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Predictors of Adherence to Highly Active Antiretroviral Therapy among Key Populations Living with HIV/AIDS in Akwa Ibom State, South-South, Nigeria

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Abstract
Key Populations are disproportionately affected and impacted by HIV/AIDS in all regions. Unfortunately, reaching Key Populations (KPs) with HIV intervention is a big challenge because of stigma, discrimination, deliberate government legislation against KPs, violence, and criminalization of KPs lifestyles. Because of the lack of KP specific interventions, data on KPs Highly Active Antiretroviral Therapy (HAART) outcomes is lacking. The study investigated Predictors of Adherence to HAART among Key Populations living with HIV/AIDS in Akwa Ibom State, South-South, Nigeria. A descriptive cross-sectional study was conducted using non-probability sampling technique. Data were analyzed using descriptive statistics, Chi-square, and ANOVA. There were 330 study sample. The socio-demographic characteristics of the respondents showed that a total of 173 (52.42%) of the respondent were female while 157 (47.58%) were male. A total of 103 (31.21%), 106(3.12) and 62 (18.79) were within the age range of (18-30), (31-40) and (41-above) respectively. The mean age of participants was 28.39 years ± (with a range of 18-71). The overall self-reported adherence to HAART reported in this study was 71.9 %. Suboptimal adherence to HAART (≤ 95 %) was 74.5% among FSW, 71.8% among MSM, and 69.4 % among PWID. The study reveals that the primary reasons for continuous uptake of HAART services from health facilities included availability of drugs, counselling support, availability of Case Managers, proximity to health facilities confidentiality, reduced waiting time and attitude of service providers. Perceived barriers to adherence most frequently reported by respondents were forgetting to take the medication, the volume of pills to be taken, side effects of the medication (nausea & vomiting) fear of stigma and religious beliefs were statistically significant (p=0.05). A well-coordinated care and follow up mechanism is required to achieve HAART adherence among the key populations. Therefore, intensifying health education and promotion alongside rescinding policies against of KPs would improve HAART adherence that will reduce further transmission of HIV and facilitate remarkable progress in achieving viral suppression.

Background of the Study
Human Immunodeficiency Virus (HIV) primarily affects the immune system and that predisposes the victim to multiple opportunistic diseases leading to Acquired Immuno-deficiency Syndrome (AIDS) (UNAIDS. Global AIDS Update. 2018). According to UNAIDS (2019), People living with HIV by WHO region, 2019. Africa 25.7 million, Americas 3.7 million, Southeast Asia 3.7 million, Europe 2.5 million, Western Pacific 1.9 million, Eastern

Mediterranean 0.4 million. People receiving antiretroviral treatment by the end of 2019 were 25.4 million. 67% of people living with HIV were receiving antiretroviral therapy by the end of 2019 (WHO, 2019). Highly Active Antiretroviral Therapy (HAART) is a standard of HIV management to suppress viral load and delay progression to AIDS. However, questions have been raised about anti-retroviral therapy and how it affects the quality of life (QoL) of people living with HIV/AIDS (PLWHA). (Desta, Biru and Kefale, 2020). The introduction of Highly Active Anti-Retroviral Therapy (HAART) was a major turning point in HIV care. It uses a combination of anti-retroviral medication recommended to aggressively suppress viral replication and halt the progress of HIV to AIDS, hence a subsequent improvement in survival and quality of life (QoL). Significant efforts have been exerted to scale-up HAART uptake in developing countries, particularly in sub–Saharan Africa, where the epidemic has had its most devastating impact. (Desta, et al., 2020).

Antiretroviral therapy is indicated for all patients with apparent AIDS-defining illness (WHO stage 4) and those with CD4 count less than 200/mm. However, the current view is that ART should be initiated when the CD4 count is $350/mm^3$ for effective care (Anyike, et al., 2019). The global scale-up of HAART has seen over 20.9 million people placed on treatment as of June 2017. HAART scale-up has significantly contributed to a 48% reduction in deaths from AIDS-related illnesses (from a peak of 1.9 million in 2005 to 1.3 million in 2017) (UNAIDS, 2018). According to UNAIDS goals, eliminating AIDS by 2030 would be possible if 90% of all people living with HIV are diagnosed, 90% of those diagnosed with HIV receive antiretroviral therapy (ART) and 90% of those on ART achieve virological suppression by 2020 (Grønborg, et al., 2018). Antiretroviral therapy (ART) in HIV management has reduced morbidity and mortality among people living with HIV. ART also improves life expectancy and quality of life for people living with HIV, while the resultant viral suppression reduces the HIV transmission risk (Bukenya, et al., 2019). Advances in combination antiretroviral treatment (ART) have resulted in significant worldwide declines in HIV-associated mortality and morbidity (Calder, et al., (2020). Key populations (KP) such as female sex workers (FSW) and men who have sex with men (MSM) bear a disproportionate burden of HIV (Mukandavire, et al., 2018).

