

Socio-demographic Factors of HIV-Positive Adolescents on Second-line ART Regimen and their Influence on Adherence in Rural Western Kenya

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Abstract: Globally, HIV-related deaths declined by 30% between 2005 and 2012 among children and adults. However, those among adolescents living with HIV (ALHIV) rose by 50%. This has been influenced by late diagnosis and poor adherence to antiretroviral therapy (ART). Socio-demographic factors most often are beyond the control of ALHIV yet they may expose them to situations that influence adherence to ART. This study explored the relationship between gender, age, household background, institution of learning and orphanhood status and adherence among 15-19 year old ALHIV on second-line ART. Results showed that: female ALHIV were more adherent than male ALHIV irrespective of age; both day and boarding institutions of learning did not provide an enabling environment that supported adherence; age, ART status of primary caregiver and their relationship with ALHIV influenced adherence and finally double and maternal orphans exhibited poor adherence. Core was the interplay between these factors as discussed.

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I. INTRODUCTION

During the years 2005-2012, while the global number of AIDS related deaths fell by 30%, the corresponding number of deaths among adolescents increased by 50%¹. These deaths have been largely attributed to challenges faced in retaining adolescents in care and treatment programs, loss to follow-up and poor adherence². Understanding the reasons for poor adherence to ART among ALHIV is important in order to promote achievement of global targets of 90-90-90 for treatment by 2020 and eliminating AIDS as a public health threat by 2030². In addition, as countries move towards provision of ART to all persons with HIV irrespective of CD4 levels in line with WHO guidelines on ART³ and also inconformity with the WHO alert regarding rising levels of HIVDR in highly endemic zones [6], it is paramount to elucidate factors influencing poor adherence among ALHIV.

Just like in the developed world, associations have also been found between socio-demographic factors such as age and living conditions and ART adherence in some African settings. Studies conducted in Rwanda [8] and Uganda [9] has highlighted the impact of living situations such as boarding houses, foster care and orphanages, on ART adherence. Similarly, orphan hood has also been identified to pose an obstacle to ART adherence for PIAs who invariably depend on care givers for treatment²². However, the evidence of the contribution of specific socio-demographic factors to poor ART adherence is nascent especially in rural contexts. Similarly, there is a dearth of information on the socio-demographic factors of ALHIV on second-line ART associated with poor adherence that may have led to their failing first-line ART regimen.

According to Kenya HIV county profiles, 2016, there were 133, 447 adolescents aged 10-19 years living with HIV with Western Kenya accounting for 49, 668 [8]. Out of these, 102,754 (77%) had initiated ART. In the same year, 2791 died of AIDS-related complications [8]. In Siaya County, among 12,253 ALHIV aged 10-19 years, 190 died from AIDS-related illnesses in 2016 despite having initiated ART [8]. Deaths that occur even after initiating ART happen due to treatment failure associated with non-adherence [5]. This negates government efforts to provide free ARVs and has also been identified as the major trigger of HIVDR in patients on ART [4]. It has been shown that adolescents and young people (15-24 years) suffer the lowest retention to treatment rates once ART has been initiated at 67% against 81% for adults [5]. The situation is complicated further with the resurgence of new infections and the current rise of levels of HIVDR in the country¹. However, it is not yet clearly known what causes adolescent non-adherence to ART. Adolescence is a period of vulnerability for biological, developmental and behavioral reasons [7]. ALHIV have the additional responsibility of a chronic disease that requires life-long daily commitment⁷. In Kenya, published data on

population based levels of and predictors of adherence for ALHIV have only looked at age, gender and level of education [5]. Consequently, there is a dearth of information on the relationship between other socio-demographic factors such as orphanhood status, living conditions, household composition and the relationship (biological or social) with primary caregiver on adherence to ART among ALHIV on second-line ART. However, because poor adherence may lead to virological failure and subsequent HIVDR, it is important to elucidate factors necessitating persistent sub-optimal adherence among ALHIV. As part of a larger study, the researcher sought to establish the relationship between socio-demographic factors of ALHIV on second-line ART and adherence as they had little control over such factors yet they already had reduced therapeutic options and also due to the fact that third-line regimen was expensive and not readily available in this context.

