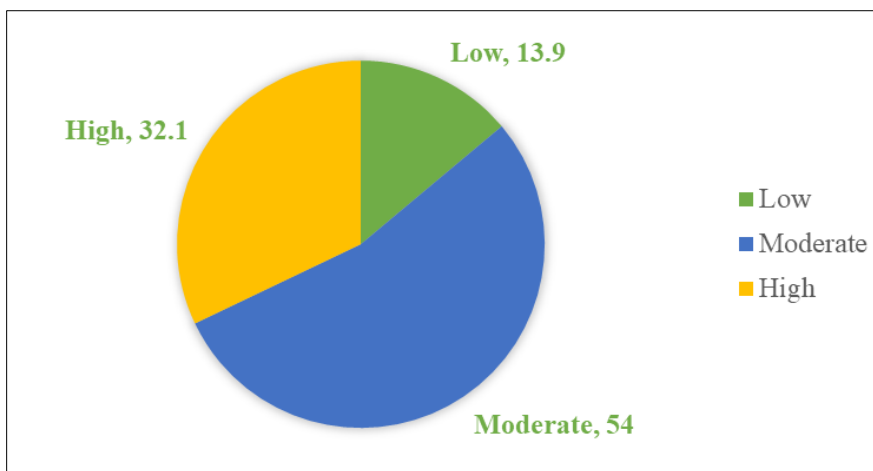
Figure 2: Adherence status of the study participants

Reasons for Non-Disclosure of Status

Reasons for non-disclosure among the study participants were fear of rejection (35;63.6%), shame (7;12.7%), loss of control of information (5;9.1%), blame (4;7.3%), desire to become pregnant (3;5.5%) and fear of negative consequences for family (1;1.8%).

Details of reasons for non-disclosure among the study participants are presented in figure 3.
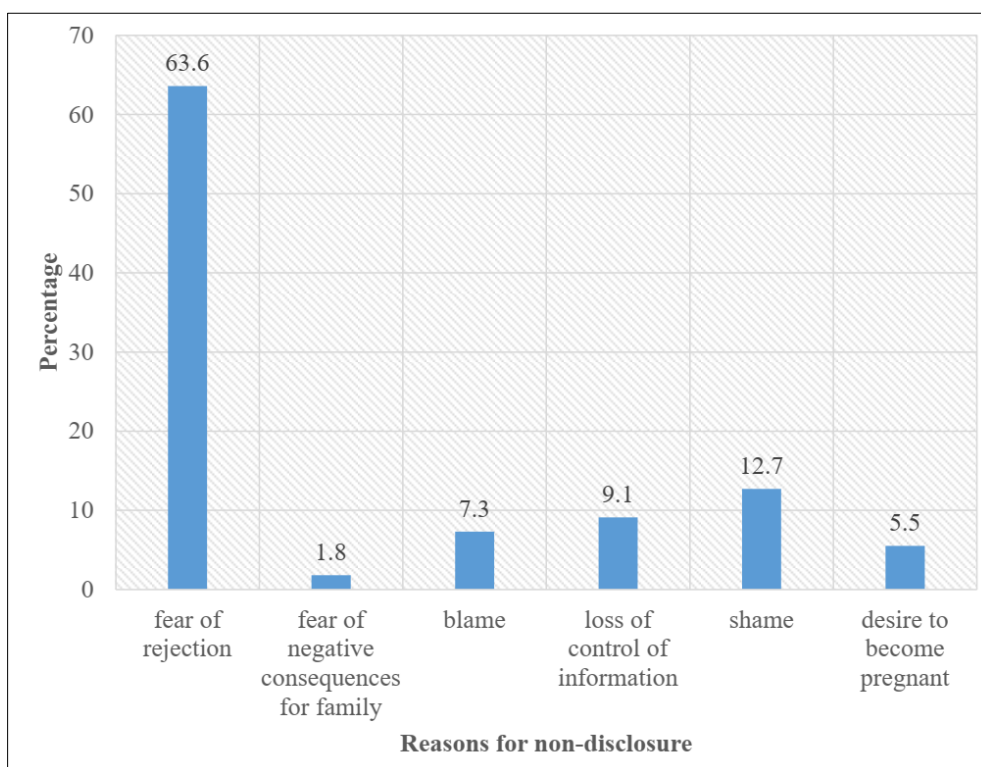

Figure 3: Reasons for non-disclosure of HIV status among the study participants

Association between Socio-Demographic and HIV Status Disclosure

A bivariate analysis showed that age (χ^2=14.743, p=0.039) and source of income (χ^2=40.191, p=0.001) had significant association with HIV status disclosure among the study participants. Participants who had external source of income had a higher percentage of disclosure as compared with those whose income was self-generated.

Gender, educational level, relationship status, monthly income, religion, no of children and occupation had no significant association with HIV status disclosure among the study participants.

