



Research Article

Factors Associated with Concomitant Usage of Herbal Remedies among People Living with HIV/AIDS on Highly Active Antiretroviral Therapy (HAART) in Enugu State, Nigeria

Ukwueze Lovina Nkechi¹, Peter Usman Bassi^{2*}

¹Department of Public Health Sciences, National Open University of Nigeria, Abuja, Nigeria (NOUN)

²Department of Internal Medicine, Faculty of Clinical Sciences, College of Health Sciences, University of Abuja, Nigeria

***Corresponding author:** Peter Usman Bassi, Department of Internal Medicine, Faculty of Clinical Sciences, College of Health Sciences, University of Abuja, Nigeria Email. Bassi.peter@uniabuja.edu.ng

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Abstract

Antiretroviral therapy (ART) has helped reduce the burden of Acquired Immune Deficiency Syndrome (AIDS) in the majority of countries. However, there is no cure for the HIV/AIDS infection yet. Use of herbal remedies among HIV-infected individuals in Africa has increased in the past decade, mainly due to traditional beliefs and claims of cure and at times due to inconsistent access to antiretroviral drugs. This study was set out to investigate the concomitant usage of herbal medication and antiretroviral therapy by people living with HIV. The study is an observational cross-sectional Study. A total of 300 research participants completed a paper-based questionnaire and returned, with 181 (60.3%) females and 119 (39.7%) males participated in the study. Majority of the client's 59% (n=177) had been on ART for 1 to 4 years. Out of the 300 respondents, 74.3% (n=223) admitted to the have used of herbal medications alongside to their Antiretroviral Therapy (ART), with 55.1% (n=87) actually feeling herbal medications can used for treating or prevent HIV. Among those that actively use ART and Herbal medications, 56.4% actively consider it safe to use ART with herbal medication. Gender (b=-0.108, p=0.046), age (b=0.116, p=0.000), level of education (b=0.066, p=0.010) and economical status (b=-0.102, p=0.003) significantly predicted herbal medicine use, F=4.719, which indicates that gender, age, level of education and economical status can play a significant role in shaping herbal medicine use.

Keywords: Prevalence; Concomitant Use; Herbal Medicine; ART HIV/AIDS

Introduction

Human immunodeficiency Virus (HIV) continues to be a major global public health issue. Globally, 39.0 million [33.1-45.7 million] people were living with HIV at the end of 2022. An estimated 0.7% [0.6-0.8%] of adults aged 15-49 years worldwide are living with HIV, although the burden of the epidemic continues

to vary considerably between countries and regions [1]. The WHO African Region remains most severely affected, with nearly 1 in every 25 adults (3.2%) living with HIV and accounting for more than two-thirds of the people living with HIV worldwide [2]. Over the years, efforts by drug development companies, government agencies, research institutes and pharmaceutical firms has led to the discovery and provisions of many potent Anti-Antiretroviral Drugs (ARVs).

There is no cure for HIV infection. However, with access to effective HIV prevention, diagnosis, treatment and care, including for opportunistic infections, HIV infection has become a manageable chronic health condition, enabling people living with HIV to lead long and healthy lives [3]. The introduction of Highly active antiretroviral therapy (HAART), has led to a significant reduction in mortality and morbidity of among people living with HIV/AIDS (PLWH) and in turn, a reduced occurrence of opportunistic infections [4] and increase the length and quality of life as well as the productivity of People living with HIV/AIDS (PLWHA) [5,6].

While still elusive, cure remains the ultimate long-term goal for treatment of HIV. A multi-pronged approach will likely be needed to achieve the goal of curing HIV. Herbal medicine may prove beneficial, as herbal medicines have good values in treating many diseases including infectious diseases, hypertension, etc. Herbal medicines have good values in treating many diseases including infectious diseases, hypertension, etc. That they can save lives of many, particularly in the developing countries, is indisputable. However, many studies have identified adverse events associated with use of herbal remedies.

In Nigeria HM have also reported a high prevalence of unprescribed medicine use, ranging from 62.9% to 72.4% across different states [7 -11]. The use of herbs among PLWHA have been reported varying rates in previous studies of use of herbal Medicine among HIV patients; 60% in the United States of America, 29.3% in Lebanon, (67%); Thailand (54.7%); KwaZulu-Natal and Pretoria, South Africa (51% and 53%, respectively; Zimbabwe; and Ghana (53.2%). Also, another literature review showed that CAM use among HIV patients ranges from 36 to 68% in Africa [12 -16].

