PROJECT TITLE:

A single-blind, randomized, parallel design study to assess the effectiveness of SMS reminders in improving ART adherence among adolescents living with HIV in Nigeria. [STARTA Trials (Adolescents)]

A randomized controlled interventional study

NCT03394391

Institutional Review Board: Babcock University Human Research Ethics Committee

Ethics approval date: 31st January, 2018

Institution: Babcock University Teaching Hospital

Principal Investigator

Dr. Olumide ABIODUN *MBCHB, MPH, FWACP (Comm. Health)*

Department of Community Medicine

Benjamin Carson School of Medicine/ Babcock University Teaching Hospital

Ilishan, Nigeria

PHONE: +234-703-856-9725

E-MAIL: abioduno@babcock.edu.ng; olumiabiodun@gmail.com

Co-Investigator

Dr. Babatunde LADI-AKINYEMI *MBCHB, MPH, FWACP*

Director Prevention and Community Services

APIN Public Health Initiative Teaching Hospital

10, Mahmudu Ndagi Close, Off Mike Akhigbe Road, Behind Apostolic Church Jabi District

Federal Capital Territory, Abuja

PHONE: +234-805-5886-1684

E-MAIL: bakinyemi@apin.org.ng

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List of Abbreviations

ACTG:	AIDS Clinical Trials Group
AIDS:	Acquired Immune Deficiency Syndrome
APIN:	AIDS Prevention Initiative in Nigeria
ARBA:	AIDS risk behavior assessment
ART:	Anti-retroviral therapy
AUDIT:	Alcohol Use Disorder Identification Test
BUHREC:	Babcock University Human Research Ethics Committee
BUTH:	Babcock University Teaching Hospital
CMD:	Chief Medical Director
CSV:	Comma-separated values
DAST:	Drug Use Screening Test
GHQ:	General Health Questionnaire
HIV:	Human Immunodeficiency Virus
LGA:	Local government area
NACA:	National Agency for the Control of HIV/AIDS
PLHIV:	People living with HIV
PSS-HIV:	The Patient Satisfaction Survey for HIV Ambulatory Care (PSS-HIV)
RCT:	Randomized controlled trials
SACA:	State Agency for the control of HIV/AIDS
SMS:	Short message services
STARTA:	State Anti-Retroviral Therapy Adherence
VAS:	Visual analogue scale

EXECUTIVE SUMMARY

The non-maintenance of ART adherence is a major barrier to the achievement of optimal treatment outcomes among adolescents living with HIV. ART adherence is a challenge among adolescents living with HIV because of lack of appropriate information, their unique emotional state and lifestyles but the most commonly quoted challenge to adherence is forgetting to take antiretroviral drugs. There is evidence to suggest that short message service (SMS) reminder- interventions may enhance drug compliance among adolescents living with other chronic diseases such as asthma and diabetes. Available literature underscores the need for randomized controlled trials (RCTs) of effective interventions to promote ART adherence among adolescents with HIV.

The aim of this study is to evaluate the feasibility, acceptability, and efficacy of interactive and tailored SMS reminders on ART adherence among adolescents (15-19 years) living with HIV in Ogun State, Nigeria. The study hypothesizes that the use of personal mobile phones and SMS reminders for the improvement of ART adherence among adolescents living with HIV are feasible, acceptable, and effective. A single-blind, parallel-design (ratio 1:1), and multi-center RCT of 200 adolescent living with HIV who are non-adherent to medications will be conducted over a one-year period in Southwest Nigeria. All the participants will receive routine adherence counseling during clinic visits and one SMS reminder each for follow-up appointments 48 hours and 24 hours before the follow-up visit date. The intervention group will also receive daily ART adherence reminder SMS. Participants will be assessed at baseline and during follow-up visits at 4, 8, 12, 16 and 20 weeks after the baseline. Baseline assessment of participants will include socio-demographic characteristics; HIV/AIDS risk behaviour assessment, Alcohol and Drug abuse assessment, Client Satisfaction Survey, ART adherence assessment, CD4count and viral load assessments. ART adherence and client satisfaction will be assessed at each follow-up visit while CD4count and viral load assessments will be done at Baseline and at 20 weeks.

It is possible that tailored SMS reminders will mitigate the barrier of forgetfulness in ART-adherence and lead to improved drug compliance, viral suppression, and quality of life among adolescents living with HIV.

BACKGROUND

In Nigeria, approximately 3.2 million people were living with human immunodeficiency virus (1)/acquired immunodeficiency syndrome (AIDS) in Nigeria (2). Nigeria has about 196,000 adolescents (10-19 years) living with HIV with an estimated 17,000 new infections and 11,000 AIDS-related deaths per year in the age group (3). Adolescents aged 15 to 19 years constitute 8.8% of Nigeria's over 173 million people and have an HIV prevalence rate of 2.9% (3).

Non-adherence to antiretroviral therapy (ART) increases the risk of non-suppression of HIV, secondary HIV transmission, and development of drug resistance; it has a negative impact on treatment outcomes, leads to decreased survival and worsened quality of life (4, 5). Adolescents on ART have lower viral suppression rates (49%) when compared with both adults and younger children (72.8% and 57%) and this is frequently a consequence of lower adherence to ART (6, 7).

