

Prevalence and Factors Associated with HIV Sero-Discordance among Couples Attending Pallisa General Hospital-Pallisa District Eastern Uganda

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ABSTRACT

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. There is an increased risk of HIV transmission to the HIV-negative partner in discordant couples which makes HIV sero-discordance 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 Pallisa General Hospital (PGH) Pallisa District. 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 PGH. 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 serodiscordant, HIV transmission, Discordant couples, Circumcision, Condom use.

INTRODUCTION

Human immunodeficiency virus (HIV) infection is one of the dreadful infections with severe health and economic burden. Despite its global presence, it is more prevalent in the sub-Saharan African region with young women and girls having a higher risk of HIV infection [1-3]. HIV serodiscordant refers to a situation where in a pair of

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long-term sexual partners, one is HIV positive and the other is HIV negative. It may originate from a situation where one sexual partner comes into the sexual relationship already infected, or becomes infected later in life [4,5]. HIV serodiscordant is recognized as a priority for HIV prevention due to the risk of transmitting the virus to the HIV-negative partner. Improvements in the effectiveness and availability of HIV treatment in recent years have enabled HIV-positive individuals to live longer and healthier. However, this treatment has also contributed to an increasing number of HIV sero-discordant couples and an increased rate of HIV transmission [6]. There is an increased risk of HIV transmission to the HIV-negative partner in discordant couples. This makes HIV serodiscordant a hindrance to HIV control and prevention strategies and therefore a public health problem worldwide [7]. Higher rates of HIV transmission occur among HIV serodiscordant partners unaware of their sero- status than among HIV-negative concordant partners [8]. Research studies on people living in serodiscordant relationships give different possible explanations for serodiscordant worldwide. Most explanations focus on the characteristics of the HIV-negative couple member, rather than on the varying infectiousness of the HIV-positive couple member [9]. The majority of explanations are that the HIV- negative discordant couple member is actually infected but is not yet detectable by available tests, some people say that there are individuals who are immune from HIV infection and others believe that it's a protection from God, several HIV- positive couple members of sero- discordant partners attribute their discordant status to the fact that they only have "gentle" sex with their partners [9].

From the de Walque [10] report, some couples describe the serodiscordant phenomenon as a situation that results in effective HIV transmission prevention strategies among couples, once a partner is infected with the virus. Explanations given by serodiscordant couples about their own HIV status appear to affect their behaviors [9]. HIV discordance has been reported to be 20-50% prevalent in the world ZDHS [11]. In Africa, the prevalence of HIV serodiscordant relationships ranges between 5-30% with more female than male discordant couples [10]. The national HIV sero discordance in Uganda has been reported to be 5% with an HIV prevalence of 7.3% [12]. HIV transmission in discordant couples is mostly linked to a high viral load of the HIV-positive partner, lack of male circumcision, extramarital sex, low literacy, ignorance of personal HIV status, and limited understanding that HIV discordance can occur within couples [13]. Whereas the HIV prevalence in Pallisa district has been reported to be 7.0%, information about the sero discordance in the district is not available. Therefore, the need to determine the prevalence and factors associated with HIVsero discordant relationships which this study addressed. This study was designed to generate knowledge about the prevalence of serodiscordant and its associated factors among couples attending PGH- Pallisa District. This knowledge will be important in the formulation of HIV control strategies.

METHODOLOGY

Study Design

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

Area of Study

The study was carried out at Pallisa General Hospital (PGH), Pallisa Town Council, Pallisa District, Eastern Uganda.

Study Population

The study included all married and cohabiting couples attending PGH.

Sample Size Determination

PGH received a total number of 762 married and cohabiting couples per month on average in the year 2021. This was calculated from the total number of women aged 18-60 years determined by the hospital health information department (PGH Health Information. Department, 2021). The total number of married and cohabiting women was considered to be equal to the number of couples because each woman usually is married to only one husband at a time (but men may marry more than one wife). The sample size of the study was obtained using the formula below;

$$n = \frac{N}{1 + N(e^2)}$$

(Yamane method [14])Where,

n = the expected sample size

N = the total number of couples attending the Hospital per month E = the

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sampling error (0.05)

Therefore, applying the above formula, $n =$

Sampling Technique

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

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 were tallied, computed using a calculator and analyzed. Association of different factors with discordance were considered.