II. RESEARCH METHODOLOGY

Study Area and Population

This research was conducted in Gem sub-County, Siaya County which has been categorized as one of the highly endemic zones in Kenya¹⁹. The sub-County consists of six wards and 29 public and 2 private PSCs accredited by the Ministry of Health (MOH) to offer antiretroviral therapy (ART) services to people living with HIV (PLHIV). It is a rural area occupied by the Luo ethnic community. The level of economic development is low with subsistence farming, livestock keeping and small-scale trading as the major economic activities. The study targeted both male (19) and female (18) ALHIV on second-line ART aged 15-19 years. The study also engaged 13 key informants (6 adherence counselors, 6 peer educators and adherence and retention officer from CHS in Siaya County). The unit of analysis was ALHIV on second-line ART.

Research Design

This study used quick ethnography which allowed the researcher to interview the same people again and again. It enabled the researcher to use both quantitative and qualitative methods to collect data from the same respondents at different points in time for a period of one year (November 2017 to December 2018) to answer the research objectives.

Sample Size and Sampling Procedure

Our study used multi-stage sampling procedure to arrive at 6 PSCs for the study. **Stage 1:** Categorized 29 public PSCs according to six administrative wards that constituted the sub County. **Stage 2:** Using simple random sampling, picked one PSC from each category in stage one. **Stage 3:** Aggregate the number of ALHIV on Second-line ART aged 15-19 years enrolled in the sampled PSCs. This formed the sample size. Our study engaged all 37 ALHIV on second-line ART who were enrolled in the 6 sampled PSCs.

Methods

Our study administered a semi-structured questionnaire to gather socio-demographic characteristics of 37 ALHIV on second-line ART. After gaining rapport, the study identified 10 (7 male and 3 female) ALHIV on second-line ART which the researcher subsequently engaged in IDIs. It is in order to note that the study took place between November 2017 and December 2018. The researcher visited each IDI participant four times in the course of this period with each session lasting two hours. We also engaged 12 caregivers (10 female and 2 male) in IDIs. The IDIs were audio recorded. The study also conducted 3 FGDs with 8 male and 8 female ALHIV on second-line ART as well as 8 (7 female and 1 male) caregivers of ALHIV on second-line ART. To facilitate the FGDs, two key informants arranged room within one PSC that acted as the venue. The researcher moderated the discussions with a research assistant taking fair notes. The discussions were also audio recorded with each FGD lasting for two hours.

Data analysis

Quantitative data from the questionnaires were coded and analyzed using SPSS to generate frequencies and percentages. Afterwards, cross-tabulations were done to expose the relationships between socio-demographic factors and adherence to ART among ALHIV. Findings were presented in tables. For qualitative data, the researcher listened to and transcribed the audio tapes and read the transcripts over and over again to familiarize herself with the data collected. Content analysis was employed to elicit patterns and themes which were used to establish explanations and deductions. Findings were presented in the form of reports and verbatim quotations.

Ethical considerations

The study sort for a research permit from Maseno University Ethics and Review Committee, and permission from Centre for Health Solutions (CHS) as it has a supervisory role over all the public PSCs in Gem Sub-County.

III. RESULTS

Our study considered five socio-demographic factors of ALHIV on second-line ART and their influence on adherence to ART. These included gender, age, institution of learning, household background and orphanhood status. Findings for each factor are presented as separate sub-headings.

Gender of ALHIV on Second-line ART and its Influence on Adherence to ART

In this study, adherence levels, good/poor, were based on self-reports from ALHIV on second-line ART, who were study participants. These were also validated by adherence counselor, in every sampled PSC, using viral load (VL) test reports of ALHIV on second-line ART done at a six-month interval. Good adherence in this study referred to ALHIV who had suppressed VL of less than 400 copies with the lowest reported being 37 copies whereas poor adherence referred to unsuppressed VL of more than 1000 copies with the highest reported being 112,000 copies.

Table 1 Relationship between Gender and Adherence to ART

Gender	Good Adherence	Poor Adherence	Total
Female	12	6	18
Male	9	10	19
Total	21	16	37

Evidence from Table 1 showed that female ALHIV on second-line ART had better adherence than their male counterparts. One 19 year old male ALHIV who was working as a sales man in a nearby town reported that he had a problem taking his drugs because he did not want his roommates to know he was on ARVs. Another 16 year old male ALHIV also reported that he sometimes avoided taking his drugs in the evening because they made him nauseated and vomited, especially when he had eaten his evening meal. He narrated:

I feel bad, especially the evening one. When I take after food, I feel bad and vomit and so I waste food. Infact, the day my mother cooks something nice, like fish, I avoid taking drugs so as not to vomit the good food I have enjoyed eating. There are times I have taken drugs before eating but this feeling did not go away (16 year old male ALHIV during IDI).

