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Occurrence and Factors Associated with HIV-Sero-Discordance in Couples at Iganga General Hospital-Iganga District, Eastern Uganda

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ABSTRACT

HIV sero-discordant refers to a situation where in a pair of long-term sexual partners, one is HIV positive and the other is HIV negative. There is an increased risk of HIV transmission to the HIV-negative partner in discordant couples which makes HIV serodiscordant a hindrance to HIV control and prevention strategies. Sero-discordance is one of the factors affecting the impact of HIV prevention strategies, therefore effective HIV prevention strategies must consider HIV discordance. Limited knowledge about the prevalence of HIV serodiscordant in the community hinders the formulation of appropriate strategies for effective control of HIV transmission. The study was aimed at determining the prevalence of HIV serodiscordant and its associated factors among couples attending Iganga General Hospital. The knowledge generated will guide the stakeholders in formulating HIV prevention and control strategies aimed at reducing HIV transmission. A cross-sectional hospital-based study was carried out through the conduction of guided interviews using a questionnaire to random-systematically selected 250 couples attending IGH. Data was analyzed and presented in tables with percentages comparing different factors. The HIV seroprevalence was 6.8%. The prevalence of discordance was 4.8% among participant couples and 52.2% among the infected couples. HIV serodiscordant was associated with sexual practice (83.3%), circumcision status of the male partner in the couple (58.3%), condom use (58.3%), use of ARVs by the HIV-infected partner (25%), and experience of STIs among partners (25%). The prevalence of HIV serodiscordant among the participant couples was 4.8%, associated mainly with sexual practice, circumcision, and condom use.

Keywords: HIV transmission, Discordant couples, Sexual partners, Condom, Serodiscordant

INTRODUCTION

HIV serodiscordant refers to a situation where in a pair of long-term sexual partners, one is HIV positive and the other is HIV negative [1-8]. It may originate from a situation where one sexual partner comes into the sexual relationship already infected, or becomes infected later in life [5-10]. HIV serodiscordant is recognized as a priority for HIV prevention due to the risk of transmitting the virus to the HIV-negative partner [9-15]. Improvements in the effectiveness and availability of HIV treatment in recent years have enabled HIV-positive individuals to live longer and healthier [16-20]. However, this treatment has also contributed to an increasing number of HIV serodiscordant couples and an increased rate of HIV transmission [14]. There is an increased risk of HIV transmission to the HIV-negative partner in discordant couples [21-25]. This makes HIV serodiscordant a hindrance to HIV control and prevention strategies and therefore a public health problem worldwide [26-30]. Higher rates of HIV transmission occur among HIV serodiscordant partners unaware of their serostatus than HIV-negative concordant partners [31-36]. HIV discordance has been reported to be 20-50% prevalent in the world [37]. Most cases of HIV transmission occur among HIV-discordant couples who are unaware of their discordant HIV sero status [38-40]. HIV-negative individuals in

HIV-discordant relationships are more likely to get infected with HIV than those in concordant HIV-negative relationships [41-49]. In Africa, the prevalence of HIV serodiscordant relationships ranges between 5-30% with more female than male discordant couples [25]. HIV transmission in discordant couples is mostly linked to high viral load, lack of male circumcision, extramarital sex, low literacy, ignorance of personal HIV status and limited understanding that HIV discordance can occur within couples [6, 26, 27]. Despite its recognized importance in HIV transmission, the concept of HIV serodiscordant and associated factors are poorly understood, rendering HIV control and prevention strategies insufficient [28]. The national HIV sero discordance in Uganda has been reported to be 5% with an HIV prevalence of 7.3% [29]. Whereas the HIV prevalence in the Iganga district has been reported to be 7.0 % [30], information about the sero discordance in the district is not available. Therefore the need to determine the prevalence and factors associated with HIV serodiscordant relationships which this study addressed.

Statement of Problem

In eastern Uganda, the prevalence of HIV is 6.5%, whereas in Iganga District the HIV prevalence is 7.0% slightly lower than the national prevalence of 7.3% [29, 30]. With such a slightly lower prevalence the HIV serodiscordant in the district is not known, yet HIV serodiscordant is known to hinder strategies aimed at effectively preventing and control of HIV transmission in the community [14]. Therefore, the need to determine the HIV serodiscordant status in the community for the formulation of effective strategies aimed at reducing HIV transmission. This study was intended to generate knowledge about the prevalence of serodiscordant and its associated factors among couples attending IGH-Iganga District. This knowledge will be important in the formulation of HIV control strategies.