Regions with long-standing practice of Traditional Medicine (TM) such as China, Africa, and India, have a considerable number of patients that visit Traditional Healers (TH) before visiting clinics or hospitals providing ART services and use herbal medicines before starting on ARVs [17,18].

People living with HIV and AIDS (PLWHA) often use African Traditional Herbal Medicines (ATHM) separately or together with conventional medicines including Antiretroviral (ARVs). While the herbal medicine may have beneficial effects in management of HIV/AIDS patients, sharp practices such as the addition of orthodox medicines to herbal preparations by some traditional medical practitioners have been reported [19]. Different orthodox medicines may be added to an herbal preparation with the hope that one of the added drugs may cure the user's ailment. Just because an herb is natural does not mean that it is safe and claims of remarkable healing powers are often not supported by reliable evidence.

There are anecdotal narratives of the use of herbal medicines among patients receiving Antiretroviral Therapy (ART) in Africa and Nigeria specifically. It was estimated that over 70% of HIV patients taking herbal remedies denied taking them when asked by medical practitioners, even research in the United States has found that up to 70% of patients who use such therapies do not tell their doctors [24,25]. This denial by HIV patients may constitute a deterrent to the medical practitioners in early detection of possible negative drug interactions that could occur with orthodox medicines especially HAART.

It is also important to note that many of the herbal medicines used by several people have not been quantified nor analyzed for its active and inactive components. There is limited data on evidence of why the prevalence and correlative reasons for herbal medicine use in Nigeria. This study is set out to examine the prevalence of concomitant usage of herbal remedies and the factors associated with its use among people living with HIV on Highly Active Antiretroviral therapy (HAART) in Enugu State, Nigeria. Traditional medicine (TM) continues to provide health coverage for most of the people in developing countries and it is equally becoming increasingly popular in western countries [20-22].

A study in Kano, Northwest Nigeria, showed a prevalence of between 4.25% and 27.5% of HIV patients using traditional medication at different stages of their treatment [23]. However, considering the large variety of medicines used in the ART, such combination would increase the possibility for occurrence of drug-medicinal plant interactions that could promote reduction of the therapeutic effects and/or increase the antiretroviral toxicity, as well as reduction on therapeutic effects and/or increase on the medicinal plants or herbal medicine toxicity.

There is, therefore, the need to generate evidence on the magnitude, pattern, and factors that influence the use of TM among PLWHAs in other parts of Nigeria to guide health planners and health communication experts on how to address the issue. The study aims to assess the extent, and document herbal medicine use and their associated factors among people living with HIV/AIDS on ART at Enugu Ezike District Hospital (EEDH) Igbo- Eze North LGA and Udi General. Hospital, both in Enugu State, Nigeria from March to June 2022.

Materials and Methods

This an observational study, with Cross-sectional Study technique. The study was conducted over a four-month period (March, 2022 – June, 2022) in Enugu state. The population of this study comprises of 8,066 people who are currently living with HIV in two selected LGAs, Igbo Eze North and Udi Local Government Areas, Enugu state. Of this total number, 4,243 are from Igbo Eze North while 3,823 are derived from Udi Local Government

Area. From available data, 2000 out of 8,066 PLHIV in these 2 selected LGAs, are combining ARVs with herbal concoctions [8]. This study focuses on these sub populations who are combining herbal remedies with ARV in the selected two Local Governments of Enugu State. These two local governments were selected based on the preponderance of herbal medicine usage and their rural location. Furthermore, the targeted population in these LGAs were easily accessible as there is easy and good road network, which was of an advantage to the researcher.

In this study, the sample size was calculated by using single proportion formula with the following assumptions: 95% confidence interval, 5% margin of error, 70.8% prevalence of herbal use, which determine a final sample size of 318. A convenient sampling technique in which all participants who voluntarily give verbal consent were interviewed until the final sample size was reached. Structured questionnaires was administered to elicit data from the respondents.

Data Analysis

The data was entered and analysed using SPSS version 23 [26]. The descriptive statistics like frequency distribution and percentages was determined. Binary analysis using a chi-square test was used to determine the independent association of herbal

medicine use to demographic and clinical characteristics. The p-value of <0.05 is considered as significant.

Ethical Considerations

Ethical approval will be obtained for the study, from (Enugu state ministry of health, department of Health and Human Service Secretariat Enugu) or from both Hospital Management Ethics Committee, and individual informed consent sought from the respondents.

