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Evaluation of the factors that affect adherence to Anti-Retroviral Therapy in HIV-Positive Clients at Comboni Hospital Kyamuhunga Bushenyi Uganda

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ABSTRACT

HIV is a global public health issue. In 2015 an estimated 36.7 million people were living with HIV including 1.8 million children. The majority of this number lives in low and middle-income countries. In the same year, 1.1 million people died of AIDS-related illnesses. Antiretroviral therapy (ART) has been shown to delay the progression of AIDS, resulting in a greater and more sustained virologic and immunologic response and improve survival. The study was a descriptive cross-sectional study, involving HIV patients on ART attending Comboni Hospital Kyamuhunga from 12st to 30th June 2017. The study aimed at understanding factors associated with poor adherence to ART among HIV-positive patients attending Comboni Hospital Kyamuhunga. Out of the 57 clients, 41(71.9%) had good adherence, and 16(28.10%) had poor adherence to Antiretroviral therapy. Forgetting accounted for (27)47% of the poor adherence, travel problems accounted for (14)25%, drug stock-outs (7)12%, and stigma, disclosure or privacy issues accounted for (9)16%. Despite results showing that most patients had good adherence, a significant number still had poor adherence to Antiretroviral therapy, the most common contributor to poor adherence being forgetting their doses and travel problems. There is a need to strengthen continuous monitoring of both adherence and correlating it with the clinical outcomes of the clients. This will create an interactive feedback mechanism that could lead to optimal clinical states and improved quality of life of clients.

Keywords: HIV/AIDS, Antiretroviral therapy, Stigma, Drug stock out, Poor adherence, Comboni Hospital.

INTRODUCTION

HIV continues to be a global public health issue [1-4]. In 2015, an estimated 36.7 million people were leaving with HIV including 1.8 million children. The majority of this number lives in low and middle-income countries. In the same year 1.1 million people died of AIDS-related illnesses [5]. Since the start of the epidemic, an estimated 78 million people have become infected and 35 million people have died of AIDS-related illnesses [5]. An estimation of 25.5 million people lives with HIV in sub-Saharan Africa. Majority of them about 19 million people live in east and southern Africa [5]. Sub-Saharan Africa contributes about 69%of the people with HIV globally with about 25 million people infected which is about 7% of the sub-Saharan African total population [6]. Antiretroviral therapy (ART) has been shown to delay the progression to AIDS, resulting in a greater and more sustained virologic and immunologic response [7] and improving survival [8]. In sub-Saharan Africa, there has been a dramatic increase in the number of HIV/AIDS patients on antiretroviral treatment from just 100,000 persons in 2003 to 3.9 million in 2009 involving close to 40% of those in need of the treatment. Two sub-Saharan African countries, Botswana and Rwanda, have achieved the universal access target (treatment coverage of 80% or more of patients in need) at the end of 2009, while

countries such as Ethiopia, Zambia, Namibia, and Senegal are moving closer to the same target having covered 50–80% of patients in need of treatment [9-11]. Adherence is defined as taking medications or interventions correctly according to prescription. There are different methods for assessing adherence and the level of adherence is specific not only to places and patient groups but also to the method of adherence measurement used. The best way to measure ART adherence includes direct methods such as biological markers and body fluid assays, or indirect methods such as self-report, interviews, pill counts, pharmacy records, computerized medication caps, and viral load monitoring [12-14]. While a combination of these methods may be employed, patient self-report is the most widely used [15] given its ease of implementation and use of already existing resources. Establishing and maintaining adherence to medication are difficult issues for individuals with any chronic illness. Anti-retroviral therapy (ART) for HIV disease is often highly demanding, requiring multiple medications, frequent dosing, and a prolonged course with significant adverse effects [16]. With the advent of anti-retroviral medication, anything less than near-perfect adherence to treatment schedules can result in diminishing efficacy of the drugs with subsequent development of drug-resistant viral strains [17, 18]. For ART to work effectively, adherence is very crucial. The recommended optimal adherence level for ART to be effective is above 95 percent. Any patient who misses more than 3 dosages in a month's treatment course is considered to have achieved suboptimal adherence which is less than 95% [19]. A level of adherence that is greater than 95% (optimal adherence) suppresses viral replication and prevents the development of resistance and treatment failure. The clinical efficacy of antiretroviral therapy (ART) in suppressing the HIV virus and improving survival rates for those living with HIV has been well-documented [20-25]. However, successful antiretroviral therapy is dependent on sustaining high levels of adherence (correct dosage, taken on time, and in the correct way—either with or without food). The minimum level of adherence required for antiretroviral drugs to work effectively is 95% [26]. Although more potent antiretroviral regimens can allow for effective viral suppression at moderate levels of adherence, no or partial adherence can lead to the development of drug-resistant strains of the virus [27]. Adherence to ART is influenced by factors associated with the patient, the disease, the therapy, and the relationship of the patient with the healthcare provider. Patient-related factors include socioeconomic status (SES) [28]. Mills *et al* [8] in a meta-analysis study found a combined continental adherence to ART of 64% with 55% adherence in North America and 77% in Africa. Twenty-four percent of non-adherence has been reported in Southwest Ethiopia [29], 22% in Cote d'Ivore [30] and 13% in Cameroon [31]. Byakika *et al* [32] reported 68% adherence to HIV treatment in Uganda, 54% in Nigeria [33] and 63% in South Africa [34].