The study also found instances where the ALHIV claimed they were engaged in various activities that took away their time and thus they ended up forgetting to adhere to drug timings. Delay in taking ones ARVs was a major reason given by ALHIV who exhibited poor adherence. For instance, a 18 year old male ALHIV narrated during an IDI that:

At six o'clock in the evening, am still expected to go and bring back cows; when I come back, I keep chicken then I go to watch TV a little before joining my sister to prepare the table for us to eat. By this time, it is already eight o'clock in the night. We then do homework and go to sleep at around ten, this is when I am reminded to take drugs. You see, six o'clock when I should take my drugs has already passed, but for morning time, I do not delay (18 year old male ALHIV during IDI).

The major reason indicated by female ALHIV who exhibited poor adherence was forgetting to ingest drugs due to lack of a reminder tool and tiredness. One 15 year old female ALHIV narrated during an IDI that she got tired and most of the times fell asleep while waiting for nine o'clock to take drugs. Sometimes, she said, *I only wake up in the morning to realize I had slept without taking the drug.* Yet other female ALHIV who showed poor adherence reported during an FGD that they were expected to take drugs at six o'clock in the morning, time which they considered too early and most often they overslept.

Age of ALHIV on Second-line ART and its Influence on Adherence to ART

Table 2 Relationship between Age and Adherence to ART

Age of ALHIV	Good Adherence	Poor Adherence	Total
15	8	11	19
16	2	1	3
17	7	7	7
18	1	2	3
19	3	2	5
Total	21	16	37

From Table 2, ALHIV who exhibited good adherence were those aged 17 years while those who showed poor adherence were those aged 15 years (out of 19, only 8 had good adherence). Having a biological parent as the primary caregiver, especially the mother, was a key factor influencing good adherence. On the other hand, the most mentioned reason for poor adherence by ALHIV 15 year olds was delay in taking drugs due to

forgetfulness. On further probing, the researcher found out that lack of a reliable reminder tool and over-reliance on caregivers had contributed to the delay in keeping prescribed drug timings by ALHIV. One male 15 year old ALHIV reported that he was supposed to take his drugs at six o'clock in the evening, but most times it founds him playing with his friends and so forgot. When the researcher inquired whether he had a reminder tool, he responded that his mother reminded him though at that time, she would still be in the market. Upon inquiry from key informants on reasons that influenced this poor adherence among younger ALHIV on second-line ART, the study found out that most of the 15 year old ALHIV on second-line ART were PIAs that had been on medication for a long period of time and the cumulative effects of delayed timing for drugs had caught up with them. In addition, delayed disclosure of HIV and ART status by caregivers was also reported. While conducting KIIs, having a boy/girlfriend was also mentioned as one of the reasons for poor adherence witnessed in this age group. On the contrary, ALHIV did not consider having a boy/girlfriend as influencing their adherence (a factor explored in-depth in a different paper).

Institution of Learning of ALHIV on Second-line ART and its Influence on Adherence

The study sought to find out the type of institution of learning that ALHIV on second line ART attended to elucidate the influence of institutional context on adherence to ART. This quest was guided by the fact that adolescents aged 15-19 years, ideally, were still spending more time in schools and also encountered peers and others who were not part of their households. How ALHIV on ART navigated their adherence activities in such contexts was of concern to this study.

Table 3 Relationship between Institution of Learning and Adherence to ART

Institution of Learning	Good Adherence	Poor Adherence	Total
Primary School	10	8	18
Boarding Secondary School	4	3	7
Day Secondary School	5	2	7
Not in any Institution	3		3
Polytechnic		2	2
Total	22	15	37

Proportionately, evidence presented shows that day institutions (primary, day secondary and polytechnic) had good adherence with slightly less than half (12 out of 27) exhibiting poor adherence. The main reason reported for good adherence was familial support in the form of being reminded to take drugs. Only 3 out of 7 in boarding institutions had challenges with their adherence. It is in order to note however, that ALHIV on second-line ART in day institutions were more in the study sample as compared to those in boarding institutions. This may have skewed the results presented. However, it is evident from the foregoing that proportionately, ALHIV on second-line ART in day institutions of learning also experienced challenges with their adherence. Therefore, the researcher deemed it necessary to explore the circumstances faced by ALHIV in both institutions of learning in order to grasp whatever factors hindered and promoted adherence in day and boarding institutions of learning respectively.