The non-maintained ART adherence is a major barrier to the achievement of optimal treatment outcomes among adolescents living with HIV. ART adherence is a challenge among adolescents living with HIV because of lack of appropriate information, their unique emotional state and lifestyles. Religious, cultural, social and health services related factors have also been recognized as a source of non-adherence to ART treatment (8). Other known barriers to ART adherence include difficult dosing schedule, side effects, food restrictions and pill burden but the most commonly quoted challenge to adherence is forgetting to take antiretroviral drugs (9-11). Many strategies, including directly observed drug use, adherence counseling, telephone calls and reminder devices adopted to enhance ART adherence have turned out to be time-consuming, costly and intrusive (4, 11, 12).

With over 148 million active mobile lines, short message service (SMS) has become a common means of communication in Nigeria (13). SMS is used commonly by teenagers, including those who are economically disadvantaged (14). SMS has been applied in a variety of healthcare setting because of its low-cost and convenient technology and has proved to be an effective tool for behavioral change interventions (15, 16). There is evidence to suggest that SMS interventions may enhance drug compliance among adolescents living with other chronic diseases such as asthma and diabetes (17-19). An RCT showed that text-messaging system increased adherence to medication among adolescents by about 7% (18). While studies have evaluated the effectiveness of SMS reminders on ART adherence among PLHIV in some low-resource settings (20, 21), to the best of our knowledge, there is a need for studies that evaluate SMS reminders for adolescents living with HIV. Indeed, a Cochrane systematic review of randomized controlled trials (RCTs) that assessed the effectiveness of SMS for improving ART adherence among people living with HIV infection identified the need of RCTs for this intervention among adolescents (22).

Mobile technology communicates interventions to people in real-time and in their natural habitat (23). A review of the literature on SMS interventions for behavioral change in health care settings identified key characteristics for success such as interactivity and tailored messages (24).

This study is one of the two parts of the STARTA trials aimed at testing the effect of text messaging on ART adherence among adolescents and younger children.

NIGERIA'S POLICY

The National Agency for the Control of AIDS (NACA) is the government agency that facilitates the engagement of all tiers of government and all sectors on issues of HIV/AIDS prevention, care, and support in Nigeria. Each of the 36 states in Nigeria has an agency for the control of AIDS that performs similar functions at the state level. The Ogun State Agency for the control of AIDS (Ogun SACA) which was established as an agency by an act of the Nigerian Parliament in 2009 is responsible for the coordination of all the organizations and efforts for the control of HIV and AIDS in Ogun State, Nigeria. The Ogun State and other state agency for AIDS control oversee the implementation of national and sub-national policies and directives on HIV/AIDS in collaboration with various donor agencies and implementing partners. They work with local and international development partners and health facilities to provide antiretroviral drugs for PLHIV including adolescents. They also, through their affiliated health institutions also provide adherence support for the PLHIV.

PROJECT GOALS

The aim of this study is to evaluate the feasibility, acceptability, and efficacy of interactive and tailored SMS reminders on ART adherence among adolescents (15-19 years) living with HIV in Southwest, Nigeria. The feasibility of using personal mobile phones and retaining participants throughout the study period will be assessed. The study will be carried out among adolescents living with HIV who have less than optimal level of adherence to ART (<95%) since they are most likely to benefit from the SMS reminders. The study will create an occasion to educate adolescents living with HIV/AIDS on self-care.

PROJECT OBJECTIVES

Objective 1: To evaluate the effect of interactive and tailored SMS reminders on ART adherence among adolescents (15-19 years) living with HIV in Southwest, Nigeria.

Objective 2: To assess the feasibility and acceptability of using personal mobile phones and interactive and tailored SMS reminders for the improvement of ART adherence among adolescents living with HIV in Southwest, Nigeria.

Objective 3: To identify the predictors of ART non-adherence among adolescents (15-19 years) living with HIV in Southwest, Nigeria.

STUDY HYPOTHESES

a. Interactive and tailored SMS reminders are efficacious in the improvement of ART adherence among adolescents (15-19) years living with HIV.
b. The use of personal mobile phones for the improvement of ART adherence among adolescents living with HIV is feasible and acceptable.
c. ART adherence among adolescents is predicted by demographic, socioeconomic, and psychosocial factors.

METHODOLOGY

The proposed study is targeted at adolescents living with HIV/AIDS who are on ART but are not adherent to medications. Two hundred participants will be recruited to participate in a randomized controlled trial to evaluate the effectiveness of interactively tailored SMS reminders on the improvement of ART adherence. The study will be conducted in Ogun State in the southwestern part of Nigeria over a 52-week period.

Participants and setting

Nigeria has 36 states in six geo-political zones. The Southwest geopolitical zone is one of the six and consist of six states namely, Ogun, Lagos, Oyo, Osun, Ondo and Ekiti states. The study will be based in Ogun State and extend to the other five states in Southwest Nigeria in order to meet recruitment goals. Ogun State is one of the 36 states in Nigeria. Ogun State has an estimated 161,200 PLHIV living with HIV and an HIV prevalence rate of 3.1%. Thirteen thousand five hundred (13,500) PLHIV are currently accessing antiretroviral drugs across 24 treatment clinics in the State.