Aim of the Study

To determine the prevalence and factors associated with HIV serodiscordant among couples attending IGH-Iganga District.

Specific Objectives

- To determine the prevalence of HIV discordant relationships among couples attending Iganga General Hospital (IGH) Iganga District.
- To determine the factors associated with HIV serodiscordant among couples attending IGH- Iganga District.

Research Questions

- What is the prevalence of HIV seroserodiscordant couples attending Iganga General Hospital- Iganga District?
- What are the factors associated with HIV serodiscordant among couples attending Iganga General Hospital-Iganga District?

Significance of the Study

There is limited knowledge about the prevalence of HIV serodiscordant and associated factors in Iganga District, yet HIV serodiscordant is among the factors hindering the efficiency of HIV control programs. The study will provide knowledge about the prevalence of HIV discordance and its associated factors. The knowledge generated will guide the stakeholders in formulating HIV prevention strategies aimed at reducing HIV transmission.

METHODOLOGY

Study Design

This was a cross-sectional study that obtained quantitative data using a structured questionnaire.

Area of Study

The study was carried out at Iganga General Hospital (IGH), in Iganga Municipal Council, Iganga District, Eastern Uganda.

Study Population

The study included all married and cohabiting adult couples attending IGH.

Sample Size Determination

IGH received a total number of 762 Married and cohabiting Couples per month on average in the year 2016. This was calculated from the total number of women aged 18-64years determined by the Hospital records department (IGH Records department, 2017). The total number of married and cohabiting women was considered to be equal to the total number of couples because each woman usually

has exactly one husband at ago (but men may have more than one wife). The sample size of the study was obtained using the formula below;

$$n = \frac{N}{1+N(e^2)}$$ (Yamane, 1967) [31]

Where
n =the expected sample size
N =the total number of couples attending the Hospital per month
e = the sampling error (0.05)
Applying the above formula,

n =762/1+762(0.05)2
=762/1+ (762*0.0025)
=762/1+1.905
=762/2.905
=262 couples

Sampling Technique

A systematic sampling method was used to select the participants regardless of tribe or religion to represent the whole population.

Selection Criteria

Inclusion Criteria

Married and cohabiting patients who knew both their HIV status and that of their spouses, attended IGH during the study period and consented to participate in the study.

Exclusion Criteria

Patients who were in critical condition
Mentally ill patients
Patients who could neither see nor hear.

Data Collection Methods

Interviews with patients were conducted using a questionnaire with the guidance of the researcher or the research assistant for interpretation where necessary.

Data Analysis

The obtained data was tallied, computed using a calculator and analyzed. Association of different factors with discordance was considered.

Data Quality Control

The questionnaire was pre-tested first in IGH- Postnatal ward to ensure relevant information is included before data collection.

All the questionnaires were checked for completeness after the interviews with every participant.

Data Presentation

Results were presented in form of tables for easier interpretation.

Ethical Considerations

An introductory letter was obtained from the Administrator, Faculty of Allied Health Sciences.

Permission was sought from the Iganga General Hospital-Medical Superintendent by presenting the introductory letter from the school.

Informed consent was asked from all the research participants using an informed consent form signed by every participant.

Participants who felt uncomfortable were allowed to withdraw at any moment in the data collection process without any penalty.

Data was handled with utmost confidentiality through the use of numbers instead of names and limited access to data by non-researchers.

RESULTS

Socio-Demographic Characteristics of Participants

A total of 250 couples (representing 500 individuals) were interviewed, of which 57.6% were from ART Clinic, 40% from ANC clinic, and 2.4% from GOPD.

46.4% of the participants presented alone but with the health details indicating HIV serostatuss of their spouses, while 53.6% presented with their partners (Table 1).

Table 1: Socio-demographic characteristics of study respondents in discordant couples.