Data Presentation

Results were presented in the form of tables for easier interpretation

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 sero-status 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	
	Frequency	Percentage (%)
Age (years)		
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

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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% of individuals were HIV seropositive, and 93.2% were HIV sero-negative (Table 2).

Table 2 HIV Serostatus 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: Concordance 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

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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% of HIV seronegative partners were females, and 41.7 % male HIV seronegative 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% practice gentle sex (Table 6).

Table 6 Sex history of participant couples

Characteristics	Number of discordant couples	
	Frequency	Percentage (%)
Had sex in the last 3months		
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 zero discordant was higher (66.7%) among those who were in monogamous marriage than those in polygamous (33.3%) (Table 7).

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Table 7 Type of marriage of participants

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

Condom use and discordance

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

Table 8: Condom use among participants

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

History of other STIs and HIV Serodiscordant

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	
	Frequency	Percentage (%)
Had STI in the last 3 months		
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	
	Frequency	Percentage (%)
Use ARVs by positive partner		
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 1500 copies/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	
	Frequency	Percentage(%)
Viral load of HIV-positive partner on the last test		
<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	
	Frequency	Percentage (%)
Male partner circumcised		
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% [15]. The current findings are also close to the national HIV prevalence of 7.3% [12]. 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% [16]. The findings in this are also slightly less than the sub-Saharan prevalence of 5-30% [10].

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 [10] who found out that there was a higher rate of male-to-female transfer of HIV than female 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 extra marital 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. [17], 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. Concerning sexual practice and HIV sero-discordance 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%). Bunnell et al. [9] also found out that most discordant couples practiced gentle sex. 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 [9].

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 White et al. [18] 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 a virus to enter the body [18-22].