Evidence from Table 3 showed poor adherence among 12 ALHIV on second-line ART who were in schools during the day and went back home in the evening and over the week-ends. It was assumed that caregiver watch still continued at home where the 12 ALHIV resided. However, according to a caregiver during in-depth interviewing, the time schedules especially for those in day secondary schools hindered prompt adherence to drug timings. For instance, some ALHIV on second-line ART were required to take drugs at 6.00 in the morning and 6.00 in the evening while others at 7.00 in the morning and 7.00 in the evening. Those ALHIV on second-line ART with such drug timings tended to miss adhering to time as they had left for school by 7 o'clock in the morning and may not have returned back home by 7.00 o'clock in the evening. This had prompted some caregivers to encourage the ALHIV on second-line ART to carry the drug to school to ingest at the required time. However, there was no way of ensuring that the ALHIV on second-line ART actually ingested the drug. On the other hand, some caregivers did not share such concerns with the healthcare providers but just went ahead to re-schedule the drug timings for their ALHIV on second-line ART while other caregivers did not bother in any way. Therefore, ALHIV on second-line ART affected by such time schedules ended up not adhering to drug timings. This was a key concern to health care providers as mentioned by a key informant:

Some caregivers do not come for meetings whenever we call them and as such do not know that the second-line ART is not as 'friendly' to poor drug timing as the previous first line ART that there ALHIV used to take. This is one of the reasons why we are still seeing unsuppressed VLs among them (IDI with KI-adherence counselor).

On the other hand, some caregivers went to school and informed the head teachers on the ART status of their ALHIV on second-line ART in a bid to acquire support in ensuring that ALHIV took their medication on time even while at school. However, in one such instance, what was meant to rally support turned into stigma and rejection leaving the caregiver in a dilemma. During an IDI, one caregiver reported that:

When my nephew was in primary school, I explained to his teacher that he could not attend morning preps because he had to take his drugs at seven o'clock. But when he joined secondary school, he started carrying drugs to school. After a while, he became sickly and this is when I went to his school because I realized he was not taking drugs. The deputy head teacher I saw told me to take his drugs to school so that they could be giving him so he was called and explained to but when he came back from school that day he asked me why I had gone to school and told everyone that he is taking ARVs, was it because he was not my son? He refused and said his drugs should not be taken to school (IDI with a social caregiver).

Other ALHIV in boarding secondary schools and orphanages during in-depth interviews reported that their drugs are kept in the sanatorium at school and by the social worker respectively. In the case of the ALHIV in boarding school, however, the nurse-in-charge left school at 6 o'clock in the evening yet he is supposed to take his ARVs at 10 o'clock in the night. He therefore, picked his drugs at six o'clock before the nurse-in-charge left, kept in his pocket as he waited for ten o'clock to ingest before going to bed. Sometimes, he said, '*I forget the drug in my pocket as I change to night wears and only see it tomorrow when I put on my uniforms.*'

The two female ALHIV in orphanages had very diverse accounts on drug adherence activities. One had been in the orphanage since she was in class four, when she became orphaned and by the time of conducting this research she had sat her Kenya Certificate of Primary Education (K.C.P.E). The social worker and mother care employees ensured she took her medication. However, they are now worried as she joins boarding school on who will take over the responsibility from them as the ALHIV on second-line ART is used to being reminded by the social worker. On the contrary, the other female ALHIV on second-line ART living in another orphanage had difficulties in maintaining drug adherence activities as a result of delayed status disclosure despite an enabling environment created by the orphanage. During an IDI, she narrated:

One day I was walking with my boyfriend along the path. A woman neighbour passed by and looked at us badly. I wondered why, then she shouted at me; look you girl, do not transfer death to people. I wondered what she meant and ran back home to my grandmother. I told her what that woman said to me, that is when my grandmother told me that the drugs she gives me every day are not to stop me from coughing, but they are ARVs (IDI with female ALHIV).

When the researcher asked her how old she was when this incident occurred, she said she was 14 years old. At the time of conducting this interview, this ALHIV on second-line ART was 17 years old and had been perinatally infected, stayed with her grandmother from when she was little as a result of being orphaned and was rescued by the orphanage when she attempted suicide. Doing follow-up at the PSC where she picks her medication, the KI informed the researcher that the ALHIV on second-line ART has had persistent poor adherence and she was still showing signs of failing the second-line ART regimen as well. The ALHIV on second-line ART had also attempted suicide previously. On probing on what could be the cause of this sustained poor adherence, the key informant narrated:

The problem began when she knew her status, the parents died while she was young and was taken over by her grandmother. However, her status was not disclosed to her until one time a neighbor saw her standing with another boy and shouted at her not to transfer death to the boy. When she went back to her grandmother to inquire what that neighbor meant, she was told that she has HIV. Since then, she rebelled and tried to commit suicide. This is when we intervened and sort for her a place at the orphanage where she now resides. However, even after much counseling, the ALHIV has refused to accept her HIV status. She still refuses to take her medication as prescribed (KII- peer educator).

