

Screening of Gynaecological Surgical Patients for HIV-1 Infection in Nigeria

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Abstract: *Background:* HIV infection in gynaecological surgical diseases (GSDs) is associated with higher complications but epidemiological data in Nigeria is scarce.

Objective: To determine the proportion, pattern and factors associated with HIV-1 infections among GSDs patients and early linkage to HIV care and treatment.

Materials and Method: This one-year prospective study enrolled consecutive volunteers admitted January 1 through December 31, 2007 for gynaecological surgeries in a tertiary Nigerian hospital. The women were pre- and post-test counselled and screened for HIV-1 antibodies using Abbott Determine for HIV- 1 and 2 (Abbott Laboratories, Illinois, USA) and Uni-Gold Recombigen HIV (Trinity Biotech, Wicklow, Ireland) in a serial test algorithm. Repeatedly reactive samples were considered positive. Discordant results were confirmed using HIV-1/2 Stat-Pak (Chembio, Medford, NY) as tie-breaker. The patients' socio-demographic characteristics and associated factors were obtained using structured questionnaire. Seropositive women were linked to care. The outcome measures were proportion of women with HIV positive results, associated factors and mortality rate over a one year follow up period.

Results: The overall proportion of HIV positive result was 6.3% (26/413) with women aged ≥ 45 years having the highest proportion (8.45%). Only 9.4 % (39/413) were aware of their HIV status prior to testing. Of the HIV positive patients, 7.7% (2/26) knew their status and were on antiretroviral drugs. They had not been sexually active in the last six months. Multiple sexual partners ($p < 0.000$), STIs ($p < 0.000$), traditional medications ($p < 0.003$), pelvic abscess ($p = 0.008$), cervical cancer ($p < 0.003$), induced abortions ($p < 0.001$) were HIV-associated factors. Previous blood transfusion, surgeries, benign tumors, non-cervical gynaecological malignancies were not. There were no mortalities over a one year follow up period.

Conclusion: The proportion of HIV infection among women admitted for GSDs was high but prior knowledge of HIV status was low. The study has provided a window of opportunity for screening, diagnosis and early treatment. Integration of HIV counselling and testing into gynecological services would be desirable.

Keywords: HIV, Gynaecological Diseases, Surgery, Linkage, Care, Associated Factors.

INTRODUCTION

Since the advent of highly active antiretroviral therapy (HAART), the contribution of HIV/AIDS to hospital admissions in sub-Saharan Africa (SSA) has reduced [1]. This was as a result of enormous resources committed by the international community to mitigate the impact and prevent new HIV infections [2]. In spite of this achievement, hospital admissions among undiagnosed HIV infected patients in Nigeria remains high [3]. Behavioral modification and expanding access beyond preventive obstetric care to gynaecological patients may be beneficial and especially in African countries where the epidemic is said to be generalized. Nigeria was recently re-categorized by the UNAIDS to have 'mixed epidemic' [4, 5]. Risk factors associated with the

epidemic include heterosexual intercourse, socio-economic and socio-cultural reasons, inappropriate blood transfusion, illicit drug-use, and use of unsterilized sharp objects and pessaries for traditional medical and gynaecological treatments [6, 7].

When gynaecological surgical disease (GSD) patients are infected with HIV and other co-infections, treatment and care become more strenuous [3, 8-10]. Furthermore, when untreated, the associated morbidity and mortality are amplified [3]. Some studies have reported that HIV-infected gynaecological surgical patients (GSPs) have more post-operative complications [3, 10], but this observation was not confirmed in others studies and no association with immune status or viral load was reported [11, 12]. Cervical cancer is an AIDS defining illness and human papilloma virus (HPV) infection is commoner among HIV-positive than negative women. It is implicated in over 95% cases of genital and anal malignancies [8, 9].

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In Nigeria, many women seek unorthodox care. This type of care-seeking behavior increases their risks for HIV infection. However, stigma and discrimination often limit women's access to HIV screening [13-15]. In our environment, without baseline HIV status, assessing the possible role of HIV/AIDS in modifying patient outcome following surgery and linkage to HIV care and treatment is difficult. The need for blood transfusion among GSPs is high making HIV screening desirable. Non-documentation of HIV status prior to blood transfusion could pose serious medico-legal issues.