Results

Sociodemographic Profiles of Respondents

A total of 300 research respondents completed a paper-based questionnaire and returned. This constitutes of 181 (60.3%) females and 119 (39.7%) males who participated in the study (Table 1). Majority of participant 40% (n=120) are between 35-45 age groups, with mean age (31.25 ±6.29 SD) years. Nearly half (45.7%) of the participants were married and about 81% were literate (able to read and write) with educational qualification fairly uniform distribution. This is show with 33% (n=99) had secondary level of education, 25% (n=75) had tertiary level, 23% (n=69) had primary education while 19% (n=57) respectively.

Variables	Male N=119 (39.7%)	Female N= 181 (60.3%)	Total N=300 (100%)
Age (Years)			
15 < 25	25 (21.2)	30 (16.5)	55 (18.3)
25 < 35	22 (18.6)	46 (25.3)	68 (22.7)
35 < 45	43 (35.4)	77 (42.3)	120 (40.0)
45 < 55	26 (22.0)	27 (14.8)	53 (17.7)
≥ 55	2 (1.7))	2 (1.1)	4 (1.3)
Marital status			
Single	38 (32.2)	41 (22.5)	81 (27.0)
Married	48 (40.7)	89 (48.9)	137(45.7)
Separated/Divorced	18 (15.3)	36 (19.8)	54(18.0)
Widow/Widower	14 (11.9)	14 (7.7)	28 (9.3)
Educational Qualifications			
Non/informal	24 (20.3)	33 (18.1)	57 (19)
Primary	25 (21.2)	44 (24.2)	69 (23)
Secondary	38 (32.2)	61 (33.5)	99 (33)
Tertiary	41(34.7)	44 (24.2)	75 (25)
Occupation			
Student	24 (20.3)	23(12.6)	47 (15.2)

Civil Servant	26 (22.0)	27 (14.8)	53 (18.33)
Self-Employed/Petty traders	29 (24.6)	63 (34.6)	92 (30.7)
Unemployed/Housewives	3 (2.5)	37 (20.3)	40 (13.3)
Unskilled Labourer	36 (30.5)	32 (17.6)	68 (22.7)
Religion			
Christianity	78 (66.1)	144 (79.)	222 (74.0)
Traditionalists	38 (32.2)	34 (18.7)	72 (24.0)
Islam	0 (00.0)	2 (1.1)	4 (1.3)
Years on HAART (Years)			
1-4	52(17.30)	125(41.9)	177 (59.0)
5-9	46 (15.3)	37 (12.3)	83 (27.3)
10-14	21(7.0)	19 (6.3)	40 (13.7)

Table 1: Shows Bio-demographic characteristics of the Participants.

With regard to employment status, most respondents (30.7% (n=92) were business owners/farmers/herders/motorcyclists, with average monthly income of N10, 000 -N50, 000.00 Nigerian Naira [i.e., 21.7 -108.7 USD] (Figure 1). Clinical Characteristics of the Participants. All of the participants knew their HIV status some and had been HAART for at 1-4 years (59.0%) back from the date of data collection period.

Figure 1 shows income categories of the respondents, with participants in low income category forming 44.7% who earned between N10,000 and N25,000 (21.7 USD - 54.3 USD) and 27.7% earning between N25,000 and 50,000 (54.3 USD - 106.7 USD) only 1.7% earned above N250000 (54.3 USD).