The HIV epidemic in Nepal is concentrated, with nearly 60% of infections occurring in key populations. According to the National Centre for AIDS and STD Control in Nepal (2018), among the key populations excluding male labour migrants, men who have sex with men (MSM) and transgender (TG) accounts for 9% of total infections Male sex workers (MSWs) and, clients of female sex workers (FSW), each account for 6% of total infections, while people who inject drugs (PWID), and FSW account for 4% and 1% of total infections. (NCASC, 2018). In Pokhara valley, one of the major tourist destinations of Nepal, the HIV epidemic is driven by the FSW and PWID. In contrast, in West to Far west Hills, the burden of HIV is highest among seasonal male labour migrants to India. (Dueba, et al., 2020). WHO defines key populations as people in populations who are at increased HIV risk in all countries and regions. Key populations include: men who have sex with men; people who inject drugs; people in prisons and other closed settings; sex workers and their clients; and transgender people (WHO, 2020) (Lo et al., 2021).

Nigeria has the fourth-largest HIV burden globally. Previous population size estimates in Nigeria were based on programmatic mapping of hotspots with the enumeration of KP at venues. The results failed to account for KPs who were not present at venues, resulting in underestimates of population sizes that also lacked precision. Reliable population size estimates are needed to guide focused and appropriately scaled HIV

epidemic response efforts for KPs (McIntyre, *et al*., 2020). In Nigeria, ART coverage for key populations stands at PWID 25%, Sex workers 12% and men who have sex with men 11%, while ART coverage for people living with HIV stands at 65% (UNAIDS KPs Alas, 2020).

By June 2020, 185 countries had already adopted the 'treat all' recommendation, covering 99% of people living with HIV globally. In addition, WHO also recommend a rapid ART initiation to all people living with HIV, including offering ART on the same day of diagnosis among those ready to start treatment. By mid-2020, 70 low-and middle-income countries reported this policy, and approximately half of them reported country-wide implementation (WHO, 2020).

Study Area

Akwa Ibom is a state in Nigeria. It is in the coastal southern part of the country, lying between latitudes 4°32′N and 5°33′N, and longitudes 7°25′E and 8°25′E. The state is located in the South-South geopolitical zone, and is bordered on the east by Cross River State, on the west by Rivers State and Abia State, and on the south by the Atlantic Ocean and the southernmost tip of Cross River State. Wikipedia (2021).

Scope of the Study

The study was designed to understand the predictors of adherence to HAART and was conducted among the key populations (KPs) who are currently receiving free, highly active anti-retroviral therapy (HAART) and have been on HAART for at least the past three (3) months. The data for this research was collected from KPs who are being supported by non-governmental agencies like community-based organizations (CBOs), Heartland Alliance International (HAI), Society for family health (SFH), Family Health International 360 (FHI 360), as well as Akwa Ibom state agency for the control of AIDS (AKSACA) and the Federal Ministry of Health in

the ART supported sites/clinics were the KPs accessed free HAART.

Study Design

The study was a descriptive cross-sectional design using a quantitative method of data collection.

Study Population

Participants in the study were HIV positive KPs (FSW, MSM and PWID) aged 18 years and above

Sample Size determination

The sample size was determined using the recommended formula by Fisher et al. (1998)

n= $\frac{z^2 Pq}{d^2}$ (Fisher *et al*., 1998)

Discussion

The overall self-reported adherence to HAART reported in this study was 71.9 %. Findings from this study was comparable with 71.2% adherence reported among PLHIVs in Port Harcourt (Kanu et al., 2017), 70% reported in Nigeria (Ugbena *et al*., 2018) and 72.9% average adherence level in sub-Saharan Africa reported in a systematic review by Heestermans and colleagues (Heestermans *et al*., 2016). However, the self-reported adherence to HAART was significantly higher than 59.9% previously reported in Calabar (Oku *et al*., 2013).