The need to prevent mother-to-child-transmission (PMTCT) of HIV has led to well organized prevention programmes in Nigeria [13]. Unfortunately, gynaecological patients were yet to benefit from such interventions. Screening for HIV is not part of routine gynaecological care. Consequently, there is paucity of data on HIV and GSPs in our environment. The feasibility of integration of HIV counselling and testing (HCT) into gynaecological services was yet to be exploited. The justification for this study is the need to provide a pilot model for integration of HCT into gynaecological services. The objectives are to determine the proportion, pattern and factors associated with HIV-1 infections among GSDs patients and benefits of early linkage to HIV care and treatment.

MATERIALS AND METHOD

This prospective study enrolled consented consecutive GSPs admitted January 1 through December 31, 2007 at the Gynaecological Clinic and Emergency Unit of the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. The women were pre- and post-test counselled by trained counselors of the PMTCT Programme and informed consents were obtained. They were screened for HIV-1 using rapid tests based on the WHO double/triple test algorithm in accordance with the Nigerian National Guideline [13, 14]. Where pre-test counselling was not feasible before surgery due to urgent need for surgical intervention (e.g. ruptured ectopic gestation with haemorrhagic shock); patients' blood specimens were preserved till the patients were adjudged post-operatively by the surgeons and counselors to be fit for the process and informed consent obtained.

Specifically, 5ml of blood was collected from the antecubital vein and sent in potassium ethylenediamine tetra-acetic acid (EDTA)-anticoagulant containing specimen bottle for serological test at the Federal Government of Nigeria owned HIV Laboratory in

UBTH. The specimens were centrifuged, plasma separated and analysed for the HIV 1 and 2 antibodies using Abbott Determine for HIV- 1 and 2 (Abbott Laboratories, Illinois, USA) and Uni-Gold Recombigen HIV (Trinity Biotech, Wicklow, Ireland) in a serial test algorithm [13]. Repeatedly reactive samples were considered positive. Discordant results were confirmed with HIV-1/2 Stat-Pak (Chembio, Medford, NY) as tie-breaker [13]. The tests were performed and interpreted in accordance with the manufacturers' instructions. The results were disclosed to the patients before surgery except otherwise indicated, then postoperatively as stated above. Seropositive women were linked to anti-retroviral care. Using structured questionnaire, relevant sociodemographic data were obtained from the patients. No woman was denied surgery because of her HIV-status. The study was approved by the hospital's Ethics and Research Committee. There was no conflict of interest and nothing to disclose.

Data Analysis

Analysis was done using GraphPad Instat tm Software statistical package, version 3.06 (GraphPad Software Inc., El Camino Real, San Diego, USA). Subgroups were compared using Chi square test or Fisher's Exact Test and descriptive statistics for proportions where appropriate. Categorical variables were expressed as frequency (percentage) and continuous variables as mean, median and range. A p value less than 0.05 was considered as statistically significant at 95% Confidence Intervals. When relevant, Odd ratios (OR) were calculated.

RESULTS

Of the 442 GSPs admitted during the study period, 413 (93.4%) accepted while 29(6.56%) declined testing. The patients' sociodemographic characteristics are shown in Table 1 while previous exposures to associated factors for HIV infection are shown in Table 2. Two-thirds, 273 (66.1%) of the women were exposed to HIV- associated factors.

A minority, 39/413 (9.4%) were aware of their HIV status prior to testing while 374 (90.6%) were not. The proportion of HIV infection was 6.3% (26/413). Two (7.7%) of the 26 HIV positive women were aware of their status prior to enrollment. They had been on antiretroviral therapy (ART) for 3 and 5 years, respectively. Both were not sexually active at the time of enrollment and had not used condoms in the preceding six months. The other 24 (92.3%) HIV

Table 1: Sociodemographic Characteristics of the Study Population

Indicator	Total N=413 (100.0%)	HIV pos n=26 (6.3%)	HIV Negative N=387 (93.7%)	P- value
Mean Age	34.14	35.04	34.08	0.654
Marital status				
Married	249(60.3)	10(2.4)	239(57.9)	0.039
Single	131(31.7)	14(3.4)	117(28.3)	
Separated/divorced/widow	33(8.0)	2(0.5)	31(7.5)	
Education				
Non-formal /Primary	125(30.3)	15(3.6)	110(26.6)	0.005
Secondary	176(42.6)	8(2.0)	168(40.6)	
Tertiary	112(27.1)	3(0.7)	109(26.4)	
Mean parity	1.80±1.92	2.15±2.19	1.78±1.91	0.344

positive women were unaware of their status, were sexually active but did not use condoms in the last six months. The women were linked to antiretroviral care.