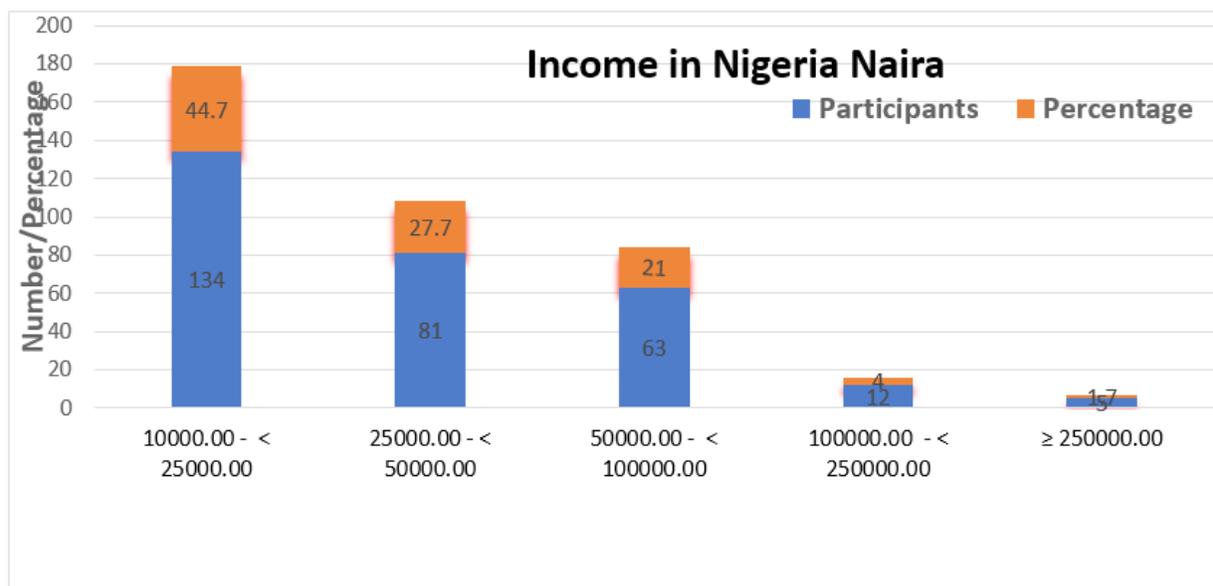


Figure 1: Showing the economic status of the participants.

Herbal Traditional Medicine

Table 2 of this study shows the utilization of traditional medicine concurrently with antiretroviral therapy. More than half (59.7%) of the participants reported that they used Herbal Medicine (HM) for the management of HIV/AIDS among which 31% had used traditional medicine to treat other diseases. Also over 74.3% had ever used traditional medicine at one time in their life. The study revealed however, that only 25.7% had disclose to their doctors of their concurrent use of HM.

Variables	Male N=119 (39.3%)		Female N=181 (60.7%)		Total N =300 (100%)	
	Yes	No	Yes	No	Yes	No
Ever used HM before treatment with medications	93 (31.3)	25 (8.3)	129 (43.0)	52 (17.3)	223 (74.3)	77 (25.7)
Taking traditional medication can be used to treat or prevent HIV/AIDS	42 (14.0)	77 (25.7)	51 (17.0)	130 (43.0)	93 (31.0)	207 (69.0)
Have taking HM concurrent with ART	78 (28)	41 (13.1)	101 (33.1)	80 (26.7)	179 (59.7)	121 (40.3)
Had inform doctor about your use of HM	36 (12.0)	83 (27.7)	41 (13.7)	140 (46.7)	77 (25.7)	223 (74.3)

Table 2: Traditional Medicine Practice.

Consistently, women had admitted to practice traditional medicine and concurrent use of HM with ART than men, and however, as can only 12.0% of men in this study, compared to women (13.7%) had disclose concurrent use of HM with their ART (Table 2).

The most frequently used herbal products, alongside ART regimens, included pure herbs (54.0%), multivitamins supplements, (21.0%), and immune boosters (17.0%) (Traditional and synthetics) (Figure 2).

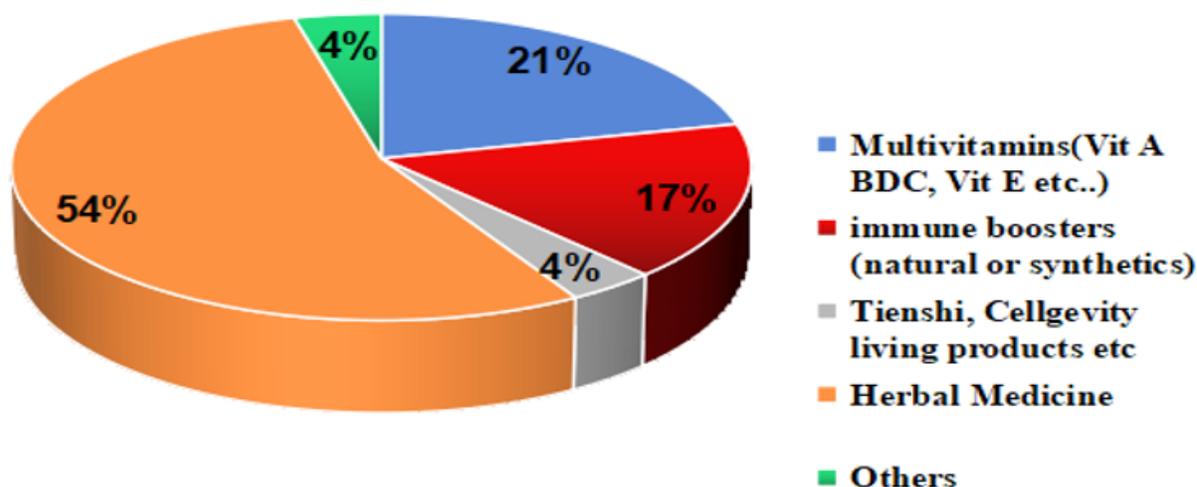


Figure 2: Showing total number of patients taking Herbal Medication concurrently with HAART.