Statement of Problem

In the treatment of patients with HIV infection, it is essential to achieve more than 95% adherence in order to suppress the viral replication and emergence of medication. So, sustaining proper adherence represents a significant challenge both for the ART Service Providers and their clients. Antiretroviral treatment success depends on sustainable high rates of adherence to the medication regimen of ART [8]. However, significant proportions of HIV-infected patients do not reach high levels of adherence and this can lead to devastating public health problems. Adherence to ART has been associated to diverse factors including patient-related factors, health conditions/diseases, the healthcare system and healthcare teams, therapy/treatment and Socioeconomic factors. The level of adherence in many health facilities in Uganda has generally been found to be below the recommended [32]. The levels of adherence in the western region however are not clear, and so are those for the Bushenyi district; however from random visits by RHITEs

Southwest, an organization that aims to strengthen HIV/AIDS response in southwestern Uganda and DHOs office, the challenge of non-adherence has been reported and does exists at all ART care sites and is well recognized as a challenge; of which ART clinic in Comboni is amongst the established ART sites; staff in the CHK have also reported non-adherence as a major challenge affecting ART treatment. And from the information above the problem of adherence is far-reaching, and is an issue of contention in ART provision sites of which CHK is no exception.

Justification of Study

Information from this study will provide a vivid picture of the level of adherence amongst clients attending CHK. It will also provide Data on factors that influence adherence to ART in clients attending CHK. Such information can be utilized by health providers and planners in establishing and improving adherence behavior amongst ART clients. The ultimate goal would thus be to improve the general quality of health and survival potential for HIV-positive clients.

Aim of study

To assess factors that affect adherence to antiretroviral therapy for HIV-positive patients at Comboni Hospital Kyamuhunga, Bushenyi, Uganda.

Specific objectives

- Determine the number of adherent ART Patients in CHK.
- Establish Factors that influence adherence to antiretroviral therapy in non-adherent clients.

Research questions

- ❖ What is the number of adherent ART patients in CHK?
- ❖ What Factors influence adherence to antiretroviral therapy in adherent clients?

METHODOLOGY

Study design

The study was a cross-sectional descriptive study design using both quantitative and qualitative methods. Data was collected from all clients who visited the ART clinics for refill. The clients were interviewed about their health beliefs, health system interaction, ARV therapy uptake and reasons for non-adherence.

Area of Study

The study was conducted in the ART clinics of CHK. It's located in the West part of Uganda about 324 KM away from Kampala, the capital city of Uganda [35]. The CHK ART clinic was established more than ten years ago, as part of the Public private- partnership programs. The clinic has three permanent staff and 4 support staff. Ever since its inception, the clinic has about 7000 clients enrolled on ART, and as per 31st Dec 2016 (HMIS 106a HIV Report) they also had about 107 mothers enrolled on art PMPT (2016). The clinic gets its clients from the neighbouring districts where they have outreach sites.

Study population

The study population were the clients attending ART Clinic services in CHK.

Study Period

The study was done for a period of Three months; APRIL 2017 to June 2017. The activities that took place during this period included obtaining all relevant permission, data collection and data analysis.