Study design and procedure

A single-blind, parallel-design (ratio 1:1), and multi-center RCT of 200 adolescent living with HIV who are non-adherent to medications will be conducted over a one-year period at HIV clinics in Ogun State and other states in Southwest Nigeria. This study is designed to have 80% power to detect a difference of 20%. When the proportion of adolescents who are adherent to ART was taken as 49% (6) and 10% attrition rate, a sample size of 96 per group was obtained using STATA 15/C statistical software. The study will recruit 200 participants from the ART clinics in Southwest Nigeria into a randomized controlled trial (RCT). Convenience sampling method by which participants will be recruited on routine clinic visits across five (5) high patient-density ART sites will be used.

Participants' recruitment

Recruitment of participants will occur over a three-month period. Recruitment will be based on five eligibility criteria namely:

a. HIV seropositivity
b. Being on ART for at least six months
c. Age 15 to 19 years as at last birthday
d. Use of personal mobile phone
e. Poor adherence to ART

For the purpose of this study, we defined poor adherence as self-reported < 95% adherence in the preceding one month using a validated visual analogue scale (25, 26). Self-reported 95% adherence level is an ideal cut-off point because self-reported measures tend to exaggerate adherence and such high adherence level will minimize the occurrence of false-negatives (27). Adolescents who are too ill to require hospital admission will be excluded from the study.

Initial eligibility screening and recruitment will be carried out by the primary caregivers using a checklist. Potential participants who meet the first four criteria will be presented with a visual analogue scale (VAS) labelled 0 to 100% at intervals of 5%. They will be educated on the implication of various percentages e.g. 0%, 50%, and 100%. They will be required to put a mark on the line at the point that shows their best guess about how much of their prescribed ART medication they had taken in the preceding one month (4 weeks). Volunteers who choose points less than 95% mark will be regarded as being non-adherent to ART and will be eligible to participate in the study. Eligible and willing participants will then be referred to the research assistants for a comprehensive informed consent process.

Baseline activities

At the baseline, the research assistants will give the volunteer participants a detailed explanation of the study, including its aim, duration, intervention and possible benefits. All the volunteers will be required to give a signed informed consent in a private room. Adolescents aged 15 to 19 years are thought to be relatively mature. According to a brief of AIDS regulations and Laws in Nigeria, children who are deemed mature in this context are capable of giving informed consent (28). Besides, based on evidence from South Africa and Lesotho, the WHO recommended that the legal age of consent for HIV testing and treatment should be 12 years (29). The consenting volunteers will then be allocated unique identifiers that they will maintain throughout the course of the study. The contact details of the lead investigator will be made available to the participants so that he can be reached directly for any reason that is related to the study. Baseline data will be obtained in a private room by trained research assistants using structured interviewer-administered paper-based questionnaires over a period of about 40 minutes. The questionnaire will assess:

1. Socio-demographic variables.

2. HIV/AIDS risk behaviour assessment: This will be done using the AIDS Risk Behavior Assessment (ARBA); a validated, adolescent-specific tool for the assessment of sexual behaviour, drug and alcohol use, and HIV-associated needle use. It assesses sexual behaviour over the previous 30 days and the previous three months (30).
3. Alcohol and Drug abuse assessment: The Alcohol Use Disorders Identification Test (AUDIT) will be used to assess alcohol abuse. AUDIT, which was developed in 1982 by the World Health Organization, is a simple tool that is used to screen for and to identify people who are at risk of alcohol problems (31). The drug abuse screening test (DAST-20, adolescent version) will be used to screen for drug abuse. DAST is a validated scale that was designed to provide a brief, self-reported instrument for population screening, clinical case finding, and treatment evaluation research. It yields a quantitative index of the drug abuse consequences (32, 33).
4. Client Satisfaction Survey: A 22-item adaptation of the SERVQUAL tool will be used for this purpose. First published in 1988, the SERVQUAL is a multi-dimensional tool that assesses patients expected and perceived quality of services across five domains. Its use currently dominates research and industry for the assessment of quality of services and is well-validated in HIV service quality assessment (34).
5. Adherence assessment: This will be done using the validated visual analogue scale (described above), Viral load assessment, monthly pill count, pharmacy records and the AIDS Clinical Trials Group (ACTG) adherence questionnaire (35). The research assistants will carry out pill counts and obtain the pharmacy records. Adherence assessment will be carried out at baseline and at every follow-up visit.

HIV viral load estimation will be done in line with APIN Public Health initiative program and in accordance with the national guideline. Sample collection, handling and disposal follows the standards and guidelines outlined by the WHO and PEPFAR (36, 37). The participants' capability to operate mobile phones will be enhanced. The research assistants will work with participants to select from a list the most preferred SMS that will serve as a daily reminder of ART adherence. Each participant will select an SMS format that will serve as a reminder for follow-up visit reminders. In addition, the participants will also choose the preferred language and time for SMS reminders. The participants will receive the adherence counseling by trained counselors. The messages will be designed in such a way that they are sensitive and protect the privacy of the participants. The participants will be able to contact the lead investigator if they wish to change their chosen messages or if the services to their mobile phones are disrupted.