Characteristics	Number of partners in discordant couples	
Age (years)	**Frequency**	**Percentage (%)**
18-24	08	33.3
25-34	13	54.2
≥35	03	12.5
Marital status		
Married	10	41.7
Cohabiting	14	58.3
Type of marriage		
Polygamy	08	33.3
Monogamy	16	66.7
Religion		
Catholic	02	8.3
Moslem	08	33.3
Protestant	04	16.7
Born-again	09	37.5
Others	01	4.2
Education level		
Illiterate	02	8.3
Primary	06	25
Secondary	07	29.2
Institution/university	09	37.5

Prevalence of HIV among participants

The results show that 6.8% individuals were HIV seropositive, and 93.2% were HIV sero-negative (Table 2).

Table 2: HIV sero-status among participants

HIV status of individual partners	Frequency	Percentage (%)
Positive	34	6.8
Negative	466	93.2
Total	**500**	**100**

Prevalence of HIV serodiscordant among participant couples

There were 9.2% HIV-infected couples observed in the current study with 4.8% discordant couples and 4.4% concordant positive couples (Table 3).

Table 3: Cordance status of participant couples

Couple status	Frequency	Percentage (%)
Discordant	12	4.8
Concordant positive	11	4.4
Concordant negative	227	90.8
Total	**250**	**100**

Discordance among infected couples

The results show that 52.2% of infected couples were discordant, while 47.8% of couples were concordant positive (Table 4).

Table 4: Discordance among infected couples

Infected couples	Frequency	Prevalence (%)
Discordant	12	52.2
Concordant positive	11	47.8
Total	**23**	**100**

Factors associated with HIV sero- discordance among participants

Gender and HIV discordance

Among the discordant couples, 58.3% HIV sero-negative partners were females, and 41.7 % male HIV sero-negative partners (Table 5).

Table 5: Gender of the HIV negative partner in a discordant couple

Gender of the HIV negative partner in a discordant couple	Frequency	Percentage (%)
Male	7	58.3
Female	5	41.7
Total	**12**	**100**

Sexual practice and HIV serodiscordant

Among the discordant couples, 58.3% reported having had sex in the last three months, and 83.3% practiced gentle sex (Table 6).

Table 6: Sex history of participant couples

Characteristics	Number of discordant couples	
Had sex in the last 3months	**Frequency**	**Percentage** (%)
YES	7	58.3
NO	5	41.7
Practice "gentle sex"		
YES	10	83.3
NO	2	16.7

Type of marriage and HIV sero discordance

The prevalence of sero discordant was higher (66.7%) among those who were in monogamous marriage than those in polygamous (33.3%) (Table 7).

Table 7: Type of marriage of participants

Characteristics	Number of discordant couples	
Type of marriage	**Frequency**	**Percentage** (%)
Polygamy	4	33.3
Monogamy	8	66.7

Condom use and discordance

The current study shows that 58.3% of discordant couples used condom on the last sex, while 41.7% not reported having used condom on last sex (Table 8).

Table 8: Condom use among participants

Characteristics	Number of discordant couples	
Used condom on last sex	**Frequency**	**Percentage** (%)
Yes	7	58.3
NO	5	41.7

History of other STIs and HIV sero-discordance

The results indicate that 75% of the discordant couples had never experienced other STIs in the last three months before the study (Table 9).

Table 9: History of STIs among participants

Characteristics	Number of discordant couples	
Had STI in the last 3 months	**Frequency**	**Percentage** (%)
YES	3	25
NO	9	75

ARV use and discordance

Of the discordant couples, 25% of the HIV positive partners were using ARVs (Table 10).

Table 10: ARV use among study participants

Characteristics	Number of discordant couples	
Use ARVs by positive partner	**Frequency**	**Percentage** (%)
YES	3	25
NO	9	75

Viral load and discordance

In 25% of the discordant couples, the HIV infected partner had a viral load of less than 1500copies/ml as per the last tested value and the rest had their viral load not tested (Table 11).

Table 11 Viral loads of HIV infected partners among the participant couples

Characteristics	Number of couples with one negative partner	
Viral load of HIV positive partner on the last test	**Frequency**	**Percentage (%)**
<1500	3	25
1500-50,000	0	00
>50,000	0	00

Male circumcision and discordance

58.3% of the participant couples had the male partner circumcised and 41.7% of the discordant couples had their male partner not circumcised (Table 11).