Among the three (3) categories of KPs studied 74.5 % FSW recorded suboptimal ≤95 % adherence to HAART, 71.8 % MSM and 69.4 % PWID. These findings differ from what was reported in Lagos, Nigeria (Njab *et al*., 2018) where 60% viral suppression rate for FSW and 52.2% for MSM which was because of adherence and Kenya (Graham *et al*., 2013) where 40 % of MSM had less than 95 % adherence against 24.7% MSM with suboptimal adherence reported in the study. 69.4% adherence levels for PWID closely collaborate with 72%. HAART adherence reported in a systematic review for PWID in transitional/low/ middle-income countries (TLMIC). (Feelemyer et al., 2013). However, adherence level 74.5 % for female sex workers was lower than what was reported in other studies

in sub-Saharan African 82 % in Burkina Faso (Konate et al., 2011), 80.7 % in Benin republic (Diabate et al., 2011) and 73.8 % reported in the Dominican Republic (Zulliger et al., 2015).

The suboptimal level of adherence to HAART among key populations in Nigeria compared with the recommended ≥95% adherence level considered appropriate to achieve therapeutic success clearly shows that adherence to HAART remains a major concern in Nigeria as poor adherence can lead to clinical, immunological, and virological failure which may later result in the spread of drug-resistant forms of the HIV virus. From this study PWID had the least level of adherence which was the same with what has been reported for HIV positive women not engaging in transactional sex in Nigeria (Kanu et al., 2017). Also, people who inject drugs (PWIDS) conjointly moves to hidden place due to government legislation. Consequently, they missed clinical appointment and pharmacy refills resulting in poor adherence and treatment failure (Olaolu, 2019).

Relevant studies have revealed important barriers to continuous engagement in HIV care and treatment among FSW in sub-Saharan Africa such as Alcohol, Hard/Soft drug use which have been found to impede FSW's engagement in the HIV care continuum, these barriers which are also applicable to women with HIV from the general population are more pronounced among FSWs due to the stigma associated with sex work and FSW may FSW face additional challenges to HIV care and treatment at multiple levels. (Zulliger *et al*., 2015, Oyefara, 2007; Baral *et al*., 2012; Scheibe et al., 2012; Chersich *et al*., 2013, USAID, 2013)

For drug users factors associated with compromised levels of HAART adherence and HIV care continuum have been identified to include long waiting times, inconvenient clinic hours, inadequate training of medical staff for treating HIV infected drug users, and lack of treatment for mental health disorders.

Discrimination exists against People who inject drugs in many countries. The stigma associated with being HIV positive and a drug user may cause PWID not to fully utilize available services from health facilities (Melo *et al*., 2006, Kru¨si *et al*., 2010, Wolfe *et al*., 2010). PWID in this study reported a low-level adherence to HAART compared to the other typology of KPs, the optimal low adherence reported in this study closely collaborates with findings with the above reasons. The study collaborates a study in coastal Kenya (Graham *et al*., 2013) assessing Adherence to Antiretroviral Therapy and Clinical Outcomes among Young Adults Reporting High-Risk Sexual Behaviour, Including Men Who Have Sex with Men. Graham *et al*., reported the lowest adherence compared to the other high-risk groups.

Most at risk populations with higher levels of education were more likely to be adherent than those without higher education. From the study, Sub-optimal level of adherence decreased with the level of education which may be one of the factors responsible for the high level of adherence recorded among MSM compared to the other two KPs. HAART adherence level was found to be significantly associated with education level for key populations which collaborates with previous studies reporting higher adherence for patients with formal education (Erah *et al*., 2008, Afolabi *et al*., 2009, Hegazi *et al*., 2010)