Randomization

The Project will collaborate with an accredited medical internet technology solutions firm (Golden Business Resource Limited) to set up a database system for dissemination and receipt of SMS. Following baseline

activities, the participants will be randomly allocated to intervention and control groups by the database administrator. Random allocation will be achieved through a computer-generated simple randomization scheme. The investigators, data manager, research assistants, counselors and other project staff will be blinded throughout the study.

Intervention

All the participants will receive one SMS reminder each for follow-up appointments 48 hours and 24 hours before the follow-up visit date. The participants that are allocated to the intervention group will also receive daily ART adherence reminder SMS. Participants in the intervention group will be required to send reply SMS to their daily messages as soon as possible. They will be expected to send '1' if they find the reminder acceptable depending on the circumstance around them at the time the message is received. They will be expected to send '2' if it was not so acceptable.

All the participants will be enrolled into a "whatsapp" group where they will discuss satisfaction with ART services provided to them. An expert will be involved on the group to offer counsel on issues of client satisfaction with ART services. All the participants will also receive a simple clinic-based intervention that is based on stress and coping theories and cognitive behavioural therapy which is aimed at improving their mental status.

Follow-up

The follow-up visits will hold every four weeks at 4, 8, 12, 16, and 20 weeks after the baseline to coincide with the participants' routine clinic visits. ART adherence and client satisfaction will be assessed at each follow-up visit. The participants will also receive the adherence counseling by trained counselors at each visit. CHIV viral load assessments will be done at Baseline and 20 weeks. In order to complete the study, a participant is required to attend all follow-up visits.