The women aged 16 to 75 years. The mean, median and modal ages were 34.14±11.12, 32.0 years and 32.0 years respectively. Majority, 234 (56.7%) of the patients were younger than 35 years. The mean ages of the HIV-positive and negative women are compared in Table 1. Women ≥ 45 years (8.45%) and those < 25 years (8.14%) had the highest proportion of HIV (P=0.98). The proportion of HIV in women aged 15-24 years (7/79; 8.9%) compared with those ≥25 years (19/308 or 6.2%) was not statistically significant; OR 1.436.

Over two-thirds (69.7%) of the patients had secondary or higher education. One of every four women was unemployed and three of every four

employed women were artisans or petty trader. There was no statistical difference in HIV proportion between employed 18/290 (6.2%) and unemployed 8/97 (8.2%) women; OR 1.329. Stable matrimony and attaining secondary and post-secondary education appeared protective against HIV infection compared with women with lower or non-formal education and separated/divorced/widowed (Table 1); p= 0.003; OR 3.434 (95% CI 1.53-7.71). Majority, 213 (51.6%) of the women were multiparous. The mean parities of the HIV positive and negative patients are compared in Table 1.

Presence of HIV associated factors was high (66.1%) in the study population, and comparisons between HIV positive and negative patients are shown in Table 2 and Figure 1. The proportion of GSDs among the HIV positive and negative women is compared in Table 3.

Table 2: Previous Exposure to Associated Factors and HIV Infection

Associated factors N=273	Exposed to Associated factor		Unexposed to Associated factor		Odd Ratio (OR)	95% CI	P-Value
	HIV+	HIV-	HIV+	HIV-			
Previous STI n=34	9	25	17	362	7.67	3.10-18.93	0.000
Blood Transfusion n=12	2	10	24	377	3.142	0.651-15.156	0.170
Multiple Sex Partners n=64	15	49	11	338	9.41	4.086-21.656	0.000
Previous Induced Abortions n=161	18	143	8	244	3.839	1.627-9.057	0.001
Use of Herbal vaginal pessaries / scarification n=2	2	0	24	387	79.082	3.691-1694.100	0.003

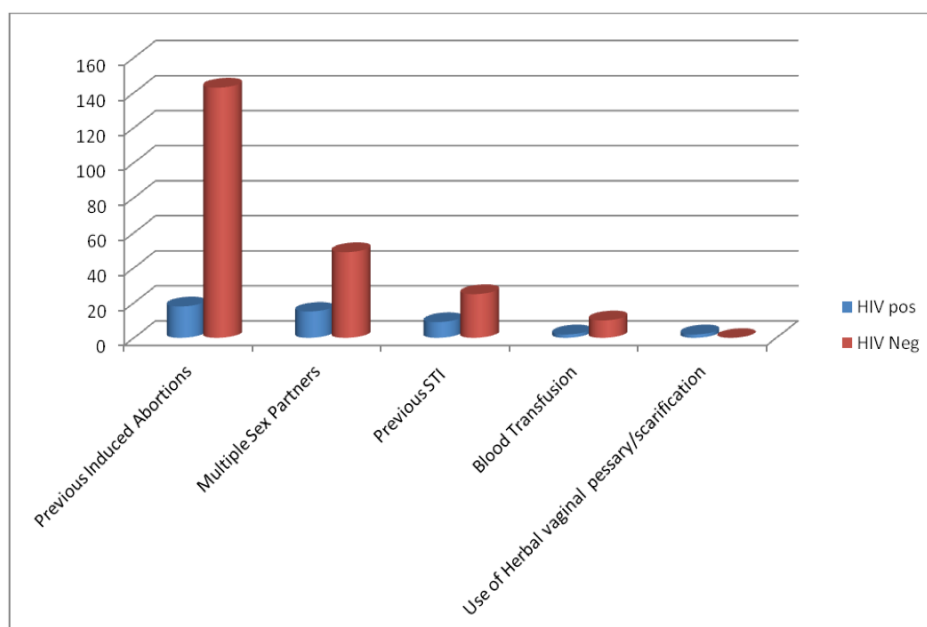


Figure 1: Cone Chart Showing Frequency of HIV Infection in the Study Population.