Alcohol use among KPS was also associated with HAART adherence, almost all positive KP who do not take alcohol reported optimal ≥ 95 % adherence to HAART medication while about half of those who took alcohol reported sub-optimal adherence level. This support finding from previous reports that alcohol use increased the risk of sub-optimal adherence to medications. (Maduka & Tobin-West, 2014, Jaquet *et al*., 2010), The high alcohol use among female sex workers compare to the other categories of MARPS also follow a similar trend from a study in Kenya where alcohol use was recorded at higher rates among the high-risk heterosexual

women's cohort than among the MSM cohort and heterosexual men. (Graham *et al*., 2013). Also, FSW from a study in Uganda admitted that alcohol intake inhibited their ability of achieving optimal adherence to HAART because it limited their ability to remember taking their medications correctly (Mbonye *et al*., 2014). Other notable soft & hard drug use among this sample population was cocaine, herbal medication, tobacco, marijuana, and tramadol. Although these substance uses were not associated with Adherence to HAART in this study, previous studies have also shown that herbal medication (Oku *et al*., 2013), alcohol as well as other forms of substance abuse have a negative impact on medication adherence (World Health Organization, 2003)

Over a half of the respondents interviewed were earning less than the national minimum wage < ₦18,000 the equivalent of $ 4 and spent an average of ₦290.78 ($0.71) as transportation cost for each clinic visit to access HIV treatment services. Although the economic status of respondents in this study was not associated with adherence, previous studies have reported that higher income, financial challenges, including transport costs, were associated with non-adherence. (Oku *et al*., 2013, Hardon *et al*., 2007). The most noticeable self-reported reasons cited for skipping missing medications among key populations identified in this study included forgetfulness, pill burden, slept through dosage time, did not want others to know, no food to take medication, change in routine/away from home among others. These reasons conform with the risk factors for suboptimal adherence to HAART cited in many studies ((Maduka and Tobin-west., 2014, Oku et al., 2013, Falang *et al*., 2012) and cuts across both key populations and the general population.

Most at risk populations in Nigeria could be an ideal population to benefit from long-acting antiretroviral injectable reported in some preliminary trials to be effective in improving

adherence and viral load suppression. (Margolis, & Murray, 2016; Spreen et al., 2013 Margolis *et al*., 2016). If operational, long-acting HAART injectable hold great promise for improving adherence by alleviating the burden of a daily pill for HIV treatment among Key populations in Nigeria.

Although cognitive variables/perception of patients on medication for chronic medical conditions have been shown in various studies to be associated with medication adherence. (Mills et al., 2006), it was not significantly associated with adherence in this study. However, a large proportion of the study respondents who were very sure they would be able to adhere to their medication regime and those who were very sure the medication would have a positive effect on their health reported high level of optimal adherence. This is most likely connected to quality counselling sessions before HAART initiation, as stipulated in the National HIV guidelines for HIV and AIDS Treatment and Care in Adolescents and Adults in Nigeria (FMOH, 2010).

Experiencing improved health status was one of the facilitators for continued adherence to, HAART highlighted during the focus group sessions among respondents and patients perceived health status have been reported in various studies to be associated with adherence (Dahab et al., 2008, Nam et al., 2008). However, some studies highlighted that perceived improved health status could also result in non-adherence to HAART if patients assumed to have been cured (Murray *et al*.,2009, Olowookere *et al*.,2008).

More than half of the respondents fell under non-disclosure at 51.52% higher than 38 % reported by Ebuenyi *et al*., (2014) 19.8 % reported by Maduka & Tobin-west in Port Harcourt, (Maduka & Tobin-West, 2014). Also 40.61 % of respondents were members of a support group higher than 15.6 % reported in a study carried out in a treatment centre in south-south Nigeria Maduka *et al*., (Maduka & Tobin-West, 2014). A study reported

by Mills et al as well as other studies have shown that social support could be a strong facilitator of adherence while noting that fear of disclosure is a barrier to adherence (Mills *et al*.,2006). In this study, however, the disclosure of HIV status and membership of a support group was not significantly associated with adherence.

The major provider related enhancer contributing to the uptake of HAART services for key populations in this study was the availability of drugs, many respondents reported that availability of ARVs contributed to their continuous uptake of HAART services from the various treatment facilities. A study carried out at the antiretroviral (ARV) clinic at the federal medical centre (FMC), Makurdi found that reliable availability of HAART was associated with increased optimal adherence among PLHIV. (Shaahu *et al*., 2008).

Summary

The challenges highlighted are surmountable and calls for concerted efforts from facilities providing HIV care services, especially for key populations to program for more qualitative service delivery and ensure all staff working within the health facility are trained on service provision for key populations. Teaching patients how to use medication reminder systems can assist them remember to take their medications accurately. The use of short text messages as reminders also been documented to improve patients' overall medication adherence. Although most respondents believed they needed no reminder to assist them in medication adherence from the questionnaire survey, a good number stated they preferred call reminders, use of alarm and linkage with treatment partners. These reminder systems were also highlighted during the focus group discussion as facilitators of medication adherence and regular clinic attendance.