Sampling Procedures

A simple random sampling technique was employed during this study where every fifth person or file encountered was interviewed until we achieved a total population sample of 57 subjects.

Sample size determination

Sample size was calculated by the use of Fischer's et al 1990 formula

$$N=\frac{Z^2PQ}{D^2}$$

Where, N-desired sample size

Z-standard normal deviation taken as 1.96 at a confidential level of 95%

P-proportion of target population, estimated to have similar characteristics (where 50% is used if no measurable estimate or 0.5)

Q-is standardized =1.0 – P; where P is 0.5, Therefore, Q will be, 1.0-0.5=0.5 or 50%

D-degree of error =0.05 or 5%

Calculation:

My confidential level was, 79%

My degree of error was, 10%

On substitution; If 95% gives 1.96 (standard deviation)
79% gives (79×1.96) ÷95=1.63 thus my deviation
Degree of error 10/100=0.1
Thus N= (1.632×0.5×0.5) ÷0.1^2= 100 people.
However due to financial constraints and the short time available for the activity we used a sample size of 57 research participants.

Data collection

Data collection was done with the help from the clinic staff; who were useful in identifying and referring the potential eligible clients who have reported for clinic appointments. The researcher informed the clients about the study and sought their consent upon an understanding of the specifics of the study. Interviewer-administered questionnaires were used to collect data. The questionnaire consisted of structured and semi-structured questions to collect both quantitative and qualitative data. The interview included items on social demographic data, treatment and a section on factors that influence adherence. Patient files or Health passport books were also reviewed to confirm the patient report on treatment type, dosage and last date of visit. Other clinic records will be reviewed to abstract the number of pills given in the last to help calculate the number of missed doses during analysis.

Inclusion criteria

- Clients confirmed to be HIV Positive clients
- On ART Treatment for not less than 2 months excluding the initiation period
- Willing to provide Consent and information

Exclusion criteria

- Clients who have just started ART.
- Clients who are too young to provide information.

Data management and analysis

A Translator was used during the interviews. The questionnaire was pretested in Ishaka Adventist hospital. The completed self-administered questionnaires and signed consent forms were collected as soon as they were completed. The researcher checked for completeness and accuracy of the forms and put them in order of numbers to be entered into a database that will be created. Quantitative data will be analyzed manually using MS Excel. The key variables to be examined will be demographic, other characteristics of the patients and adherence factors.

Ethical considerations

This study was approved by the University of Research Ethics. A letter of introduction was delivered to DHO Bushenyi and the head of CHK and ART clinic. Confidentiality was maintained at all times and all collected data records used were kept for future reference or consultation.

RESULTS

This study targeted clients attending ART Clinic services in CHK. Clients were interviewed with the help of an expert client, before receiving their next refills. Pill counts were taken and clients were also requested to volunteer any other information relevant to this study. The interview included items on social demographic data, treatment, and a section on factors that influence adherence. Patient files or Health passport books were also reviewed to confirm the patient report on treatment type, dosage, and last date of visit.

Number of adherent ART clients in CHK

Out of the 57 clients, 41(71.9%) had good adherence, 16(28.10%) had a poor adherence to Anti-retroviral therapy as shown in pie chart below.