Details of the socio-demographic characteristics of the study participants and its association with HIV status disclosure are presented in Table 2.

Table 2: Association between socio-demographic and HIV status disclosure

Socio-demographic characteristics	Status disclosure		χ^2	p-value
	Yes **n-306**	**No** **n-55**		
AGE (YEARS)			14.743	0.039*
<20	0 (0.0)	2 (100.0)		
20 – 29	35 (92.1)	3 (7.9)		
30 – 39	127 (84.1)	24 (15.9)		
40 – 49	93 (84.5)	17 (15.5)		
50 – 59	40 (83.3)	8 (16.7)		
60 – 69	8 (88.9)	1 (11.1)		
70 – 79	3 (100.0)	0 (0.0)		
GENDER			1.527	0.217
Male	54 (90.0)	6 (10.0)		
Female	252 (83.7)	49 (16.3)		
EDUCATION			2.662	0.616
No formal education	89 (83.2)	18 (16.8)		
Primary	60 (80.0)	15 (20.0)		
Junior secondary	30 (88.2)	4 (11.8)		
Senior secondary	81 (88.0)	11 (12.0)		
Post-secondary	46 (86.8)	7 (13.2)		
OCCUPATION			5.532	0.653
Civil Servant	52 (89.7)	6 (10.3)		
Trading	136 (82.9)	28 (17.1)		
Artisan	14 (93.3)	1 (6.7)		
Farming	63 (81.8)	14 (18.2)		
Housewife	21 (87.5)	3 (12.5)		
Student	5 (83.3)	1 (16.7)		
Unemployed	14 (87.5)	1 (12.5)		
Retiree	1 (50.0)	1 (50.0)		
SOURCE OF INCOME			40.191	<0.001*
Self –	161 (74.9)	54 (25.1)		
External	145 (99.3)	1 (0.7)		
RELATIONSHIP STATUS			5.696	0.322
Single/never married	30 (88.2)	4 (11.8)		
In a relationship not living with partner	4 (100.0)	0 (0.0)		
Co-habiting	0 (0.0)	1 (100.0)		
Married	187 (85.8)	31 (14.2)		
Separated/divorced	21 (80.8)	5 (19.2)		
Widowed	64 (82.1)	14 (17.9)		

Association between HIV Status Disclosure and Adherence to Haart

In this study there was a significant association between HIV status disclosure and adherence to HAART among the participants (χ^2 24.540, p= 0.001).

Details of the association between status disclosure and adherence to HAART are presented in Table 3.

Table 3: Association between HIV status disclosure and adherence to HAART

Factors	Adherence status		χ^2	p-value
	Low **n (%)**	**Moderate/High** **n (%)**		
Status disclosure			21.289	**<0.001***
Yes	31 (10.1)	275 (55.2)		
No	19 (34.5)	36 (47.3)		

Logistics Regression of Factors That Affect HIV Status Disclosure

Bivariate level analysis showed a significant association between age (p=0.039) and source of income (p=<0.001), with HIV status disclosure. Also, there was a significant association between HIV status disclosure and adherence to HAART among PLWHA (p=<0.001). Hence, these factors were graduated to logistic regression analysis to show their effects. However, the study showed that participants who had external source of income were less likely to disclose their HIV status than those whose source of income was self-generated. The study also revealed that those who had disclosed their HIV status were four times as likely to have moderate/high adherence as compared with non-disclosed group.

Details of the logistic regression of factors affecting HIV status disclosure among the study participants are presented in table 4.

Table 4a: Logistic regression analysis

Factors	Odd Ratio	95% C.I	p-value
Source of Income External	0.021	0.003-0.151	**<0.001**[*]
Age	1.001	0.970-1.032	0.970

Table 4b: Logistic regression for HIV status disclosure and adherence to HAART

Factors	Odds ratio	95% C.I	p-value
Status disclosure Yes	4.682	2.400 – 9.135	<0.001*
No	RC		

Predicted for moderate/high adherence
RC: reference category

DISCUSSION

The rate of self-disclosure of HIV status in this study was 84.8%. This finding was similar to other studies done in Nigeria by Adefemi *et al*., with a disclosure rate of (87%) [17]. Oluwaseun *et al*., in Nigeria found a disclosure rate of (81.9%) [18]. Kumar *et al*., in Eastern India found a disclosure rate of (82.6%) [19], and Shewaye *et al*., in Ethiopia found a disclosure rate of (86.2%) [20]. The rate of self-disclosure found in this study was higher than previous studies done by Amoran in Nigeria among PLWHA found a disclosure rate of (50.9%) to at least one person and Ebuenyi *et al*., in an antiretroviral clinic in Nigeria found a low disclosure rate of (62%) [21]. The Southwestern zone of Nigeria have been shown to have low acceptance attitude towards PLWHA, this may be attribute to the lower rate of HIV status disclosure in this area [22]. The disparity in the disclosure rates in the present study could be due to the study setting. The participants had universal access to comprehensive HIV care such as provision of nutritional support, facility-based support groups and provision of antiretroviral drugs.