Various reminder systems have been reported in multiple studies to improve adherence and treatment outcomes of patients on HAART in sub-Saharan Africa (Abdulrahman et al., 2017, Maduka & Tobin-West., 2013, Bärnighausen et al., 2011) However, some of these interventions may only be effective in specific settings and may not have a large effect among key populations. Findings from this study emphasize the need for future research on the effect of selected interventions targeted at key populations which can be adopted by various programs providing HIV services for KPs to reinforce adherence behaviour.

Conclusion

Higher levels of adherence ≥ 95 % to antiretroviral therapy are recommended for improved treatment outcomes among HIV positive patients more significantly for key populations who are the major drivers of the HIV epidemic. The HAART adherence level 79.69 % reported in this study for KPs was lower than the recommended ≥ 95 %. Significant Patient, provider, and treatment-related predictors (barriers/enhancer) of HAART adherence among positive KPs in Akwa Ibom state such as simply forgot, fell asleep, change in routine, away from home, busy with other things, too many drugs to take, ran out of medication, wanted to avoid side effect, felt healthy, do not want others to know, felt depressed, bad attitude of healthcare workers, lack of confidentiality, distance to the health centers, waiting time in the health center, serene environment, counselling support, availability of case managers and religious constraint as predictors were also identified. These predictors/barriers are however surmountable, concerted effort is therefore needed by all stakeholders along the HIV care cascade in addressing these barriers and focus on strengthening adherence enhancers in other to improve treatment outcomes and prevent the emergence of resistant strains of HV and treatment failure. The importance of the findings from this research calls for an all-inclusive programming for most at risk populations which will comprise components of education, Alcohol

and Non-drug use, use of reminder systems for positive KPs in addition to HIV care and support services. These findings further necessitate more research and intervention programs that utilize a multifaceted, approach to help retain KPs along the HIV cascade and enforce optimal adherence behaviour for key populations affected by HIV.

Recommendations

1. ARV clinics should establish support groups for key populations and linking them with treatment partners will help improve clinic attendance and adherence
2. Government should increase staff strength in ARV clinics and re-train the health workers in providing services targeted at KPs
3. ARV clinics should utilize the services of case management officers and adherence counsellors will go a long way to ensure clients are not lost along the HIV cascade
4. Various reminder systems can be explored with clients during counselling sessions to enforce adherence
5. Public health scientists should engage in more research targeted at HIV positive key population and explore interventions focused on improving adherence among most at risk populations.
6. Punitive legislation on against KPs should be rescinded.
7. Users' fees removal for PLHIV by the state government should be implemented in all ART sites.

Contributions to knowledge

- This present research is the first to study assessing the HAART adherence rate amongst KPs in Akwa Ibom State
- Highlights a scarcity of data disaggregated by KPs
- This study necessitates more research and intervention programs that utilize a multifaceted approach to help retain KPs

along the HIV cascade and enforce optimal adherence behavior for the positive KPs

- Among the three (3) categories of KPs studied 85.45 % FSW recorded optimal $\geq$ 95 % adherence to HAART versus 80.91 % MSM and 72.72.8 % PWID.

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APPENDIX 1
CONSENT FORM

Researcher Name: John Etim Edet

Contact: Department of Public Health, Faculty of Allied Medical Sciences University of Calabar, Calabar. (08037549480).

I am a post graduate student of the department of Public Health, currently running a Master of Public Health program and conducting academic research on the predictors of adherence to highly active antiretroviral therapy (HAART) among key populations (KPs) in Akwa Ibom State. Your participation in this questionnaire would aid me and other researchers to determine predictors of HAART adherence among HIV positive KPs in Akwa Ibom State which will help in proffering better HIV programming for KPs.

Please be assured of a maximum degree of confidentiality with respect to any information given by you in course of this study. Your name will not be used for identification, rather numbers would be used in an encoded pattern in reporting the data/results. You are also free to opt out at any time during this interview and your participation is voluntary. I am open to any question with regards to this interview from you anytime.

Kindly indicate if your consent to participate in this study by signing below.

Thank You.