Of the 183 women with pre-viable (<24 weeks) pregnancy complications, 38.2% had spontaneous miscarriages while ectopic pregnancies and hydatidiform mole accounted for 32.8% and 29.0%, respectively. The proportion of HIV infection in women with these complication were 4.3% ($P < 0.05$), 5.0% ($p = 1.00$) and 1.9% ($p = 0.23$), respectively (Table 3). While induced abortion was an associated factor, previous surgeries ($p = 0.35$) and blood transfusion ($P = 0.170$) were not. Other associated factors are shown in Tables 2 and 3 and Figure 2.

Cervical cancer was the most common gynaecological malignancy 76.3% (45/59) and constituted 10.9% (45/413) of all GSDs (Table 3). Non-cervical malignancies were 23.7% (14/59) and represented 3.4% (14/413) of all GSDs. The non-

cervical malignancies were endometrial carcinoma 8.5% (5/59), ovarian cancer 11.9% (7/59) and choriocarcinoma 3.3% (2/59). Over all, the proportion of HIV in gynaecological malignancies did not independently associate HIV with cervical cancer when compared with HIV in other malignancies, 21.6% vs 16.7%; $P = 0.17$ (95%CI 0.355-121.46). However, when the proportion of HIV in women with gynaecologic malignancies were compared with HIV non-malignant GSDs, cervical cancer was then a significant factor; $p < 0.003$ (OR 4.204, 95CI 1.710-10.334). Conversely, non-cervical malignancies were not HIV associate factors; $p = 0.218$.

Among women with and without benign gynaecological tumors (BGTs), the proportions of HIV infection were 4.2% (6/143) and 9.1% (22/242),

Table 3: Frequency of Gynecological Surgical Diseases (GSDs) and HIV Status

GSDs N=413 (100.0%)	Had the GSD		Had not the GSD		Odd Ratio OR	95% CI	P-value
	HIV+	HIV-	HIV+	HIV-			
Pre-viable Pregnancy Complications n=183 (44.3%)	7	176	19	211	0.442	0.181-1.075	0.068
Pelvic Abscess n=22 (5.3%)	5	17	21	370	5.182	1.742-15.413	0.008
Gynecologic Malignancies n=59 (14.3%)	10	49	42	312	1.516	0.714-3.218	0.289
Benign Gynecological Tumors n=149 (36.1)	6	143	22	242	0.461	0.182-1.165	0.106

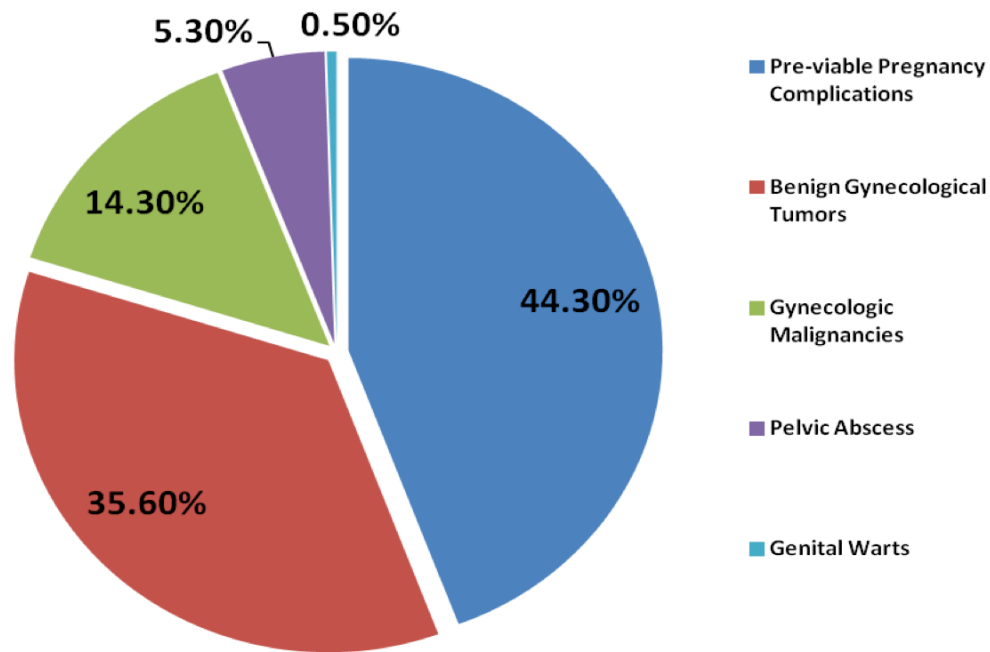


Figure 2: Pie Chart showing the frequency of Gynecological Surgical Diseases.

respectively; $p=0.10$. The benign GSDs (Table 3) included Bartholin's abscesses, clitoridal cysts, uterine fibroids, ovarian cysts, hematometria, vesico-vagina fistulae, utero-vaginal prolapse, post-coital lacerations, uterine synechiae, squamous intra-epithelial lesions (SILs) and early pregnancy complications.