Table 12 Circumcision status of the male partners of the participant couples

Characteristics	Number of discordant couples	
Male partner circumcised	**Frequency**	**Percentage** (%)
YES	7	58.3
NO	5	41.7

DISCUSSION

Prevalence of HIV sero discordance among participant couples

The prevalence of HIV infection among couples was 6.8%, very close to the district HIV prevalence of 7.0% [30]. The current findings are also close to the national HIV prevalence of 7.3% [29]. The findings of this study showed that 4.8% of the couples were HIV discordant. This is slightly less than the national HIV serodiscordant

prevalence of 5% [32]. The findings in this are also slightly less than the sub-Saharan prevalence of 5-30% [33]. This may be because of a big difference between the sub-Saharan HIV prevalence (60%) [4], and that of the Iganga district (7.0%) [30]. The result of this study is also relatively lower than that obtained at VCT Centers in Ethiopia [34].

FACTORS ASSOCIATED WITH HIV SERODISCORDANT AMONG PARTICIPANT COUPLES.

Gender of the positive partner and HIV serodiscordant

In this study, there were more discordant couples with HIV-infected female partners (58.3%) than HIV-infected male partners (41.7%). This is similar to De Walque [33] who found out that there was a higher rate of male-to-female transfer of HIV than in females in discordant couples thus a reduced risk of male seroconversion in a female discordant couple. This was due to the fact in Africa, male partners usually have extramarital partners, unlike female partners.

Presence of other STIs and HIV serodiscordant

There was a higher prevalence of HIV discordance among couples in which no partner had STIs in the last 12 months (75%) than those in which a partner had STIs (25%). This finding is in line with the results by Wawer *et al.* [35], who reported a biological link between HIV infection and the presence of STIs. They stated that the increased shedding of the HIV virus in genital secretions and semen and the presence of the HIV virus in genital ulcers that can come into contact with mucus during sex enhance the transmission of HIV.

Sexual practice and HIV serodiscordant

In this study, there was a higher prevalence of HIV discordance among couples who practiced gentle sex (83.3%) compared with those who did not (16.7%). Bunnel *et al.* [36] also found out that most discordant couples practiced gentle sex. The gentle sexual practice involves "readiness" for sexual activity, an adequate amount of genital fluid present at the time of sexual contact, and the length of time taken in the sexual act. This reduces the risk of abrasion during sex which would promote the transmission of HIV to the negative partner [36].

Male circumcision and HIV serodiscordant

This study showed more discordant couples (58.3%) with a male partner circumcised, and 41.7% of the couples had a male partner not circumcised, however, 45.5% of the concordant positive couples had circumcised male partners while 54.5% of positive couples had uncircumcised male partners. The results agree with the findings of Bailey *et al.* [37] who reported a 60% reduced risk of HIV transmission to circumcised men and an unchanged trend of HIV infection of the female partner by circumcised men. Circumcision reduces the likelihood of genital ulcers and abrasion that eases HIV transmission. Tears in the foreskin during sex make it easier for viruses to enter the body [37].

Use of ARVs by the partner and HIV serodiscordant

In this study, in 25% of discordant couples, the positive partners were using ARVs while in 90.9% the concordant positive couple partners were on ART. This is different from a study carried out in Mozambique [38] that revealed more discordance among couples where the HIV-positive partner was on ART and a few couples where the HIV-positive partner was either not using ARVs or using them but with poor adherence. The above findings were due to the fact that good adherence to the use of ARVs by the HIV-positive partner reduces viral load. Low viral load reduces the risk of HIV transmission by 92% [39]. However, the current study did not establish the Clients' adherence to ART therefore they might have been on ARVs but with poor adherence that enhances seroconversion thus reducing the number of discordance couples on ART.

Condom use and HIV serodiscordant

Results in this study show that 58.3% of discordant couples used condoms while 9.1% of concordant-positive couples used condoms. This is similar to the results of Fishel *et al.* [38] showed that condom use prevented sexual transmission of HIV in their study in Mozambique.

CONCLUSION

In the current study, the prevalence of HIV among participants was 6.8%. The prevalence of HIV serodiscordant among infected couples was 4.8%, slightly lower than the 5% national discordance rate. HIV serodiscordant observed in the current study was associated with sexual practice (83.3%), the circumcision status of the male partner in the couple (58.3%), condom use (58.3%), use of ARVs by the HIV-infected partner (25%) and experience of STIs among partners (25%).