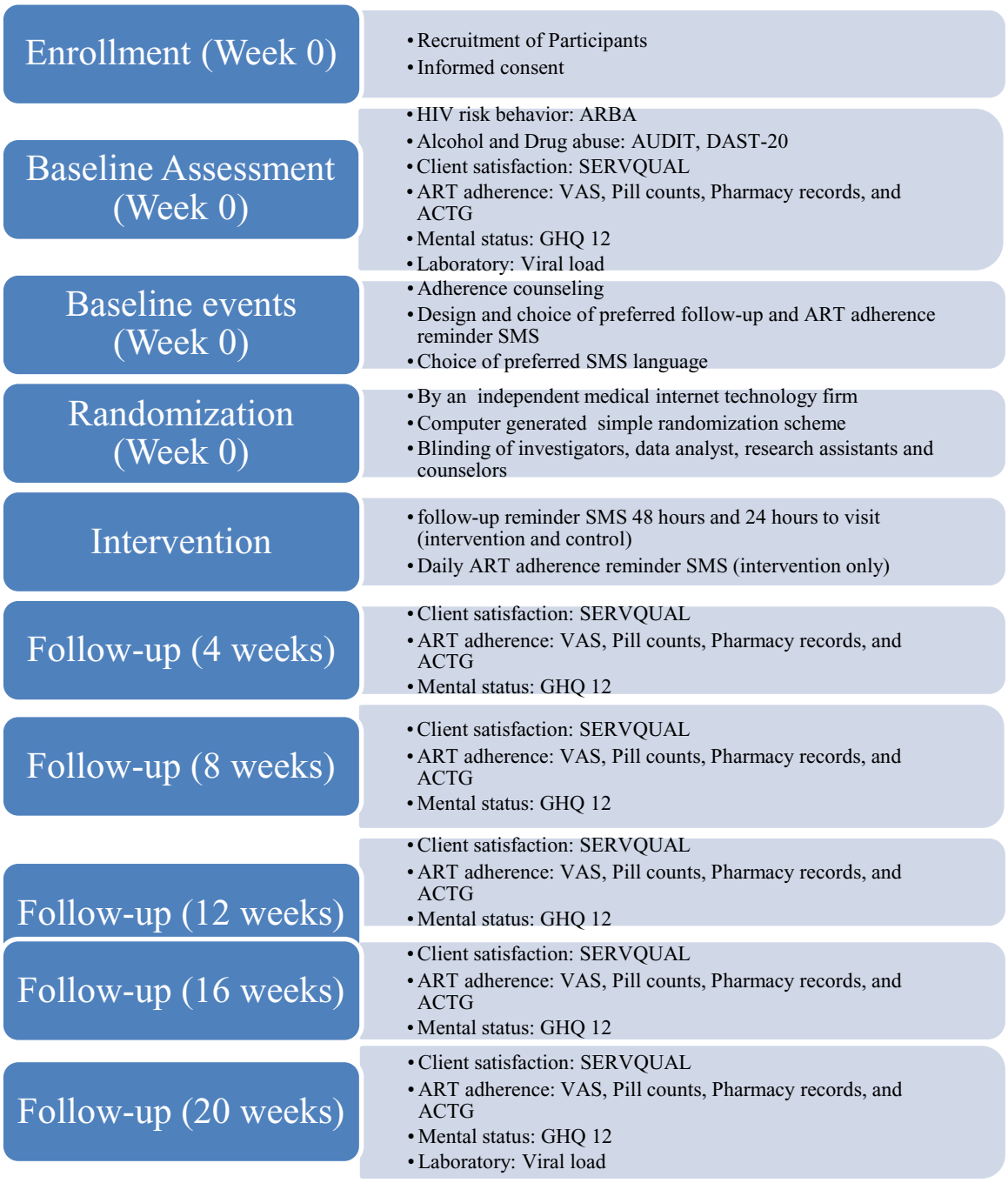

Figure 1: Randomized controlled study design

Adherence counseling

In this trial, the counselors will be female master's degree level social workers with ART counseling experience. The adherence counselor will be mentored and will be supervised by the investigators. Adherence counseling will be conducted in a setting that mimics a typical ART clinic setting. Each session will consist of a 15 minutes face to face session and will deliver information on the impact of HIV on the

human immune system, the role of ART, the importance of adherence, the characteristics and consequences of non-adherence, and strategies to enhance adherence. The '5As of adherence' approach will be used (38).

Trial Assistance

The trial assistants will be bachelor's degree holders in relevant disciplines and with relevant research experience. They will be trained in research ethics, the study protocol, data collection tools, and data entry. They will obtain a signed informed consent from participants and allocate unique identifiers to them. The trial assistants will also administer the questionnaires, enter data into analysis software and assist participants in getting laboratory investigations done.

Trial Coordination

This trial will be coordinated on a day-to-day basis by a coordinator who will be an MPH degree holder with relevant experience in research coordination.

EXPECTED OUTCOMES

Primary outcome measure (ART adherence)

ART adherence will be assessed using the visual analog scale (VAS), Viral load, Pill count, Pharmacy record, and the AIDS Clinical Trials Group (ACTG) adherence questionnaires at baseline and during every follow-up visits. The VAS has been found to be reliable, valid and suited for patients in resource-limited settings with insufficient human resources for time-consuming adherence assessments. It showed the highest sensitivity to detect patients with possible virologic failure at 95% cut-off for non-adherence (1, 39).

Secondary outcome measures

1. **Patient satisfaction**

Patient satisfaction is a potent predictor of ART adherence (40, 41).

2. **Mental health status**

Mental illnesses are varied, especially among adolescents because they experience a range of emotional, social and physical changes. The effects of mental illnesses on adolescents vary and can be acute, chronic, mild or severe. The commonest mental illnesses among adolescents are depression and anxiety disorders. Adolescents living with HIV have additional risk factors that increase their susceptibility to mental illnesses. This increased vulnerability may result from the loss of family, having to live independently, with relatives or in care. They are often exposed to poverty and violence. The stigma, discrimination, and social isolation that is associated with HIV further impact mental health negatively. They may result in poor adherence to ART (8).

The General Health Questionnaire (GHQ) 12 will be used to assess the mental health status in this study. The GHQ which was developed in 1970 by Goldberg to measure the current mental health has since been used in different settings and different cultures (42). The questionnaire was originally developed as a 60-item instrument but many shorter versions have been developed over time. The GHQ-12 is brief, simple, easy to complete, and has been widely used in research settings as a screening tool. It is a consistent and reliable instrument when used in the general population (42, 43).

Process measures

An ART adherence checklist will be completed by the counselors during each counseling session. The filled checklists will be examined to monitor the adequacy of counseling sessions. The participants will be required to send a reply SMS as soon as possible after ART and follow-up reminders are received. This will help confirm that SMS are delivered to participants and serve as a measure of feasibility and acceptability of the intervention.

Ethical consideration

Ethical approvals will be obtained from the Babcock University Human Research Ethics Committee (BUHREC) and Ogun State Ministry of Health Ethics Board. All the necessary permissions will also be obtained. A signed consent will be obtained from all participants. Participation will be entirely on voluntary basis and participants will be free to withdraw participation from the trial at any time without any negative consequence. Confidentiality of data and samples will be maintained. Data collection will be carried out in private rooms. Mobile phone numbers and all other participant details will be used for the purpose of the research only. Hard and soft copies of collected data will be stored in secure cabinets and password-secured laptops respectively. Only the data and PI will have access to the data. After the project, only the PI will have access to the data while the soft data will be encrypted and saved on an external drive and in the cloud. Physical data will be retained for 5 years while soft data will be retained for 10 years.

All the study participants will receive ART adherence counseling at each visit. They will also receive 5000 Naira at each visit to compensate for the cost of transportation, time and other additional costs of SMS, feedback phone calls and data.

All the study staff and investigators will be required to complete and pass the Nigerian National Code for Health Research Ethics online.