Signature …………………………   Date …………….

APPENDIX 2

Questionnaire for the study on the predictors of adherence to highly active antiretrviral therapy among key populations living with HIV/AIDS in Akwa Ibom State, South South Nigeria

Predictors of Adherence to ARTs

Date: /   /21

Questionnaire ID _____   Facility Code _____

Typology of KP   1   2   3   Hospital No _____

Sex   F ☐   M ☐   Age ☐ Year ☐

Dear respondent,
This questionnaire is to enable the researcher gather information on Predictors of Adherence to Antiretroviral Therapy (ART) among Positive Key Populations (KPs) in Akwa Ibom State. Information gotten because of your response will be treated as confidential and used strictly for academic purpose only. Thank you for helping in this important study.

A

Please check as apply

Marital Status

Married ☐   Single ☐   Window ☐   Divorced/Separated ☐

Educational qualification

None ☐   Primary ☐   Secondary ☐   Tertiary ☐   Vocational ☐

How long have you been on Medication? ☐

Money may be a cause to not taking medication as at when due
Average Monthly Income?   < 18,000   >18,000   others   Transportation cost to Health facility?

B   **How sure are you that:**

Please circle one response for each question

	YES	NO	MAYBE
You will be able to take all or most of the study medication as directed?	1	2	3
The medication will have a positive effect on your health.	1	2	3
Total number of pills taken each day	**1**	**2**	**3**

C

Taking medications every day can be difficult. What were the most common reason(s) for missing your medications within the last month?

Possible Reasons for Missed or Delayed Medications	Check all that apply	Rank top 3 reasons
Simply Forgot	☐	☐
Fell asleep / slept through dose time Change in routine away from home	☐	☐
Were busy with other things? working / at school	☐	☐
Had too many drugs to take?	☐	☐
Ran out of Medications	☐	☐
Wanted to avoid side effects?	☐	☐
Felt good/Healthy?	☐	☐
No food to take medication with	☐	☐
Felt sick / bad (for example, nausea or vomiting)	☐	☐
Felt overwhelmed / depressed	☐	☐
Did not want others to know	☐	☐
Too many pills	☐	☐
Bad attitude of Healthcare workers	☐	☐
Hospital requires money before giving drugs	☐	☐
NGO worker refuse to remind me as promised	☐	☐
Did not want to take medications	☐	☐
Religious constraints?	☐	☐
Long waiting time in the Hospital	☐	☐

E

When was the last time you missed taking any of your medications? Check one box

(5) Yesterday   (4) 2-4 Days   (3) 5- 7 days ago   (2) 1- 3 weeks ago   (1) More than 1 Month   (0) Never skip medications or not applicable

What is the total amount of your medications taken in the past two 2) weeks?

Total prescribed dose for 2 weeks?

How many dose did you missed?

F   HARD & SOFT DRUG USAGE

Do you take any of the following? Check all that apply

				Daily	2-3 Times a week	4-5 times a week	Once/Twice in a month
Cocaince/Meth (powder, crack,white)	Y	N	If yes how often?	1	2	3	4
Marijuana (Canabis/Weed/indian hemp/igbo ?	Y	N	If yes how often?	1	2	3	4
Codeine?	Y	N	If yes how often?	1	2	3	4
Tramadol	Y	N	If yes how often?	1	2	3	4
Rophynol	Y	N	If yes how often?	1	2	3	4
Alchohol	Y	N	If yes how often?	1	2	3	4
Cigarette	Y	N	If yes how often?	1	2	3	4
Herbal combinations	Y	N	If yes how often?	1	2	3	4

G

The following questions ask about your social support.

Have you disclosed your status to anyone? ○ Y   ○ N

Who do you disclosed to?

Do you belong to any support group?   ○ Y   ○ N

Who visits to remind you to take your drug?   NGO Worker ○   Hospital Staff ○

H

	Not satisfied	Somehow satisfied	Very satisfied
How satisfied are you with the support you get from family members	1	2	3
How satisfied are you with the support you get from your friends?	1	2	3
How satisfied are you with the support you get from Social/ religious group?	1	2	3

Satisfaction with service delivery

Does any of these factors listed below contribute to uptake of services from this facility?