Recommendations

The current study included only couples visiting the hospital. A further study with wider coverage is crucial to establish a more accurate and updated level of HIV prevalence and serodiscordant in the district. There should be sensitization of the public about the existence of HIV serodiscordant, promoting practices, and the required behavioral changes to live in a discordant couple without seroconversion of the HIV-negative partner. Results of the current study on the effect of viral load on seron-discordance status are not conclusive as viral load details of most participant discordant couples were not available for comparison. There is, therefore, the need for further research to explore the viral load of the HIV-positive partner of a discordant couple as a factor associated with discordance.

REFERENCES

[1]. Obeagu, E. I. (2023). A Review of Challenges and Coping Strategies Faced by HIV/AIDS Discordant Couples. *Madonna University journal of Medicine and Health Sciences,* 3(1):7-12.

[2]. Redd, A. D., Collinson-Streng, A., Martens, C., Ricklefs, S., Mullis, C. E., Manucci, J. and Quinn, T. C. (2013). Identification of HIV Superinfection in Seroconcordant Couples in Rakai, Uganda, by Use of Next-Generation Deep Sequencing. *Journal of Clinical Microbiology*, **51**(8): 2805-2805.

[3]. Andrew D Redd, Aleisha Collinson-Streng, Craig Martens, Stacy Ricklefs, Caroline E Mullis, Jordyn Manucci, Aaron AR Tobian, Ethan J Selig, Oliver Laeyendecker, Nelson Sewankambo, Ronald H Gray, David Serwadda, Maria J Wawer, Stephen F Porcella, and Thomas C Quinn. (2011). Erratum: Identification of HIV superinfection in seroconcordant couples in Rakai, Uganda, by use of next-generation deep sequencing. *Journal of Clinical Microbiology*, **49**(8): 2859-2867.

[4]. WHO. (2009). Guidance on Couple HIV Testing and Counseling Including Antiretroviral use.

[5]. Bishop, M. and K. F.(2010). Serodiscordant Couples in Sub-Saharan Africa: What Do Survey Data Tell Us? Washington, DC: Futures Group, Health Policy Initiative, Task Order 1.

[6]. Angbalaga, A., Ani, C. C., Atsukwei, D., Eze, E. D., Afodun, A. M., Igoh, E. O., Ukaonu, C. B. (2018). Correlation of hepatobiliary ultrasonographic findings with cd4cell count and liver enzymes in adult hiv/aids patients in Jos. *Journal of AIDS and HIV Research*, **10**(6): 83-95.

[7]. Ambrose, B. M., GO Mauti, M Nansunga, EM Mauti, BM Mabeya, GR Neel (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.

[8]. Eguogwu, F. C., Ugwu, O., Amadi, N. C., Ike, O. C., Ohale, A. C., Okwara, J. and Udeogu, C. H.(2021). Levels of Maternal Serum Alpha-fetoprotein and Beta Human Chorionic Gonadotropin in HIV Seropositive Pregnant Women Attending Antenatal Care at Nnamdi Azikiwe University Teaching Hospital Nnewi, Nigeria. *Journal of Advances in Medicine and Medical Research*, **33**(12): 32-38.

[9]. Jakheng, S. P. E. and Obeagu, E. I. (2022). Seroprevalence of human immunodeficiency virus based on demographic and risk factors among pregnant women attending clinics in

Zaria Metropolis, Nigeria. *J Pub Health Nutri., 5*(8): 137.

[10]. Noah Kiwanuka, Merlin Robb, Oliver Laeyendecker, Godfrey Kigozi, Fred Wabwire-Mangen, Fredrick E Makumbi, Fred Nalugoda, Joseph Kagaayi, Michael Eller, Leigh Anne Eller, David Serwadda, Nelson K Sewankambo, Steven J Reynolds, Thomas C Quinn, Ronald H Gray, Maria J Wawer, and Christopher C Whalen. (2010). Epidemiology and Prevention-HIV-1 Viral Subtype Differences in the Rate of CD4+ T-Cell Decline Among HIV Seroincident Antiretroviral Naive Persons in Rakai District, Uganda. *Journal of Acquired Immune Deficiency Syndromes*, 54(2): 180.