Data and Safety Monitoring Plan

The intervention is not associated with any defined significant adverse effect. Data and safety monitoring will be overseen by the principal investigator. He will ensure that participants' rights are protected. The

trial coordinator will make sure ensure that all required documentation and reports are timely, complete, and accurate. The counselors will ask study participants for symptoms of adverse reactions and side effects of ART at every contact. The data manager will routinely assess the collected data for accuracy and completeness. She/he will also make sure that data collection aligns with study the protocol and keep data-collection tools in a secured locker and restrict access to data. Bi-monthly review meetings will be held to ensure that the project proceeds as planned. A data use agreement will be signed with the medical internet technology solutions firm for the protection of participants' data and privacy. All participants' data will be held in sacred trust and exchanged only with the project and will not be used for any other purpose whatsoever.

Data Analysis

The research assistants will code and enter the data obtained into Microsoft excel software in the CSV format. The data will be exported to the STATA C version 15 for analyses. The data manager will fully review 5% (one in every twenty) questionnaire for errors. The data manager in conjunction with the investigators will be responsible for baseline, interim and final data analysis. The investigators, data manager, research assistants, counselors and other project staff will be blinded throughout the study. An independent medical internet technology firm will be contracted to randomize participants and to send the required SMS to the participants. After the scientific review has been completed and data collection has been completed, at the point of analysis, a list of participants' unique identifiers in two groups will be sent to the data analysts without specifying which the investigation or control group is. The blinding of the clinical database will finally be removed after final data analysis has been completed.

Statistical Methods

ART adherence will be measured at baseline and at every follow-up visit. Complete case analysis and the intention-to-treat analysis will be carried out. Baseline characteristics will be compared using the chi-square test, rank-sum test, and independent t-test as appropriate. The proportion of participants who are adherent to ART [≥95%] at the end of the follow-up period will be compared with the baseline data using the chi-square test. The independent t-test will be used to compare the means of ART adherence between the investigation and control groups after each follow-up visit in order to test if the intervention has any effect. The incidence proportion, incidence rate, relative risk, risk difference, and odds ratio will be used to measure the effect. Multiple regression analyses will be used to control for possible confounders. Subgroup analysis will also be undertaken in order to generate further hypotheses. Survival analysis will also be carried out to adjust for

censoring (competing risk and loss to follow-up). Longitudinal data analysis will be carried out to explore the change in response over time.

The acceptability of the SMS will be accessed by the responses given by participants. The proportion of participants who find the method acceptable will be determined.

The feasibility will be determined using the proportion of participants who are deemed to have completed the study (participate fully).

The study will also assess client satisfaction and the possible effect of adherence on mental health status of adolescents. Correlation and linear regression analyses will be used to determine the association between adherence (percent) and mental health status (GHQ 12 measure).

PROJECT ACTIVITIES AND IMPLEMENTATION

Figure 1 shows a synopsis of the intended activities, RCT design the overall flow during the study.

Timeline

Activity	Period (week)
Initial Planning, Procurement, recruitment and training of project staff	1 to 13
Review meetings	Monthly
Recruitment of participants and informed consent	9 to 21
Randomization and baseline activities	22 to 25
Data cleaning, entry and analysis	9 to 52
Follow-up	26 to 45
Report writing and rounding up	45 to 52

Project management/logistics support

Staffing

For effective project implementation and management, the following staff would be required:

Role		% time	Responsibilities
Principal Investigator	1	25%	Oversees entire project, especially its scientific integrity
Co-Investigator 1	1	15%	Oversee data collection and management process
Co-Investigator 2	1	15%	Oversee the delivery of intervention

Trial Coordinator	1	100%	Day to day management of the trial
Trial Assistants	5	100%	Assessment of participants, Data collection, and entry
Data manager/Statistician	1	20%	Coding, data monitoring and quality management, determination of statistical analysis
Project accountant	1	20%	Keeping record and monthly reporting of financial transactions
Counselor	2	100%	Adherence counseling

The study will also empower a critical mass of adolescent volunteers to participate in the activities. The Project office which will be located within Babcock University Teaching Hospital will provide technical assistance. This will involve visits to the project site by participants, training of staff, monitoring, general coordination, and reporting.

Organogram

The project will be implemented under the following Organogram and institutions:

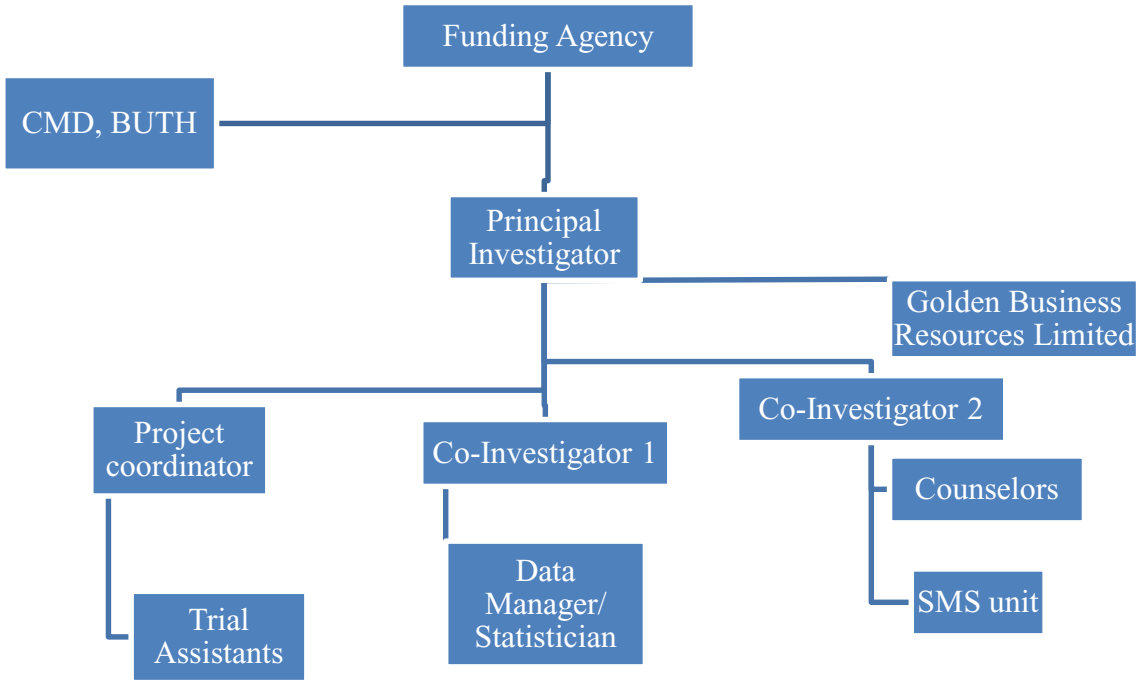

Figure 2: Project Organogram

Logistic support

The following items would be procured for use in the Project Office and for the study

1. Office furnishings and equipment

2. 5 Laptops and their accessories; one printer, one photocopier, and office consumables

Reporting

The Lead Investigator will send regular reports according to the terms of the contract. Regular reports will also be submitted to the Chief Medical Director CMD), Babcock University Teaching Hospital (BUTH).

Monitoring and Evaluation

The monitoring will be jointly carried out by the Investigators, the Ogun SACA, the CMD, BUTH and other relevant stakeholders. All data will flow to the project office as soon as possible after being collected. Data will be kept confidentially and access will be restricted. All collated data will be evaluated and discussed by investigators and research assistants. All project staff will be involved in relevant logistics and planning of the study, and also receive copies of the work plan. Relevant checklists will be utilized to assure the quality of ART counseling and screening. Participants will be expected to a send reply to SMS reminders to confirm that the messages were received.

The study will be evaluated in a participatory manner using both process and outcome indicators. This will be carried out midterm into the project, and at the end of the project. A data analyst will be engaged to participate in the analysis of pre and posttest data and evaluation workshop involving the investigators and all project staff.

Sustainability of Interventions

The most problematic aspects regarding the sustainability of many projects, especially those involving elements of service in this scenario, are recurrent costs of accommodation, consumables such as drugs, staff salaries etc. With this in mind, the project will engender the commitment of all relevant stakeholders including the State Government, relevant LGA authorities, community leaders including the Traditional and Religious Leaders. The Ogun SACA, being an implementing partner, will be involved at all stages of planning, implementation, and evaluation.

The Ogun State HIV control program does not have a PCR DNA machine for viral load testing. However, there is an arrangement with some tertiary facilities (about 100 to 160 km from the project site) to which sample are transported for analysis. This mitigates the cost of having to purchase a viral load machine by about 90%.

The database system for dissemination and receipt of SMS which will be put in place by this study will also be available for the scale up of the intervention if it is proved to be feasible and effective. Also, the core intervention (SMS reminders) is relatively cheap and will, therefore, be easy to sustain.

Dissemination of findings

The findings of the study will be communicated to the funding agency as agreed. The findings will also be submitted to relevant governmental agencies. The findings of the study will be presented as two abstracts at the International AIDS Society conference 2019 and five (5) publications in relevant reputable journals, including AIDS and Behaviour, Journal of Adolescent Health, and International Journal of Adolescent Medicine and Health.

Limitations of the study

The inclusion criteria set the adherence level at a very high level (95%). It is possible that this will mitigate the effect of the tendency of individuals to exaggerate their self-reported adherence to medications.

FUNDING/SPONOSRSHIP

STARTA Trials (Adolescents) will be undertaken with a grant provided by Merck Sharp and Dohme (MSD) under the Merck Investigator Studies Program-2017.

INVESTIGATORS

Institution

Babcock University Teaching Hospital

Implementing Partners

Ogun State Agency for the Control of AIDS, Ogun State Ministry of Health and APIN Public Health Initiative, Nigeria.

Principal Investigator

Dr. Olumide ABIODUN – Reproductive Health and HIV Physician/ Epidemiologist/

Dr. ABIODUN holds an MBChB degree in Medicine and Surgery from the Obafemi Awolowo University, Ile-Ife and an MPH degree from Olabisi Onabanjo University, Ago-Iwoye. He is a Fellow of the West African College of Physicians. He has led and participated in many donor-funded projects and studies. Currently, Dr. Olumide ABIODUN is a Senior Lecturer with the Department of Community Medicine, Babcock University, and Honorary Consultant at Babcock University Teaching Hospital.