Majority of the study participants (195;54.0%) had moderate adherence to HAART. Majority of participants (169;55.2%) who had disclosed their HIV status had moderate adherence to HAART while about a third (106;34.6%) of the participants who had disclosed their HIV status had high adherence to HAART. Thirty-one (10.1%) of the participants who had disclosed their HIV status had low adherence to HAART. Our findings were similar to those obtained in Ilorin, Nigeria by Anyaike *et al*., who found that 89.8% of the study participants who disclosed their HIV status did not miss their medication [23].

The study participants were aged 18-79 years, with a mean age of 39.75 ± 10.00 years. In this study majority of the participants were between the age of 30 to 39. Our finding was similar to a study by Ahmed-Mohammed *et al*., on perception and predictors of HIV among PLWHA in Sokoto, Nigeria where majority of the participants were aged between 31 to 40 years [24]. This was in contrast with the study by Madi *et al*., in Mangalore, India with majority of the participants aged 41 to 60 years [3]. In this study majority of the participants who had disclosed their HIV status were between aged 20 to 29 years. Our study was comparable to previous study in Nigeria by Amoran who found that participants who were 20 to 39 years were more likely to disclose their HIV sero-status [12]. This was contrast to study by Ebuenyi *et al*., who found that participants aged 31 to 43 were more likely to disclose their HIV status [21]. Similar pattern was also reported by Kumar R *et al*., [19]. They found that 83.7% of the participants who disclosed their HIV status were aged about 30 years.

The study showed that 15.2% of the study participants did not disclose their HIV status to anyone. Majority of the study participants did not disclose their HIV status because of fear of rejection (63.6%). Other reasons were shame (12.7%), loss of control of information (9.1%), blame (7.3%), desire to become pregnant (5.5%) and fear of negative consequences such as divorce, discrimination and stigma, violence from partner and fear of being accused of infidelity. The findings in this study were similar to the study by Adeniyi *et al*., among HIV-infected pregnant women in South Africa [27]. The study by Odiachi *et al*., and Okeke *et al*., in North Central Nigeria also showed fear of rejection and negative consequences as the reason for non-disclosure of HIV status [28, 29].

Stigmatization and discrimination have been linked to non-disclosure of HIV status among people living with HIV. Notwithstanding recent progress that has been done in creating awareness, prevention of HIV/AIDS and availability of subsidised management for HIV-infected persons in Nigeria, HIV associated stigma and discrimination remains an important issue influencing disclosure in our environment [28].

In this study there was a significant association between HIV status disclosure and adherence to HAART. This was similar to a study conducted in Bahir Dar, Ethiopia by Dessie *et al.*, which showed a significant association between HIV status disclosure and adherence to HAART [30]. Our findings may be associated with the increased access to antiretroviral drugs in the hospital, regular training of the treatment adherence counsellors, the shift from multiple pills therapy to combined pills therapy and use of alarm as a reminder. Our study was contrary to the study by Muller *et al.*, among HIV infected children in South Africa which showed no significant association between HIV status disclosure and adherence to HAART [31]. A study by Turissini *et al.*, on the prevalence of disclosure of HIV status to HIV-infected children in Western Kenya and Sirikum *et al.*, on study of HIV disclosure and its effect on treatment outcomes in perinatal HIV-infected Thai children found no significant association between HIV status disclosure and adherence to HAART [32, 33]. This negative effect was attributed to children's fear of social stigma and therefore, the tendency to hide taking medications from others. Also, denial of their status, leading to increased refusal to take medications. The odds ratio also revealed that those who had disclosed their HIV status were four times as likely to have moderate/high adherence as compared with non-disclosed group.

CONCLUSION

Disclosure of HIV status is important for good adherence to HAART therapy. The study found that 84.8% of the participants attending the ART clinic of Federal Medical Centre Keffi had disclosed their HIV status. The study showed that age group of 30 to 39 years and source of income (self-sponsored) were significantly associated with HIV status disclosure. The present study also showed that there was a significant association between HIV status disclosure and adherence to HAART leading to better clinical outcome among the participants.

LIMITATION

The study was a cross-sectional analytical design hence, the variation of disclosure and adherence of the participants to HAART that can occur over time may not have been captured.

Furthermore, the self-report nature of the data collection approach used in the study could have been affected by desirability bias, hence misrepresenting the results. The study did not assess the effect of other factors such as forgetfulness, poor understanding of the relationship between non-adherence and disease progression, side effects of drugs, alcohol and drug abuse, poor social support, poor health provider-patient relationships, being away from home and others that can affect adherence to medication.

Conflict of Interest: The authors declare no conflict of interest and had not received funding from any source.

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