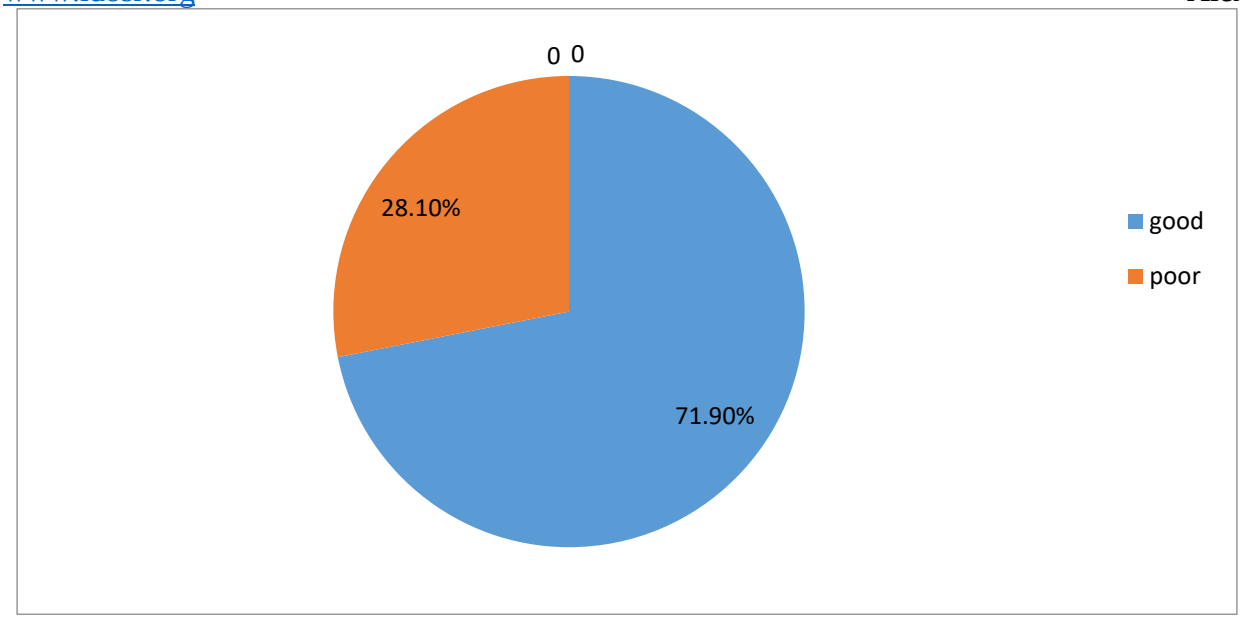

Figure 1: Classifies levels of adherence in ART clients in CHK.

Factors that influence adherence to anti-retroviral therapy

Forgetting accounted for (27)47% of the poor adherence, travel problems accounted for (14)25%, drug stock-outs (7)12% and stigma, disclosure or privacy issues accounted for (9)16%. As shown in the figures below.

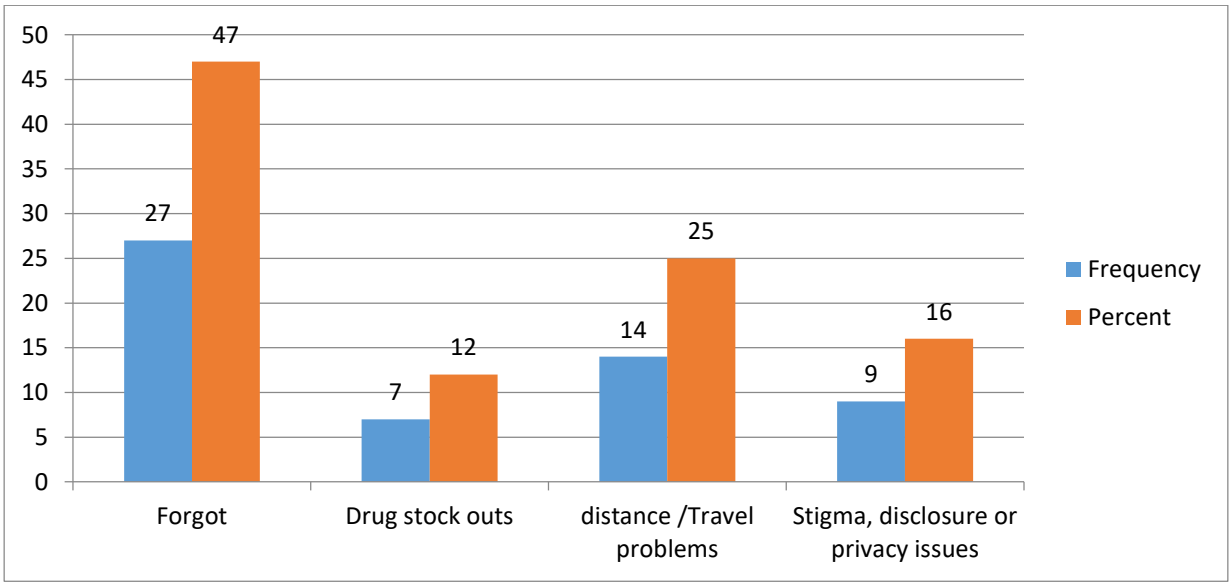

Figure 2; The Graph below shows reasons for poor adherence to anti-retroviral therapy.