With regard to the sources of the traditional medicines, the majority of patients who used TM reported that their sources were obtained from herbal shops and traditional medicine clinics (41.7%), while 25% cultivate the herbs they used. (41.22%), followed by home made preparations (32.82%) and preparations from traditional healers (16.03%). (Table 3).

Variables	Male N=119 (39.3%)	Female N=181 (60.7%)	Total N=300 (100%)
Reason for Using HM			
Treatment	62 (52.5)	75 (41.2)	137 (45.7)
Protective	14 (11.9)	26 (14.3)	40 (13.3)
Complementary	15 (12.7)	26 (14.3)	41 (13.7)
HM can make ARV drug more effective	0 (00.0)	5 (2.7)	5 (4.1)
Sources of HM supply			
Cultivated	30 (25.4)	45 (24.7)	75 (25.3)
Bought from a herbal shop	55 (46.6)	70 (38.5)	125 (41.7)
Pharmaceutical preparation	4 (3.4)	9 (4.9)	13 (4.3)
Sources of information on HM			
Internet/social media	29(9.7)	45(15.0)	74 (24.7)
Media (Radio/TV)	11 (3.7)	15 (8.3)	26 (8.7)
Books/Periodicals	23 (7.7)	30(10.0)	53 (17.7)
Family/Friends	56(18.7)	91(30.0)	147 (49.0)

Table 3: Factors associated with HM Use.

Only 31.3% believed that herbal medications are safe to use with ART and, among those that actively use ART and Herbal medications, 56.4% actively consider it safe to use ART with herbal medication. Significant proportion of the 300 respondents (45.7%) considered HIV treatment as the primary reason for using herbal medications; it was different for respondents who actively use ART and herbal medications, only 30 respondents, 10% of the entire respondents considered herbal medications as complementary to HIV treatment (Table 4). Respondents were also asked about how effective they considered the combination use of ART and herbal medications. Although 62.3% felt herbal medications affect the effectiveness of ART, 78.1% of those that actively use herbal medication agrees that it affect ART.

Variables	Male N=118 (39.3%)		Female N=182 (60.7%)		Total N=300 (100%)	
	Yes	No	Yes	No	Yes	No
HM are safe	40 (33.9)	76 (64.4)	54 (29.7)	124 (68.1)	94 (31.3)	200 (66.7)
HM have bad complications	110 (93.2)	8 (6.8)	168 (92.3)	14 (7.7)	187 (62.3)	22 (7.3)
HM can affect the effectiveness of your ARV drugs	75 (61.8)	43 (36.4)	112 (61.5)	70 (38.5)	153 (78.1)	113 (21.9)
Have noticed the effectiveness of HM after use	26 (22.0)	77 (65.3)	28 (15.4)	54 (29.7)	54 (18.0)	197 (65.7)
Have had adverse effects with HM usage						
No ADR	9(7.6)		14 (7.7)		22 (7.3)	
Yes, mild complications like sensitivity	43 (36.4)		84 (46.2)		127 (42.3)	
serious complications	46 (39.0)		35 (19.2)		81 (27.0)	
Yes, may lead to death	21 (17.8)		49 (26.9)		70 (23.3)	

HM affect the effectiveness of your ARV drugs			
Can cause ARV Drug Resistant	27 (22.9)	45 (24.7)	34 (45.9)
Can lead ART treatment failure	60 (50.8)	72 (39.6)	21 (28.4)
Allergic impact	31 (26.3)	60 (33.0)	16 (21.0)

Table 4: Respondance awareness of impact/complication of the concurrent herbal medication among patient on HAART.

Only 3 respondents (4.1% of those that responded) agreed that there may be beneficial effects of using ART and herbal medication. However, interestingly, most of the respondents 45.9% (n=34) considered the drug resistant effect and 28.4% (n=21) and failure of ART as the effect of concomitant use. Also, 16 respondents consider allergy as an impact of concomitant use of ART and herbal medication (Table 5).