Use of ARVs by the partner and HIV serodiscordant

In this study, 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 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 [19-22]. 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% [20]. However, the current study did not establish the client's 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% concordant positive couples used condoms. This is similar to the results of Fishel et al. [19] which 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 sero-discordance 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 a wider coverage is crucial to establish a more accurate and updated level of HIV prevalence and sero-discordance in the district. There should be sensitization of the public about the existence of HIV sero-discordance, promoting practices and the required behavioral changes to live in a discordant couple without sero conversion of the HIV negative partner. Results of the current study on effect of viral load on serodiscordant 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. Alum, E. U., Ugwu, O. P.C., Obeagu, E. I. and Okon, M. B. Curtailling HIV/AIDS Spread: Impact of Religious Leaders. *Newport International Journal of Research In Medical Sciences (NIJRMS)*, 2023; 3(2): 28-31. <https://nijournals.org/newport-international-journal-of-research-in-medical-sciences-nijrms-volume-3-issue-2-2023/>
2. Obeagu, E.I., Alum, E.U. and Obeagu, G.U. Factors Associated with Prevalence of HIV Among Youths: A Review of Africa Perspective. *Madonna University Journal of Medicine and Health Sciences*, 2023; 3(1): 13-18. <https://madonnauniversity.edu.ng/journals/index.php/medicine>
3. Alum, E. U., Obeagu, E. I., Ugwu, O. P.C., Aja, P. M. and Okon, M. B. HIV Infection and Cardiovascular diseases: The obnoxious Duos. *Newport International Journal of Research in Medical Sciences (NIJRMS)*, 2023; 3(2): 95-99. <https://nijournals.org/newport-international-journal-of-research-in-medical-sciences-nijrms-volume-3-issue-2-2023/>
4. Ambrose, B.M., Mauti, G.O., Nansunga, M., Mauti, E.M., Mabeya, B.M., & Neel, G.R. To determine the Serostatus and Frequency of HIV Exposed Infants in Ishaka Adventist Hospital. *Journal of pharmacy and nutrition sciences*, 2016; 6: 72-77.
5. Obeagu, E. I. A Review of Challenges and Coping Strategies Faced by HIV/AIDS Discordant Couples. *Madonna University Journal of Medicine and Health Sciences*. 2023; 3(1): 7-12.
6. Takács, R., Takács, S., Kárász, J., Horváth, Z., Oláh, A. Exploring Coping Strategies of Different Generations of Students Starting University. *Front Psychol*. 2021 Sep 30;12:740569. doi: 10.3389/fpsyg.2021.740569.
7. Anyanwu, C. F., JohnBull, T. O., Usman, I. M., Aigbogun Jr, E. O., Ochai, J., Qasem, A. H., ... & Batiha, G. E. S. 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*. 2021; 3: 664080.
8. Redd, A. D., Collinson-Streng, A., Martens, C., Ricklefs, S., Mullis, C. E., Manucci, J., ... & Quinn, T. C. Identification of HIV Superinfection in Seroconcordant Couples in Rakai, Uganda, by Use of Next-Generation Deep Sequencing. *Journal of Clinical Microbiology*. 2011; 51(8): 2805-2805.
9. Bunnell, R. E., Nassozi, J., Marum, E., Mubangizi, J., Malamba, S., Dillon, B., et al. Living with discordance: knowledge, challenges, and prevention strategies of HIV-discordant couples in Uganda. *AIDS Care*. 2005 Nov;17(8):999-1012. doi: 10.1080/09540120500100718.
10. de Walque, Damien. "Who gets AIDS and how? The determinants of HIV infection and sexual behaviors in Burkina Faso, Cameroon, Ghana, Kenya, and Tanzania," Policy Research Working Paper Series 3844, The World Bank, 2006.
11. Zimbabwe National Statistics Agency (ZIMSTAT) and ICF International. 2012. Zimbabwe Demographic and Health Survey 2010-11. Calverton, Maryland: ZIMSTAT and ICF International Inc.
12. UNAIDS. Global Report: UNAIDS report on the global AIDS epidemic 2013.
13. Were, E., Wools-Kaloustian, K., Baliddawa, J., Ayuo, P.O., Sidle, J. and Fife, K. Stakeholders' perception of HIV sero-discordant couples in western Kenya. *East African Medical Journal*. 2008; 85(7): 326-333.
14. Yamane, Y. Mathematical Formulae for Sample Size Determination, 1967.
15. Annual Health Sector performance report. Pallisa district health office report, 2009.
16. Ministry of Health (MOH) [Uganda] and ORC Macro. (2006) Uganda HIV/AIDS sero-behavioural survey 2004-2005. Ministry of Health and ORC Macro, Calverton, USA.

17. Wawer, M. J., Gray, R. H., Sewankambo, N. K., Serwadda, D., Li, X., Laeyendecker, O., et al. Rates of HIV-1 transmission per coital act, by stage of HIV-1 infection, in Rakai, Uganda. *J Infect Dis.* 2005 May 1;191(9):1403-9. doi: 10.1086/429411.
18. White, R. G., J. R. Glynn, K. K. Orroth, E. E. Freeman, R. Bakker, H. A. Weiss, L. Kumaranayake, J. D. F. Habbema, A. Buve and R. J. Hayes. "Male circumcision for HIV prevention in sub-Saharan Africa: who, what and when?" *AIDS.* 2008; 22(14): 1841-1850.
19. 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. Page | 70
20. Kigozi, G., Musoke, R., Kighoma, N., Watya, S., Serwadda, D., Nalugoda, F., ... & Wawer, M. J. Effects of medical male circumcision (MC) on plasma HIV viral load in HIV+ HAART naïve men; Rakai, Uganda. *Plos One*, 2014; 9(11): e110382.
21. Emmanuel Ifeanyi Obeagu, Getrude Uzoma Obeagu and Ugwu Okechukwu Paul-Chima (2023). Stigma Associated With HIV/AIDS: A Review. *NEWPORT INTERNATIONAL JOURNAL OF PUBLIC HEALTH AND PHARMACY (NIJPP)* 3(2):64-67.
22. Emmanuel Ifeanyi Obeagu, Stella Malot, Getrude Uzoma Obeagu and Okechukwu Paul-Chima Ugwu (2023). HIV resistance in patients with Sickle Cell Anaemia. *NEWPORT INTERNATIONAL JOURNAL OF SCIENTIFIC AND EXPERIMENTAL SCIENCES (NIJSES)* 3 (2):56-59.

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