Table 1: Factors that influence adherence to anti-retroviral therapy

	Frequency	Percent
Forgot	27	47
Drug stock outs	7	12
distance/Travel problems	14	25
Stigma, disclosure or privacy issues	9	16

DISCUSSION

Number of adherent ART patients at CHK

Despite showing that most 41(71.9%) had good adherence, others 16(28.1%) had either poor adherence to Antiretroviral therapy. These findings were slightly lower than findings as review by Vreeman and colleagues [15] that indicated that the majority of the studies in developing countries report adherence levels of more than 75% (range 45–100%), while in developed countries the majority report less than 75% (range 20–100%) [36]. These findings also are lower than those in another systematic review by Mills and colleagues obtained a pooled estimate of adequate adherence by sub-Saharan African patients of 77% (95% confidence interval, 68–85%; based on a total of 12,116 patients), whereas these findings agree with the figure for North American patients which indicated a 55% (95% confidence interval 49–62%; based on a total of 17,573 patients). The same study concluded that adherence is a concern in North America.

Factors that influence adherence to anti-retroviral therapy

Forgetting accounted for (27)47% and was the largest contributor to poor adherence, travel problems accounted for (14)25%, drug stock-outs (7)12.2% and stigma, disclosure or privacy issues accounted for (9)16%. These results agree with studies conducted in a similar African setting. However, these results slightly differ from findings in a study by Talam *et al.* [37], which cited reasons for missing the prescribed dosing time by the patients as being away from home 68.8%, being too busy 58.9%, forgetting 49.0%, having too many medicines to take 32.6% and stigma attached to ARVs 28.9%. This same study highlighted that on the basis of keeping clinic appointments, all the respondents claimed to adhere to scheduled clinics. However, from hospital records, it was established that only 93.5% of the respondents kept clinic appointments. The most common reasons for poor adherence to clinic appointments were; Being away from home (50%), forgetting (50%), being too busy (50%), stigma (70%), feeling sick (80%), and changes in work routine (60%). Drug stock irregularities were another contributor to poor adherence, just like in a WHO [11] report that identified Health system barriers that affect adherence, especially a regular and timely supply of medication to patients. The report highlighted an unreliable supply of medications could severely reduce patient adherence rates. This difference in findings could be attributed to the fact that the research setting is not similar all the way and that clients have alternative sources of ARVs and so don't have to travel very long journeys.

CONCLUSION

Despite results showing that most patients had good adherence, a significant number still had poor adherence to Antiretroviral therapy, the most common contributor to poor adherence being forgetting their doses and travel problems.

Recommendation

- There is a need to strengthen Continuous monitoring of both adherence and correlating it with clinical outcomes of the clients this will create an interactive feedback mechanism that could lead to optimal clinical states and improved quality of life of clients.
- There are need for conducting periodic research and development in the area of ART adherence in clients and patient behavior.
- Adherence support structures need strengthening and involve clients at a home-based / community level.

REFERENCES

[1]. Obeagu, E. I., Alum, E. U. and Obeagu, G. U. (2023). Factors Associated with Prevalence of HIV Among Youths: A Review of Africa Perspective. *Madonna University Journal of Medicine and Health Sciences*, **3**(1): 13-18.

[2]. Brazier, E., Maruri, F., Duda, S. N., Tymejczyk, O., Wester, C. W., Somi, G. & Wools-Kaloustian, K. (2019). Implementation of "Treat-all" at adult HIV care and treatment sites in the Global Ie DEA Consortium: results from the Site Assessment

Survey. *Journal of the International AIDS Society*, *22*(7), e25331.

[3]. Tram, K. H., Mwangwa, F., Atukunda, M., Owaraganise, A., Ayieko, J., Plenty, A. and Marquez, C. (2017). Isoniazid preventive therapy completion in the era of differentiated HIV care. *Journal of acquired immune deficiency syndromes (1999)*, *76*(5), e115.

[4]. Ambrose, B. M., Mauti, M., Nansunga, E. M., Mauti, B. M. and Mabeya, G. R. (2016). To determine the serostatus and frequency of HIV exposed infants in Ishaka Adventist Hospital. *Journal of Pharmacy and Nutrition Sciences*, 6(2):72-77.

[5]. UNAIDS. (2014) Global plans towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive. UNAIDS Country Report.