Herbal Medicine Use	Beta Coefficient	R ²	F	t-value	p-value
Gender	-0.108	0.007	4.719	-2.003	0.046
Age	0.116	0.035	4.719	3.923	0.000
Marital Status	0.029		4.719	1.120	0.264
Level of Education	0.066		4.719	2.595	0.010
Religion	0.009		4.719	0.296	0.767
Occupation [#]	-0.018		4.719	-0.867	0.387
Economic Status [*]	-0.102		4.719	-3.001	0.003

Hypothesis Supported: [#]= No, ^{*}=Yes

Table 5: Multivariate regression analysis.

The hypothesis tests if gender, age, marital status, level of education, religion, occupation and economic status carry a significant impact on herbal medication use with ART. The dependent variable herbal medicine use was regressed on the predicting variables to test the hypotheses. Gender (b=-0.108, p=0.046), age (b=0.116, p=0.000), level of education (b=0.066, p=0.010) and economical status (b=-0.102, p=0.003) significantly predicted herbal medicine use, F=4.719, which indicates that gender, age, level of education and economical status can play a significant role in shaping herbal medicine use. According to the results, marital status, religion and occupation of people living with HIV did not significantly predict concomitant use of herbal medication with ART.

Discussion

Despite the fair availability and accessible of ART in the area of study, the use of traditional and complementary medicine continue to thrive among HIV/AIDS patients on ART. The study revealed that 59.7% of the patients on ART reported using TM concurrent with ART regimens. Our study is higher but similar to study reported by Feyissa et al (2022) [27] who recorded 52% among HIV/AIDS and Tuberculosis Patients in Metekel Zone, Northwest Ethiopia. This is also higher than previously reported in Nigeria, where Ilomuanya et al (2017) [28] reported 42.7%

in South Western Nigeria reported and far higher than 4.25 by Tamuno (2011) [29] in Kano, Nigeria. The concurrent usage of HM with ART has also been previously reported in various studies across Africa ranging from 26.1%-98.2%. Shiferaw A (2020) [30] in Addis Ababa reported 26.1%, Namuddu B, et al. (2011) [31] in Uganda, 46.4%, Lubinga, et al. [32] and 98.2% by Mudzviti T (2012) in Zimbabwe [33] respectively.

There was reports of various reasons for concurrent use of HM with ART from regions to countries. In our study, the reasons reported by our respondent for using HM, includes, HM is a form of HIV/AIDS treatment (45.7%), also, they claim HM on its own, is complementary treatment (13.7%) to HAART and the believe that HM can make ARV drug more effective (3.0%) respectively. Similar reasons was reported by other workers where their study participants believe that herbal remedies can effectively manage HIV/AIDS-related illnesses and they believe that herbal medicine can cure HIV/AIDS and/or TB [27].

Studies conducted in other African nations have also indicated to a connection between using herbal remedies medications and ART regimen [35,36] They showed that although the majority of HIV patients respected and had confidence in ARVs, it was also clear that ancestors' beliefs, particularly those relating to the curative properties of herbal medications, could

not have been completely discounted [37]. Despite using ART medication, many of the respondents supported the usage of these herbal remedies. On the other hand, comparable studies conducted in other African countries showed that the majority of HIV patients were taking herbal medications alongside ART, and that this had no impact on their adherence to the medication [32,34]. In this study, the majority of HIV patients utilized herbal medication as supplemental therapy rather than to treat their infection. The findings of this study also support the opinions of several of our study participants, who said that they combined ART with herbal remedies for objectives other than medical treatment, such as body washing and cleansing [38].

Most of our patients (74.3%) like in other studies 55.8%-92% [10,15,17] did not disclose use of HM to their healthcare giver the use of HM. The non-disclosure to healthcare providers maybe for fear of discontinue ART. In Nigeria ART Clinic patients are usually, warn patient not to use traditional medicine along with their ART to avoid adverse effects and failure of treatment. We believe this might have affected the actual prevalence of TM usage among our patients.

Only 31.3% believed that herbal medications are safe to use with ART and, among those that actively use ART and Herbal medications, 56.4% actively consider it safe to use ART with herbal medication. This is not surprising in our environment based on the high believe in traditional medicine practice. In the work of Ondwela, Mothiba, et al., they found out that number of people prefer herbal medicine or concurrently take herbal medicine along with orthodox medicine while sick.[14] There is a strong believe on the ability of herbal medicine to cleanse the blood.