It was evident that this ALHIV on second-line ART had problems adhering to her medication. She had rashes on her face, hands and legs, probably on other parts of the body too and also had a bad cough. The key informant explained that these were opportunistic infections resulting from high VL. The key informant was worried that this ALHIV on second-line ART may be in danger as she was already failing second-line ART and third-line ART was not readily available.

Household Background of ALHIV on Second-line ART

The study sought to find out whom the ALHIV was living with and what was the relationship between the ALHIV and the homestead within which the ALHIV resided. This was guided by the fact that as much as the healthcare provider has a role to play, for example ensuring ARV supply, adherence counseling, and place of residence played a pivotal role when it came to adherence and compliance with the prescriptions from the PSC.

Table 4 Relationship between Orphanhood Status, Primary Caregiver and Adherence to ART

Orphanhood Status	Good Adherence	Poor Adherence	Total
Double Orphan	11	9	20
Aunty	2		2
Grandmother	5	9	14
Husband	1		1
Orphanage	1	1	2
Well-wisher	1		1
Maternal Orphan	2	3	5
Father/Step-mother		2	2
Grandmother	1		1
Grandmother/Father	1	1	2
Non-Orphan	6	2	8
Both Parents	6	2	8
Paternal Orphan	3	1	4
Mother	3	1	4
Total	22	15	37

Table 4 shows (evidence supported by direct observations) that 16 ALHIV on second-line ART living with younger caregivers, either biological (parents) or social (aunty, orphanage employees) exhibited good adherence as compared to only 6 ALHIV living with older caregivers (grandmother). Similarly, orphanhood and age of primary caregiver as socio-demographic factors influencing poor adherence among ALHIV on second-line ART was also evident. Paternal orphans presented slightly better adherence than maternal orphans. However, it is important to point out that even among ALHIV on second-line ART who exhibited ‘good’ adherence; this level was not satisfactory according to the study key informants because after six months of optimal adherence to ART, VL levels should be undetectable, a measure that had not been achieved by even those that could be categorized as having good adherence.

During Operation Triple Zero (OTZ) campaign session, one particular PSC in-charge asserted that only 2 ALHIV on ART in that session had good VL test results that showed good adherence. The rest, including ALHIV on second-line ART had VL test results that were not encouraging, meaning their adherence was poor. Considering this report and relating it to a higher number (29) of ALHIV on second-line ART were orphaned, it was self-evident that orphanhood status influenced adherence among ALHIV on second-line ART. However, the study found out that those ALHIV who were maternal orphans did not live with their father, but were transferred to their grandmothers, probably due to social and cultural concerns related to parental responsibilities, and so were affected by the challenges facing grandmothers as caregivers. Similarly, other widowers also remarried and transferred the responsibility of care and support of the ALHIV on second-line ART to step-mothers which had its own unique set of challenges. On the contrary, paternal orphans were residing with their mothers, and this accorded them a better chance at ART adherence related activities since their caregivers were biological and relatively younger. The role played by an ALHIV’s social setting, also emphasized by SEP, could not be overlooked as it either promoted or hindered adherence activities among ALHIV on second-line ART. As indicated earlier 26 orphaned ALHIV on second-line ART lived with their grandmothers. Out of 15 ALHIV that had poor adherence, 12 were orphans living with their grandmothers. Consequently, these ALHIV were affected by challenges facing older caregivers, especially, grandmothers.

There were, however, other older caregivers who understood the risk of poor adherence especially once ALHIV had been shifted to second-line ART. During caregiver FGD, one female caregiver who was the grandmother of an orphaned male ALHIV narrated how she ensured that her sister’s grandchild took his drugs on time. She narrated that:

He used to throw away drugs behind the clothes’ basket, I think because he had not been told why he was taking drugs every day. However, when sister called me that he was not good and was moving to another drug, I had to do something. This is when we told him why he was on drugs and even though he cried, there was nothing that could be done. Since then, I ensure that I give him his drugs even if it means following him up to the field where he is playing carrying water and drug, I do, to ensure he takes his drugs (FGD with caregivers).