[6]. Tyagi, M. and Bukrinsky, M. (2012). Human immunodeficiency virus (HIV) latency: the major hurdle in HIV eradication. *Mol Med.*, 18(1):1096-108. doi: 10.2119/molmed.2012.00194. PMID: 22692576; PMCID: PMC3475336.

[7]. Chi, B. H., Cantrell, R. A. and Zulu, I. (2009). Adherence to first-line antiretroviral therapy affects non-virologic outcomes among patients on treatment for more than 12 months in Lusaka, Zambia," *International Journal of Epidemiology*, 38(3),746–756.

[8]. Mills E. J., Bakanda C., J. and Birungi, H. (2011). Life expectancy of persons receiving combination antiretroviral therapy in low-income countries: a cohort analysis from Uganda, *Annals of Internal Medicine*, 155(4): 209–217.

[9]. Odwee, A., Kasozi, K. I., Acup, C. A., Kyamanywa, P., Ssebuufu, R., Obura, R. and Bamaiyi, P. H. (2020). Malnutrition amongst HIV adult patients in selected hospitals of Bushenyi district in southwestern Uganda. *African health sciences*, *20*(1), 122-131.

[10]. Nkemakonam, O. C., Nkiloka, O. E., Fidelia, E. O., Ann, M. I., Uchenna, E. G. and Sophia, K. (2021). Outcome of Fixed Dose Combination of Tenofovir, Lamivudine and Dolutegravir in Rural HIV Care Facility in Nigeria. *International Journal of Health Sciences and Research*, 11 (12), 1-8.

[11]. WHO (2010). Towards universal access: scaling up priority HIV/AIDS interventions in the health sector: progress report 2010, In: WHO, editor. Geneva, Switzerland.

[12]. Okethwangu, D., Birungi, D., Biribawa, C., Kwesiga, B., Turyahabwe, S., Ario, A. R. and Zhu, B. P. (2019). Multidrug-resistant tuberculosis outbreak associated with poor treatment adherence and delayed treatment: Arua District, Uganda, 2013–2017. *BMC infectious diseases*, *19*(1), 1-10.

[13]. Buyu, D. W., Miruka, C. O., Maniga, J. N. and Onchweri, A. N. (2016). Factors Affecting Adherence to Anti-Retroviral Therapy at Kampala International University Teaching Hospital, Bushenyi District, Uganda. *American Journal of Medical Sciences*, 4(1), 17-22.

[14]. Mfinanga, S., Chanda, D., Kivuyo, S. L., Guinness, L., Bottomley, C., Simms, V., Chijoka, C., Masasi, A., Kimaro, G., Ngowi, B., Kahwa, A., Mwaba, P., Harrison, T. S., Egwaga, S. and Jaffar, S. (2015). REMSTART trial team. Cryptococcal meningitis screening and community-based early adherence support in people with advanced HIV infection starting antiretroviral therapy in Tanzania and Zambia: an open-label, randomised controlled trial. Lancet, 385(9983):2173-82. doi: 10.1016/S0140-6736(15)60164-7.

[15]. Vreeman, R. C., Ayaya, S. O., Musick, B. S., Yiannoutsos, C. T., Cohen, C. R., Nash, D., Wabwire, D., Wools-Kaloustian, K. and Wiehe, S. E. (2018). Adherence to antiretroviral therapy in a clinical cohort of HIV-infected children in East Africa. *PLoS One*, 13(2): e0191848. doi: 10.1371/journal.pone.0191848.

[16]. Williams, P. L., Storm, D., Montepiedra, G., Nichols, S.,

Kammerer, B., Sirois, P. A., Farley, J. and Malee, K. (2006). PACTG 219C Team. Predictors of adherence to antiretroviral medications in children and adolescents with HIV infection. *Pediatrics*, 118(6): e1745-57. doi: 10.1542/peds.2006-0493.

[17]. Henry, K. (2000). The case for more cautious, patient-focused antiretroviral therapy. *Ann Intern Med*, 2000; 132:306-11.

[18]. Carpenter, C. C., Fischl, M. A., Hammer, S. M., Hirsch, M. S., Jacobsen, D. M. and Katzenstein, D. A. (1997). Antiretroviral therapy for HIV infection in 1997. Updated recommendations of the International AIDS Society-USA panel. *JAMA*, 277:1962-9.