	NO	MAY BE	YES
Proximity/ Distance to the facility	1	2	3
Attitude of service provider	1	2	3
Availability of drugs	1	2	3
Confidentiality	1	2	3
Waiting time	1	2	3
Serene environment	1	2	3
Availability of Case Management Officers	1	2	3
Counselling Support	1	2	3

I

This last session will ask you to suggest the following reminders that can help you remember to take your medications?
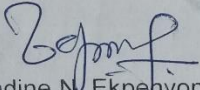
None needed

Use pillbox

Use alarm

Time pill taking with daily routine
(i.e., prayers, eating, radio program)

Coded text-messaging reminders

Make medications more palatable (add flavor to medications)

Use Treatment Partner (an HIV+ peer, friend or family member);

Call Reminders

Others Specify: _____

Thank you for helping in this important study

Interviewer Name	Interviewer Signature	Date (dd/mm/yyyy)

APPENDIX 3

Letter of Introduction from the Department of Public Health, University of Calabar

DEPARTMENT OF PUBLIC HEALTH
FACULTY OF ALLIED MEDICAL SCIENCES
COLLEGE OF MEDICAL SCIENCES
UNIVERSITY OF CALABAR,
P.M.B. 1115, CALABAR, NIGERIA.
www.unical.edu.ng

Vice-Chancellor	Ag. Head of Department
Prof. Florence Banku Obi, fnaec, Mnae, JP	Dr. Bernadine Nsa Ekpenyong, FNCO, FAAO, JP
B.Ed, (Jos) M.Ed (Jos), PGCEE (Glasgow), Ph.D (Calabar)	OD (ABSU), MPH (Calabar), Ph.D (Calabar)
vcunical@unical.edu.ng, obibanku2000@yahoo.co.uk	benyita2001@yahoo.com, bekpenyong@unical.edu.ng
	☎ +2348033475138

UC/CMS/PUH/034   24th August, 2021

TO WHOM IT MAY CONCERN

LETTER OF INTRODUCTION: EDET, JOHN ETIM
(PUH/MPH/18/001)

This is to introduce the above-named, who is a MPH student in the Department of Public Health, University of Calabar, Calabar. He is carrying out a research on **"Predictors of Adherence to Highly Active Antiretroviral Therapy among Key Populations Living with HIV AIDS in Akwa Ibom State, South-South, Nigeria";** needed information from your establishment.

Kindly assist the bearer with the necessary information needed as all such information will be used purely for academic purpose, and will be treated in strict confidence.

Thanks for understanding.

Dr. Bernadine N. Ekpenyong
AG. HEAD OF DEPARTMENT

APPENDIX 4

Certificate of Ethical Approval from the Akwa Ibom State Ministry of Health

AKHREC/30/9/21/045

Ministry of Health

30ᵗʰ Sept., 2021

AKWA IBOM STATE HEALTH RESEARCH ETHICS COMMITTEE

NHREC/21/6/2021

NOTICE OF FULL REVIEW AND APPROVAL

TITLE: Predictors of Adherence to Highly Active Antiretroviral Therapy among Key Populations Living With HIV / AIDS in Akwa Ibom State, South-South, Nigeria

Health Research Ethics Committee assigned number: AKHREC/30/9/21/045
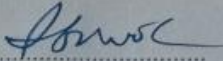
Applicant's Name: Edet, John Etim

Applicant's Address: Department of Public Health Faculty of Allied Medical Sciences University of Calabar, Calabar

Date of Receipt of valid Application: 26ᵗʰ August, 2021

Date Protocol was approved: 30ᵗʰ September, 2021

This is to inform you that the research described in the submitted protocol (HREC No. AKHREC/30/9/21/045), the consent forms and other participants information materials have been received and given *full approval by the Health Research Ethics Committee*. This approval dates from 30/09/2021 to 29/09/2022. If there is delay in starting the research, please inform the HREC so that the dates of approval can be adjusted accordingly. Note that no participants accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in the study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research endeavor to submit your annual report to the HREC early in order to obtain renewal of your approval to avoid disruption of your research.*

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the HREC. No changes are permitted in the research without prior approval by HREC except in circumstances outlined in the code. The HREC reserves the right to visit your research site without previous notification.

DR. IBORO E. UDOH, MPH(Essex)
FOR: CHAIRMAN, HREC

Block 8, Idongesit Nkanga Secretariat, Uyo, Akwa Ibom State, Nigeria.
www.akwaibomstate.gov.nig