Conclusion

The conclusions derived from the findings of this study revealed high prevalence of concomitant use of herbal medication alone with HAART and some were opting to take only herbal medicine and dropping/refusing the HAART. Gender, age, marital status, level of education, religion, occupation and economic status of people living with HIV/AIDS studied, predict concomitant use of herbal medication with ART. Most of these usages were undisclosed to the attending healthcare practitioners, and even those who do disclose said they normally obtain the herbal preparation from friends and relative where they get the information.

Conflict of Interest

There are no conflict of interest to declare

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References

1. (2023) Global Health Observatory (GHO) Data: HIV/AIDS.
2. Sub-Saharan Africa constitutes as East and Southern Africa and West and Central Africa.
3. Barré-Sinoussi F, Ross AL, Delfraissy J (2013) Past, present and future: 30 years of HIV research. *Nat Rev Microbiol* 11: 877-883.
4. Awofala AA, Ogundele OE (2018) HIV epidemiology in Nigeria. *Saudi J Biol Sci* 25: 697-703.
5. Centers for Disease Control (CDC) (2016) Atlas Plus. HIV Diagnoses.
6. Ibeh BO, Omodamiro OD, Ibeh U, Habu JB (2013) Biochemical and haematological changes in HIV subjects receiving winniecure antiretroviral drug in Nigeria. *J Biomed Sci* 20: 73.
7. Adeoye I, Etuk V (2023) Prevalence, predictors and pregnancy outcomes of unprescribed and herbal medicine use in Ibadan, Nigeria. *BMC Complement Med Ther* 23: 17.
8. Awodele O, Amagon KI, Usman SO, Kennedy IA, Sikiru OU, et al. (2014) Safety of herbal medicines use: case study of Ikorodu residents in Lagos, Nigeria. *Curr Drug Saf* 9: 138-144.
9. Okoronkwo I, Onyia-Pat J-L, Okpala P, Agbo MA, Ndu A (2014) Patterns of complementary and alternative medicine use, perceived benefits, and adverse effects among adult users in Enugu urban, Southeast Nigeria. *Evid Based Complement Alternat Med* 2014: 239372.
10. Duru CB, Uwakwe KA, Chinomnso NC, Mbachi II, Diwe KC, et al. (2016) Socio-Demographic determinants of herbal medicine use in pregnancy among Nigerian women attending clinics in a tertiary hospital in Imo state, South East, Nigeria. *Am J Med* 4: 1-10.
11. Oreagba IA, Oshikoya KA, Amachree M (2011) Herbal medicine use among urban residents in Lagos, Nigeria. *BMC Complement Altern Med* 11: 117.
12. Peltzer K, Preez NF, Ramlagan S, Fomundam H (2008) Use of traditional complementary and alternative medicine for HIV patients in KwaZulu-Natal, South Africa. *BMC Public Health* 8: 255.
13. Limsatchapanich S, Sillabutra J, Nicharojana LO (2013) Factors related to the use of complementary and alternative medicine among people living with HIV/AIDS in Bangkok, Thailand. *Health Science Journal* 7: 436-446.
14. Duggan J, Peterson WS, Schutz M, Khuder S, Charkraborty J (2001) Use of complementary and alternative therapies in HIV-infected patients. *AIDS Patient Care STDS* 15: 159-167.