[11]. Elizabeth M. Irungu, Renee Heffron, Nelly Mugo, Kenneth Ngure, Elly Katabira, Nulu Bulya, Elizabeth Bukusi, Josephine Odoyo, Stephen Asiimwe, Edna Tindimwebwa, Deborah Donnell, Connie Celum, Jared M. Baeten, and Partners Demonstration Project Team (2014). Evaluation of a Risk Score Tool to Identify Higher-risk HIV-1 Serodiscordant Couples for Antiretroviral-based HIV-1 Prevention. AIDS Research and Human Retroviruses, 30(S1), A72.

[12]. 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.

[13]. Wayengera, M., Mwebaza, I., Welishe, J., Nakimuli, C., Kateete, D. P., Wampande, E. and Joloba, M. L. (2017). Sero-diagnosis of active Mycobacterium tuberculosis disease among HIV co-infected persons using thymidylate kinase based antigen and antibody capture enzyme immuno-assays. *Mycobacterial diseases: tuberculosis & leprosy*, **7**(2).

[14]. Takács, R., Takács, S, T Kárász, J., Horváth, Z. and Oláh, A. (2021). Exploring Coping Strategies of Different Generations of Students Starting University. Front Psychol. 12:740569. doi: 10.3389/fpsyg.2021.740569. PMID: 34659057; PMCID: PMC8514630.

[15]. Obiomah, C. F., Obeagu, E. I., Ochei, K. C., Swem, C. A. and Amachukwu, B. O (2018). Hematological indices o HIV seropositive subjects in Nnamdi Azikiwe University teaching hospital (NAUTH), Nnewi. *Ann Clin Lab Res*, **6**(1):1-4.

[16]. Nwosu, D. C., Obeagu, E. I., Nkwocha, B. C., Nwanna, C. A., Nwanjo, H. U., Amadike, J. N. and Nwankpa, P. (2016). Change in Lipid Peroxidation Marker (MDA) and Non enzymatic Antioxidants (VIT C & E) in HIV Seropositive Children in an Urban Community of Abia State. Nigeria. *J. Bio. Innov*, **5**(1):24-30.

[17]. Osinde, M.O., Kaye, D. L. and Kakaire, O. (2011). Sexual Behavior and HIV Sero-discordance . *J Obstet Gynaecol,* 31(5):436-40.

[18]. Obeagu, E. I., Okwuanaso, C. B., Edoho, S. H. and Obeagu, G. U. (2022). Under-nutrition among HIV-exposed Uninfected Children: A Review of African Perspective. *Madonna University journal of Medicine and Health Sciences,* **2**(3):120-127.

[19]. Akunueze, E. U., Ifeanyi, O. E., Onyemobi, E. C., Johnson, N. and Uzoanya, E. A. U.(2018). Antioxidants in the Management of Human ImmuodeficiencyVirus Infection. *J HIV Retrovirus*, **4**(2): 1-12.

[20]. Lingappa, J. R., Lambdin, B., Bukusi, E. A., Ngure, K., Kavuma, L. and Inambao, M. (2008). Regional Differences in Prevalence of HIV-1 Discordance in Africa and Enrollment of HIV-1 Discordant Couples into an HIV-1 Prevention Trial. *PLoS ONE,* 3(1): e1411. https://doi.org/10.1371/journal.pone.0001411.

[21]. Zimbabwe National Statistics Agency - ZIMSTAT and ICF International. (2012). Zimbabwe Demographic and Health Survey (ZDHS) 2010-11. Calverton, Maryland, USA: ZIMSTAT and ICF International. Available at

http://dhsprogram.com/pubs/pdf/FR254/FR254.pdf.

[22]. 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.

[23]. 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.

[24]. 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 HarcourtTeaching Hospital. *Frontiers in Reproductive Health*, *3*, 664080.

[25]. De Walque, D.(2010). Sero-discordant couples in five African Countries: Implications for Prevention Strategies. *Population and Development Review*, 33: 501-523.

[26]. Brazier, E., Maruri, F., Duda, S. N., Tymejczyk, O., Wester, C. W., Somi, G. and 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.

[27]. Were, E., Wools-Kaloustian, K., Baliddawa, J., Ayuo, P.O., Sidle, J. and Fife, K. (2008). Stakeholders' perception of HIV sero-discordant couples in western Kenya. *EastAfrican Medical Journal*, **85**(7): 326-333.