[19]. Heyer, A. and Ogunbanjo, G. A. (2006). Adherence to HIV anti-retroviral therapy part ll: Which interventions are effective in improving adherence? *SA FamPract.,* 48(9):6-10.

[20]. Anyanwu, C. F., JohnBull, T. O., Usman, I. M., Aigbogun Jr, E. O., Ochai, J., Qasem, A. H. and Batiha, G. E. S. (2021). Substance Use, Highly Active Antiretroviral Therapy, and Liver Enzymes: Evidence from a Cross-Sectional Study of HIV-Infected Adult Patients Without Comorbidities on HAART in the University. of Port Harcourt Teaching Hospital. *Frontiers in Reproductive Health*, *3*, 664080.

[21]. Zürcher, K., Ballif, M., Kiertiburanakul, S., Chenal, H., Yotebieng, M., Grinsztejn, B. and Ayangma, L. (2019). Diagnosis and clinical outcomes of extrapulmonary tuberculosis in antiretroviral therapy programmes in low-and middle-income countries: a multicohort study. *Journal of the International AIDS Society*, *22*(9), e25392

[22]. Kigozi, G., Musoke, R., Kighoma, N., Watya, S., Serwadda, D., Nalugoda, F. and Wawer, M. J. (2014). Effects of medical male circumcision (MC) on plasma HIV viral load in HIV+ HAART naïve men; Rakai, Uganda. *Plos one*, *9*(11), e110382.

[23]. Kredo, T., Van der Walt, J. S., Siegfried, N. and Cohen, K. (2009). Therapeutic drug monitoring of 5 antiretroviral for people with HIV. *Cochrane Database Syst Rev, 5*(3):CD007268.

[24]. Lohse, N., Hansen, A. B., Gerstoft, J. and Obel, N. (2007). Improved survival in HIV-infected persons: consequences and perspectives. *J Antimicrob Chemother*., 60:461–3.

[25]. Vergidis, P. I., Falagas, M. E. and Hamer, D. H. (2009). Meta-analytical studies on the epidemiology, prevention, and treatment of human immunodeficiency virus infection. *Infect Dis Clin North Am*., 23:295–308.

[26]. Lima, V., Harrigan, D., Richard, M., Melanie, M., David, M., Wood, E., Hogg, R., Montaner, S. and Julio, S. G. (2008). Differential impact of adherence on long-term treatment response among naive HIV-infected individuals. *AIDS*, 22(17): 2371-2380. DOI:10.1097/QAD.0b013e328315cdd3

[27]. Bangsberg, D. R. (2006). Less than 95% Adherence to nonnucleoside reverse-transcriptase inhibitor therapy can lead to viral suppression. *Clinical Infection Dis*., 43:939–41.

[28]. Falagas, M. E., Zarkadoulia, E. A., Pliatsika, P. A. and Panos, G. (2008). Socioeconomic status (SES) as a determinant of adherence to treatment in HIV infected patients: a systematic review of the literature. *Retrovirology*, 5:13.

[29]. Amberbir, A., Woldemichael, K. and Getachew, S. (2008). Predictors of adherence to antiretroviral therapy among HIV-infected persons: a prospective study in Southwest Ethiopia. *BMC Public Health* **8**, 265. https://doi.org/10.1186/1471-2458-8-265

[30]. Eholié, S. P., Tanon, A., Polneau, S., Ouiminga, M., Djadji, A., Kangah-Koffi, C., Diakité, N., Anglaret, X., Kakou, A. and Bissagnené, E. (2007). Field adherence to highly active antiretroviral therapy in HIV-infected

adults in Abidjan, Côte d'Ivoire. *J Acquir Immune Defic Syndr.*, 45(3):355-8.doi:10.1097/QAI.0b013e31805d8ad0. PMID: 17438479.

[31]. Fonsah, J. Y., Njamnshi, A. K., Kouanfack, C., Qiu, F., Njamnshi, D. M. and Tagny, C. T. (2017). Adherence to Antiretroviral Therapy (ART) in Yaoundé-Cameroon: Association with Opportunistic Infections, Depression, ART Regimen and Side Effects. PLoS ONE, 12(1): e0170893.https://doi.org/10.1371/journal.pone.0170893.