Similarly, it is within the household that HIV status disclosure is done (ideally) either directly or indirectly by the primary caregiver. According to a key informant, non-disclosure or partial disclosure had an influence on how ALHIV responded to the life-long drug regimen. One female caregiver of a male ALHIV on second-line ART reported during a KII that she did not disclose to the ALHIV when it was discovered that he had HIV and was put on medication. She reiterated that even the younger brother whom she engaged to remind the ALHIV time for drugs did not know what those drugs were for. However, she had to disclose when the ALHIV failed the first-line due to poor adherence as it was discovered that sometimes he overpowered the

younger brother and never took his drugs. The adherence counselor in the PSC where this particular ALHIV on second-line ART was enrolled reported getting concerned because this ALHIV had failed first-line only after a period of two years (began in 2015 and was shifted to second-line in 2017). Furthermore, this concern was also orchestrated by the fact that he was still young and if nothing was done, he was going to fail the second-line ART too. The KI explained that second-line ART required higher levels of adherence as compared to first-line ART and it was only one drug unlike first-line where one could always get other combinations. Lastly, the KI reiterated:

Third-line as much as it was said to be there, literally, it was not. In fact in the whole of Gem sub-County, it was only in Wagai PSC that there was one ALHIV on third-line and there is another ALHIV who has failed second-line, and for seven months running, is still waiting for third-line ARV from Nairobi (KII-adherence counselor).

In addition, our study also found out that presence of other family members on ART promoted adherence activities. During an in-depth interview, one female caregiver reported requesting the doctor if their time for taking medication, her and her female ALHIV on second-line ART, could be synchronized to enable her support the ALHIV well. However, this did not happen but she still reported that because she was also on ARVs it was easier to ensure that her ALHIV actually took her drugs, this was because every time she took hers out, she called the ALHIV to also remove hers and place it on the table until it was time to take. The study also found out that in instances however, where the caregiver was also on ART but lived in denial or partial acceptance, it influenced how the ALHIV on second-line ART under such a caregiver related with ART. For instance, if ALHIV is told to hide and ensure nobody saw them taking drugs while at school, it became difficult to adhere especially to drug timing as the ALHIV had to monitor and control situations in order to ensure that no one saw them. It follows therefore, that in cases where this was not achieved, then the ALHIV delayed or missed taking drugs altogether. Consequently, caregiver ART status had either positive or negative influence depending on caregiver's attitude and acceptance of their status.

IV. DISCUSSION

This study has shown good adherence among older female ALHIV as compared to older male and younger ALHIV who exhibited poor adherence. It was also reported during KIIs (5 adherence counselors and 3 peer educators) that female ALHIV were more interested in ART related knowledge and rarely missed clinic appointments as compared to male ALHIV. The researcher also noted a gender imbalance among the health care providers in the sampled PSCs. All the adherence counselors were female and only 2 out of 6 peer educators were male. This could have influenced the interest reported among female ALHIV. Yet another probable reason for this would be that in Luo communities, there was more attention on adolescent girls as compared to adolescent boys especially in the quest to avoid pregnancies that led to children born out of wedlock¹¹. In this study, caregivers of female ALHIV were more engaged in their whereabouts including matters related to ART when compared to those of male ALHIV. However, previous studies on whether gender influenced adherence among ALHIV on ART are inconclusive and gaps exist. For instance, a previous systemic review of the literature [14] found that there is an association between gender and non-adherence to ART among adolescents. Similarly, another observational study among various age groups in Uganda reported that males on ART had higher mortality [15]. On the contrary, other studies found that female gender was associated with marginally significant increase in non-adherence [16] whereas some found an inconsistent association between gender and non-adherence [17]. This study posits that a reliance on gender solely without any consideration of other confounding socio-demographic and cultural factors is untenable. Therefore, just as Social Ecological Perspective (SEP) [18] theorizes, there is an intertwined relationship between an individual and their environment. Moreover, the health status of individuals is influenced not only by environmental factors but also by a variety of personal attributes, for example, genetic heritage, psychological dispositions and behavioral patterns. Consequently, rather than focusing on individuals or aggregates, SEP incorporates multiple levels of analysis for assessing the healthfulness of settings and well-being of individuals. This study therefore considered gender alongside other factors such as age and still reported good adherence among females of various ages as compared to males. It can thus conclusively report that gender influences adherence.