Co-Investigator

Dr. Babatunde LADI-AKINYEMI- HIV Specialist, Obstetrician and Gynecologist

Dr. Ladi-Akinyemi is the Director, Prevention and Community Services of AIDS Prevention in Nigeria Public Health Initiatives (APIN). He holds MBChB degree in Medicine and Surgery and Master's degree in Public Health from the Olabisi Onabanjo University, Sagamu. He is a fellow of the West African College of Surgeons (Obstetrics and Gynecology. He brings his clinical and public skill to bear on HIV patient management.

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PARTICIPANTS' CONSENT FORM

Participant Consent Document

Dear Ms./Mr._____

We invite you to participate in the ***STARTA Trials-Adolescent (STA)***. This study is being conducted by Dr. Olumide ABIODUN of the Babcock University, Ilishan, Ogun State, Nigeria and Dr Babatunde LADI-AKINYEMI of APIN Public Health Initiatives.

Please read/listen to the reading of this document carefully. It provides important information to help you decide whether or not to participate in this research. Local staff members of STA are also available to give you more details. You should feel free to ask any questions or discuss any concerns. Your participation is completely voluntary. Even after deciding to participate, you may withdraw at any time. The care you receive in this health center will not change in any way if you choose not to participate.

General information about the *STA*

Why are we doing this study?
In order to get the best benefit from Anti-HIV drugs, it is required that people take the drugs as agreed with their health care provider. This is often not the case because people often forget to take the drugs. This study will tell how we might help people to remember to take the drugs as agreed with the provider.

Who will participate in this research?
We are recruiting 230 young people between the ages of 15 and 19 years who are currently on treatment for HIV and have personal mobile phones. They will be divided into two groups to test two different methods of helping people to take their Anti-HIV drugs as agreed with their doctors.

What does my participation involve?
The study will take place on six of your routine consecutive visits over a six month period. On each visit, you will be required to answer some questions. The interview on the first visit should last between 40 and 45 minutes, while the subsequent interviews will last no more than 20 minutes. During the first, third, and fifth visits, your blood samples will be taken for blood assessments. This will include the tests you routinely take and will not attract any extra cost or inconvenience. At the first visit, you will be required to choose methods which you find most acceptable which will be used to help you to take your drugs and to attend your clinic visits. Subsequently, you will receive routine short messages (SMS) on your mobile phones depending on the group to which you are assigned. Apart from the usual cost of maintaining your mobile phone, this will not attract any cost on your part. You will be required to respond to the SMS which you receive as appropriate. A study staff will educate you on what responses you are required to give. You will be enrolled into a "whatsapp" group where you can ask questions and give your opinion about the services at the clinics. An expert will advise and address your concerns on the forum. You will be trained on how to mental a healthy mental health. The cost of responding to the SMS and data subscription will be borne by the study.

What will you do with my responses and blood samples?
Your responses will be used for research purposes only while the results of the analysis of your blood samples will be used for research and to improve your care. The CD4 and viral load assessment results will be made available to you through your health care provider. Your data and sample may be shared with other researchers for further study purpose only. Your unique identifier will not be shared for any purpose whatsoever. All such all information got from you will remain confidential.

Where will my data and blood samples be stored?

Your blood samples will be processed at sites with machines for such tests within Nigeria. This is how it is routinely processed and as such there is no difference with what used to happen. Some of your blood sample, without any form of identification, will be kept in the biobank at the Babcock University for future testing with new methods discovered by science.

What if I decide not to participate in the study?
If you do not wish to participate in this study, no one will treat you differently. Declining will not cause you to lose any health benefits you may be receiving. Your doctor and the medical care you receive will not change. You can withdraw from the study at any time without giving any explanation. Withdrawing will not cause any problems for you. If you leave the study, you can request that your data not be used in future analyses and/or that your blood samples be destroyed. If you request, we will destroy any samples and data still controlled by the author and the biobank but we will not be able to destroy materials given to other researchers.

Is there any risk or inconvenience for those who participate in this study?
There is no additional risk from taking your blood samples beyond what you routinely experience. This procedure may cause minor bleeding which is expected to stop with minor pressure on the needle site. The interview will, however, take some time and may involve answering some very personal questions.

Will it cost me anything?
There is no additional cost to you for participating in this study.

What benefit do I get?
The results of your blood assessments will be provided to you through your health care giver to help improve your care. You will receive help in the form of adherence counseling, and/or messages (SMS) to help you take your medications as required.

Will I receive compensation for my participation in this study?
Yes, you will receive a total of 5000 Naira after each research visit to offset the cost of responding to the SMS, data subscription, mitigating inconvenience due to research and to help offset the cost of transportation to and from the trial site.

To whom should I direct any questions?
If you have additional questions or wish to withdraw your participation in the future, please the investigators, [redacted].

Declaration of consent:
I understand that my signature verifies that I have read this information. I agree to participate in the study. I acknowledge receiving a signed copy of this document.

Participant Signature: _____

Name (Print): _____ Date: _____

STA representative Name, Signature, and Date: _____
_____