[32]. Byakika-Tusiime, J., Oyugi, J. H., Tumwikirize, W. A., Katabira, E. T., Mugyenyi, P. N., Bangsberg, D. R. (2005). Adherence to HIV antiretroviral therapy in HIV+ Ugandan patients purchasing therapy. *International Journal of STD AIDS*, 16:38-41.

[33]. Iliyasu, Z., Kabir, M., Abubakar, I. S., Babashani, M. and Zubair, Z. A. (2005). Compliance to antiretroviral therapy among AIDS patients in Aminu Kano Teaching Hospital, Kano, Nigeria. *Nigeria Journal of Medicine*, 14:290-294.

[34]. Orrell, C., Bangsberg, D. R., Badri, M. and Wood, R. (2003). Adherence is not a barrier to successful antiretroviral therapy in South Africa. *AIDS*, 17(9):1369-75. doi: 10.1097/00002030-200306130-00011.

[35]. Natukunda, K., Kugonza, D. R. and Kyarisiima, C. C. (2011). Indigenous chickens of the Kamuli Plains in Uganda: I. Production system and flock dynamics. *Livestock Research for Rural Development. Volume 23,*10.

[36]. Simoni, J. M., Montgomery, A., Martin, E., Michelle, N., Demas, P. A. and Rana, S. (2007). Adherence to Antiretroviral Therapy for Pediatric HIV Infection: A Qualitative Systematic Review with Recommendations for Research and Clinical Management. *Pediatrics*, 119(6), e1371-e1383.

[37]. Talam, N. C., Gatongi, P., Rotich, J. and Kimaiyo, S. (2008). Factors affecting antiretroviral drug adherence among HIV/AIDS adult patients attending HIV/AIDS clinic at Moi Teaching and Referral Hospital, Eldoret, Kenya. *East African Journal of Public Health,* 5, 74-78.

[38]. Omoding, B. (2023).Evaluation of the Awareness and Practice of HIV Positive Mothers towards Infant Feeding Options at Serere Health Center IV, Serere District. IDOSR Journal of Scientific Research 8 (2), 40-57.

[39]. Okello, A. (2023).Incidence of Tuberculosis in HIV Sero-positive Patients at HIV Clinic at Kampala International University Teaching Hospital, Bushenyi District. *IDOSR Journal of Scientific Research* 8 (2), 137-147.

[40]. Birungi, J. (2023).Safe Male Circumcision and HIV Prevention in Males in Bigando, Kigulya Division, Masindi Municipality. *INOSR Experimental Sciences* 11 (2), 77-88.

[41]. Sebwami, R. (2023).Evaluation of Male partner participation in prevention of mother to child transmission of HIV/AIDs at Hoima Referral hospital. *INOSR Experimental Sciences* 11 (2), 108-121.

[42]. Nassuna, R. (2023).Occurrence of Malaria in HIV/AIDS Patients at Ishaka Adventist Hospital, Bushenyi District, Uganda. *IDOSR Journal of Science and Technology* 9 (1), 86-97.

[43]. Katigi,L.(2023).Factors Influencing the Elimination of Mother to Child HIV Transmission Services at Mbarara Regional Referral Hospital, Mbarara District, Uganda. *IDOSR Journal of Biology, Chemistry and Pharmacy*, 8 (1), 15-32.

[44]. Kajura, O. M. (2023).Evaluation of the occurrence and factors responsible for Hypertension in HIV Patients on HAART attending Chai Clinic at Kampala International University Teaching Hospital ... *IDOSR Journal of Biology, Chemistry and Pharmacy* 8 (1), 80-91.

[45]. Ekemu, W. (2023).Evaluation of Occurrence and Factors associated with Tuberculosis amid HIV Positive Adults Attending ART Clinic in Amuria District. *IDOSR Journal of Science and Technology* 9 (1), 40-52.

[46]. Funda, D. M. Albert, N. O. (2023). Assessment of the impact of COVID-19 on access of HIV care and Antiretroviral Therapy at selected health facilities in Bushenyi District, Uganda. *INOSR Scientific Research,* 9 (1), 1-12.

[47]. Shabohurira, A. (2023).Incidence of Intestinal Helminthes among HIV Patients at Kampala International University Teaching Hospital, Uganda. *INOSR Experimental Sciences*, 11 (1), 87-98.