This study has reported poor adherence among both male and female younger ALHIV aged 15 and 16 years as compared to older female ALHIV aged 17-19 years. However, older male ALHIV aged 18 and 19 years also exhibited poor adherence. This is contrary to most studies that have explored age as a socio-demographic factor influencing adherence among ALHIV on ART which have reported poorer adherence only among younger ALHIV on ART without giving reasons for the same [12-13]. This study reported specific reasons for the witnessed poor adherence among younger ALHIV on ART. These included non-disclosure of HIV status, also noted by previous studies which stated that non-disclosure may lead to adolescents hiding their medication and avoiding getting pill refills¹¹ while in some instances, the adolescent's HIV status was kept hidden from s/he even after initiating ART and s/he did not exactly know what the medication was for as disclosure was directly

related to perceived and experienced stigma¹³. In addition, inadequate support from caregivers was also reported as contributing to poor adherence among younger ALHIV. Contrary to other studies¹⁰⁻¹², evidence also showed older male ALHIV on second-line ART aged 18 and 19 having poor adherence as compared to their female age mates. Evidence from this study also noted onset of adolescence, especially initiating relationships with the opposite sex as contributing to poor adherence, specifically among 15 and 16 year olds. Having a boy/girlfriend was reported as influencing poor adherence among ALHIV on second-line ART. This concurs with the findings of a study which reported having a boy/girlfriend as one of the socio-demographic factors influencing poor adherence among ALHIV on ART [7]. However, ALHIV reiterated that they hid their medication and sometimes missed taking because they did not want their friends and classmates to know they were taking ARVs. According to ALHIV it was not only their boy/girlfriends but everyone they did not desire to disclose their ART status to. This implied therefore, that age alone was not a sufficient variable to rely on when determining socio-demographic factors influencing adherence among ALHIV on ART. A combination of factors would produce more reliable predictions in this case.

More often than not, ALHIV on ART between the ages of 15-19 are in institutions of learning and examining how school schedules interacted with drug schedules together promote or inhibit adherence was necessary. Although previous studies have only concentrated on boarding and orphanage facilities as exhibiting a lack of privacy that made it difficult for ALHIV to maintain medication use^{11,12} our study revealed that even those who were day scholars in institutions of learning also faced similar challenges related to privacy and medication use, especially with drug timings. Our study noted that some boarding institutions of learning provided a mechanism in which ARVs were stored in a central place, either in the sanatorium or the Principal's office and later dispensed to the respective ALHIV on ART, similar to a previous study [11]. However, this had its own set of challenges, especially relating to work and drug timings. For example, the health professional in one scenario had to leave work before it was time for the study respondent to take his drugs. The ARVs were thus dispensed earlier than required and it was the responsibility of the ALHIV to keep and ingest later at the prescribed time. Consequently, the fact that the drugs were kept at the sanatorium and a qualified health professional gave/dispensed it did not necessarily imply promotion of adherence activities since no one confirmed whether the drug that was dispensed, let's say, at 6 o'clock in the evening was actually ingested at 10 o'clock in the night as prescribed as ALHIV would not desire unwanted disclosure and may avoid taking the drug where fellow schoolmates were, as it is in dormitories of boarding schools. This finding concurs with a study which reported that adolescents went to great lengths to avoid acts that could arouse suspicion about their status, for example by avoiding the use of noisy pill bottles, by not taking medications in the presence of their peers or frequenting the school clinic and by not associating with known HIV positive peers [19]. A closer look at previous research that has reported lack of privacy in orphanages and boarding facilities [11, 12] reveals our study's point of departure, with previous research concentrating on delayed drug timing due to lack of privacy and not with the time itself. That is to say, researches have only reported that ALHIV fear or rather delay in taking their drugs because they fear stigma that would result from being seen by others to be using ARVs. However, our study went ahead and interrogated the drug time itself as prescribed by the healthcare providers. The researcher posits here that health care providers may need to consider certain circumstances which the ALHIV on second-line ART found themselves, such as time schedules of various activities in schools and review the time for taking the drugs accordingly. This would go a long way in supporting adherence activities among ALHIV on second-line ART as it would synchronise more appropriate dose-timing with realistic daily activities both in homes and institutions of learning.