[28]. WHO. (2012). Guidance on couple HIV testing and counseling including anti-retroviral for treatment and prevention in sero-discordant couples: Recommendations for a Public Health Approach. Geneva:

[29]. UNAIDS. (2013). Evidence for HIV Decline in Zimbabwe. Report on Global HIV/AIDS Epidemic.

[30]. Iganga District Health Office Report (2009). Annual Health Sector Performance Report.

[31]. Yamane, T. Statistics (1967): An Introductory Analysis, 2nd Edition, New York: Harper and Row.

[32]. MOH. Status of antiretroviral therapy in Uganda. Kampala: Ministry of Health, 2006).

[33]. De Walque, D. (2006). Discordant Couples: HIV Infection among Couples in Burkina Faso, Cameroon, Ghana, Kenya, and Tanzania." Policy Research Working Paper Series 3956. Washington, DC: World Bank.

[34]. Kloos, H., Assefa, Y. and Adugna, A. (2007). Utilization of antiretroviral treatment in Ethiopia between February and December 2006: spatial, temporal, and demographic patterns. *Int J Health Geogr*, **6**, 45. https://doi.org/10.1186/1476-072X-6-45

[35]. Maria, J. W., Ronald, H., Gray, Nelson K. Sewankambo, David Serwadda, Xianbin Li, Oliver Laeyendecker, Noah Kiwanuka, Godfrey Kigozi, Mohammed Kiddugavu, Thomas Lutalo, Fred Nalugoda, Fred Wabwire-Mangen, Mary P. Meehan and Thomas, C. (2005). Quinn, Rates of HIV-1 Transmission per Coital Act, by Stage of HIV-1 Infection, in Rakai, Uganda, *The Journal of Infectious Diseases*, 2005; 191(9):1403–1409

[36]. Bunnell, R. E., Nassozi, J., Marum, E., Mubangizi, J., Malamba, S., Dillon, B., Kalule, J., Bahizi, J., Musoke, N and Mermin, J. H. (2005). Living with discordance: knowledge, challenges, and prevention strategies of HIV-discordant couples in Uganda. *AIDS Care*, 17(8):999-1012. doi: 10.1080/09540120500100718. PMID: 16176896.

[37]. Bailey, RC, S Moses, CB Parker, K Agot, I Maclean, JN Krieger, CF Williams, RT Campbell, J. N. (2007).

Male circumcision for HIV prevention in young men in Kisumu, Kenya: A Randomized Controlled Trial. *Lancet*, 369: 643-656.

[38]. Fishel, J. D., S. E. K. Bradley, P. W. Young, F. Mbofana, and C. Botão. (2011). HIV among couples in Mozambique: HIV status, knowledge of status, and factors associated with HIV serodiscordance. Further analysis of the 2009 Inquérito Nacional de Prevalência, Riscos Comportamentais e Informação sobre o HIV e SIDA em Moçambique 2009. Calverton, Maryland, USA: ICF International.

[39]. Attia, S., Egger, M., Müller, M and Zwahlen, M. (2009). Low N. Sexual transmission of HIV according to viral load and antiretroviral therapy: systematic review and meta-analysis. AIDS, 23(11):1397-404. doi: 10.1097/QAD.0b013e32832b7dca. PMID: 19381076.

[40]. 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.

[41]. 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.

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

[43]. 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.

[44]. 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.

[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.

[48]. Eze, C. E. (2023).Socio-Cultural Factors Responsible For the High Incidence of HIV in Nigeria: A Study of Akwa Ibom State, Nigeria. *IAA Journal Arts and Humanities* 10 (1), 26-31.

[49]. Byaruhanga, I. Tamale, A. Asingwire, S. (2023).Intentional Behaviors that Affect Utilization of Family Planning Services among HIV-Positive Women Attending Antiretroviral Therapy Clinics in Bushenyi District- Uganda. *INOSR Experimental Sciences* 10 (1), 61-85.

Isiko, Yasin (2023). Occurrence and Factors Associated with HIV-Sero-Discordance in Couples at Iganga General Hospital-Iganga District, Eastern Uganda. *IDOSR Journal of Experimental Sciences,* 9(2)17-28.https://doi.org/10.59298/IDOSR/JES/101.1.7002