15. Malangu N (2007) Self-reported use of traditional, complementary and over-the-counter medicines by HIV-infected patients on antiretroviral therapy in Pretoria, South Africa. *Afr J Tradit Complement Altern Med* 4: 273-278.
16. Gyasi RM, Tagoe-Darko E, Mensah CM (2013) Use of traditional medicine by HIV/AIDS patients in Kumasi Metropolis, Ghana: a cross-sectional survey. *American International Journal of Contemporary Research* 3: 117-129.
17. Hughes GD, Puoane TR, Clark BL, Wondwossen TL, Johnson Q, et al. (2012) Prevalence and predictors of traditional medicine utilization among persons living with AIDS (PLWA) on antiretroviral (ARV) and prophylaxis treatment in both rural and urban areas in South Africa. *Afr J Tradit Complement Altern Med* 9: 470-484.
18. Mncengeli S, Manimbulu NM, Panjasaram N (2016) Concurrent use of Antiretroviral and African traditional medicines amongst people living with HIV/AIDS (PLWA) in the eThekweni Metropolitan area of KwaZulu Natal. *Afr Health Sci* 16: 1118-1130.
19. Erah PO (2002) Herbal Medicines: Challenges. *Trop J Pharm Res* 1: 53-54.
20. World Health Organization (2002) Traditional Medicine; Growing Needs and Potential. WHO Policy Perspectives on Medicines; pp. 1-6. Geneva.
21. Kisangau DP, Lyaruu HV, Hosea KM, Joseph CC (2007) Use of traditional medicines in the management of HIV/AIDS opportunistic infections in Tanzania: A case in the Bukoba rural district. *J Ethnobiol Ethnomed* 3: 29.
22. Bannerman R (1983) Traditional medicine and health care coverage. In: Bannerman R, Burton J, Wen-Chieh C, editors. *The Role of Traditional Medicine in Primary Health Care*. Geneva: World Health Organization; pp: 318-327.
23. Tamuno I (2011) Traditional medicine for HIV infected patients in antiretroviral therapy in a tertiary hospital in Kano, Northwest Nigeria. *Asian Pac J Trop Med* 4: 152-155.
24. Hanapi NA, Azizi J, Ismail S, Mansor SM (2010) Evaluation of selected Malaysian medicinal plants on phase I drug metabolizing enzymes, CYP2C9, CYP2D6 and CYP3A4 *in vitro*. *Int J Pharmacol* 6: 494- 499.
25. Dwyer JT, Salvato-Schille AM, Coulston A, Casey VA, Cooper WC, et al. (1995) The use of unconventional remedies among HIV-positive men living in California. *J Assoc Nurses AIDS Care* 6: 17-28.
26. SPSS Version 23.
27. Feyissa M, Fenta TG, Asres K, Gebremariam T (2022) Prevalence, Perception and Predictors of Concomitant Herbal Medicine Use among HIV/AIDS and Tuberculosis Patients in Metekel Zone, Northwest Ethiopia: A Cross-Sectional Study. *Evid Based Complement Alternat Med* 2022: 8235229.
28. Ilomuanya MO, Okubanjo OO, Azubuike C, Oguntibeju A, Ajiboye D, et al. (2016) Evaluation of the frequency of use of herbal drugs with concomitant administration of highly active antiretroviral therapy and its effect on medication adherence in two health care facilities in south western Nigeria. *JAHN* 9: 8-16.
29. Tamuno I (2011) Traditional medicine for HIV infected patients in antiretroviral therapy in a tertiary hospital in Kano, Northwest Nigeria. *Asian Pac J Trop Med* 4: 152-155.
30. Shiferaw A, Baye AM, Amogne W, Feyissa M (2020) Herbal Medicine Use and Determinant Factors Among HIV/AIDS Patients on Antiretroviral Therapy in Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. *HIV AIDS (Auckl)* 12: 941-949.
31. Namuddu B, Kalyango JN, Karamagi C, Mudiope P, Sumba S, et al. (2011) Prevalence and factors associated with traditional herbal medicine use among patients on highly active antiretroviral therapy in Uganda. *BMC Public Health* 11: 855.
32. Lubinga SJ, Kintu A, Atuhaire J, Asiimwe S (2012) Concomitant herbal medicine and Antiretroviral Therapy (ART) use among HIV patients in Western Uganda: a cross-sectional analysis of magnitude and patterns of use, associated factors and impact on ART adherence. *AIDS Care* 24: 1375-1383.
33. Mudzviti T, Maponga CC, Khoza S, Ma Q, Morse GD (2012) The impact of herbal drug use on adverse drug reaction profiles of patients on antiretroviral therapy in Zimbabwe. *AIDS Res Treat* 2012: 434171.
34. James PB, Wardle J, Steel A, Adams J (2018) Traditional, complementary and alternative medicine use in Sub-Saharan Africa: a systematic review. *BMJ Glob Health* 3: e000895.
35. Nlooto M (2015) Views and experiences of healthcare professionals towards the use of African traditional, complementary and alternative medicines among patients with HIV infection: the case of eThekweni health district, South Africa. *BMC Complement Altern Med* 15: 170.
36. Heestermans T, Browne JL, Aitken SC, Vervoort SC, Klipstein-Grobusch K (2016) Determinants of adherence to antiretroviral therapy among HIV-positive adults in sub-Saharan Africa: a systematic review. *BMJ Glob Health* 1: e000125.
37. Zamawe C, King C, Jennings HM, Fottrell E (2018) Associations between the use of herbal medicines and adverse pregnancy outcomes in rural Malawi: a secondary analysis of randomised controlled trial data. *BMC Complement Altern Med* 18: 166.
38. Croome N, Ahluwalia M, Hughes LD, Abas M (2017) Patient-reported barriers and facilitators to antiretroviral adherence in sub-Saharan Africa. *AIDS* 31: 995-1007.