In relation to household background, this study observed that changing primary caregivers orchestrated by loss of ALHIV on ART's biological caregivers impacted negatively on adherence. This was a big concern, and was in line with studies that have assessed influence caused by change of caregivers on ART poor adherence witnessed among ALHIV on ART and highlighted frequent changes of primary caregivers particularly among PIAs as one of the events reflecting household instabilities contributing to poor adherence¹⁰. Looking at the aforementioned and comparing with what studies present concerning caregiver withdrawal and its influence on adherence among ALHIV, it is in order to note that personal resilience and acceptance of one's status also played a key role on adherence levels of ALHIV irrespective of their living situations. According to SEP²⁰, the microsystem represents the complex relationship between the individual and the environment in the immediate setting. It encompasses characteristics that influence behavior, for instance, knowledge, attitudes, skills and beliefs. Few studies have looked into the role played by personal resilience and the desire to live a healthy and normal life in promoting adherence among ALHIV in rural areas. Finally, the researcher observed that a combination of factors account for poor adherence among ALHIV on ART and thus identifying one socio-demographic factor as influencing poor adherence would be erroneous. This was also in line with SEP [18, 20] which recognizes the intertwined relationship between an individual and their environment.

In addition, this study also looked into the role played by orphanhood status on adherence to ART among ALHIV on second-line ART. It is indeed one of the few studies that have examined different

orphanhood statuses and their influence on ART adherence. In most adherence related studies, orphan status was classified as ‘orphan’ or ‘non-orphan’^{21,22}. Our study noted that maternal orphans had poorer adherence as compared to paternal orphans. Few studies have reported that caregiver support on a child may be different between maternal orphans and paternal orphans due to the difference in each parent’s relationship with the child following their social and cultural setting²³. However, double orphans were the worst hit in terms of poor adherence as they were more likely to be under the care of older, poor and less knowledgeable caregivers, in this case, grandmothers. Our study finding concurs with most studies that have reported that in communities affected by HIV and AIDS, elderly people were the primary caretakers of the large number of orphaned children [24-26]. Similarly, grandparents undertaking care roles are incapacitated from many fronts – lack of food and income, shock and trauma suffered after the death of their children and poor health [26].

Finally, our study also looked into the relationship between caregiver ART status and adherence of ALHIV on ART under their care. We observed that caregivers who were also on ART, irrespective of being social or biological, and had disclosed their ART status to others outside the family were more open to discussing adherence related matters with ALHIV on ART and thus exhibited good adherence. Caregivers who were still in denial and had kept their ART status a secret even from close family members influenced ALHIV on ART under their care negatively, thus portrayed poor adherence. Our finding was contrary to studies which reported that if the caregiver was also HIV infected, it would result in negative impacts on adherence of the ALHIV based on the fact that s/he was likely to struggle with his/her own illness, psychosocial issues and more so financial burden²⁷. On the other hand, HIV infected caregivers played the role of treatment partners and provided the much needed support, a finding also presented by other previous studies³⁰. Consequently, self-perceived family support and/or the knowledge of the ART status were considered important predictors of adherence [30]. Furthermore, our study using SEP’s emphasis on the mesosystem presented an understanding of how familial relationships influenced adherence to ART among ALHIV on second-line ART. It was recognized that the way individuals’ construed adherence did not only include “how to adhere” as guided by the prescriptions from the health care provider and ‘why to adhere’ based on individual aspects but also the opinions of significant others which influenced the willingness and ability to adhere.

Most studies on adherence among ALHIV on ART have tended to concentrate on PIAs probably because PIAs have been on the HIV scene for a longer period of time. Similarly it was difficult to find studies that actually differentiated between PIAs adherence and that of BIAs[29-33]. Furthermore, most research review urban settings and miss out on rural settings. . Similarly, most studies on ALHIV on ART did not differentiate the ART line [31-36] and it was important to note that once an ALHIV had been shifted to second-line ART, there was need for more rigorous follow-up on adherence-related activities due to reduced therapeutic options.

This study was limited by the fact that it only focused on ALHIV on second-line ART because they already had reduced therapeutic options and excluded those on first-line ART. However, results could still apply to ALHIV on first-line to act as pointers of areas that would lead to poor adherence hence necessitating shift to second-line ART. Our study, just as other stakeholders recognizes that ALHIV should be maintained on first-line regimen for as long as possible. Secondly, methodologically, it considered a small sample size that may hinder generalization to larger sub-populations; however its main aim was to provide an in-depth understanding of the subjects under study.

V. CONCLUSION

Adherence to ART is important in order to accrue maximum benefits from ARVS in the management of HIV among ALHIV. Our study has demonstrated that adherence to ART among ALHIV was influenced by various socio-demographic factors, including age, gender, institution of learning, household background, specifically relationship with primary caregiver and orphanhood status. Consequently, to improve ART adherence among this age group, it was important to consider the interplay between various socio-demographic factors as our study has indicated.

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