DISCUSSION

The study has shown that the proportion of HIV infection among women admitted with GSDs in this unit is high but prior knowledge of HIV status was low. Also, the study provided a window of opportunity for screening, diagnosis and early linkage to care and treatment for HIV infected GSPs.

Over 93% of the patients accepted screening but only a minority (9.4%) knew their status prior to enrollment. There is limited published data (locally and elsewhere) on gynaecological surgery in women with HIV making comparison of data difficult. Williams *et al.* [16], made similar observation in a recent review. The paucity of data on HIV in gynaecological surgery have been attributed to possible lack of differences in the clinical management of women with HIV when compared with HIV negative women undergoing routine gynaecologic procedures [16]. Most available data are from obstetric studies on PMTCT of HIV. The acceptance rate of 93% in this study is comparable with the 83% - 97% reported for pregnant women by Pai *et al.* [17].

The proportion of HIV infected women (6.3%) is higher than the Nigerian national average of 4.1% [18] and the 2.3% [19] reported for oral surgery patients. It is, however, comparable with the 7% reported for Namibian population [20]. Using similar method (Uni-Gold → Stat-Pak → OraQuick), Eller *et al.* [21] reported 100% sensitivity and 99.6% specificity in the absence of errors. Similar test method is in use in the Nigerian national HIV control programme [13].

The proportion of women that knew their status prior to enrollment was 9.4%. Majority, (92.3%) of HIV the infected women were not aware their status and were not using condoms. The proportion of those aware of their status is comparable with the less than 10% reported for the estimated 26 million HIV-infected Africans that know their status [22]. Though not assessed in this study, it has been reported that fewer than 10% of sexually active persons know the status of their sexual partners [23]. Unfortunately, being not aware of one's status is said to put the person more at-risk [24].

Overall, age was not statistically significant ($p > 0.6$) in this study (Table 1) but there were two-peak age-related proportions of infected women; those aged ≥ 45 years (8.45%) and those < 25 years (8.14%). The pattern and distribution of gynaecologic diseases including behavioural characteristics of the patients (Table 3) might account for this observation. Over 44.3% of the patients presented with early pregnancy

complications and majority were single (31.7%; 131/413) and young. Older women presented more with non-pregnancy GSDs (Tables 1, 2 and 3). In the United States of America, HIV/AIDS was the fifth and sixth leading cause of death among women aged 35–44 and 25–34, respectively in 2005. Among black women in this study, HIV/AIDS was the leading cause of death among women aged 25–34 and the third leading cause of death among all women aged 35–44 in 2005 [16]. No mortality was recorded over a one year period in this study

Furthermore, sexually active young people, especially singles, are said to be more vulnerable to HIV infection. The World Health Organization (WHO) [23] reported that 50% of all new HIV infections worldwide were among young people and 30% of those living with the virus were 15–24 years old. The proportion (8.14%) of HIV infection in women < 25 years in this study is lower than the 30% reported for the general world population [23]. Giving the short life expectancy among untreated HIV infected persons, the higher rate (8.45%) of HIV infection in the middle-aged group (> 45 years) might suggest recent (<10 years) infection or a mere chance finding. This study has also highlighted the importance of educating older women and their partners on the consequences of sexual mobility and need for HIV test.

Among other sociodemographic variables, being single ($p < 0.03$) and having no formal education ($p < 0.005$) were factors associated with HIV infection while stable matrimony, secondary or post secondary education were protective against the infection. This finding is in consonance with the observation that good quality education is a powerful tool in the prevention of HIV/AIDS even as preventing HIV is essential for education [25].

Multiple sex partners (MSPs), previous STI, induced abortions, traditional treatment using scarifications and herbal vaginal medication were strongly associated with HIV infection, but previous blood transfusion and surgeries were insignificant factors (Table 2 and Figure 1). Commercial sex work (CSW) and MSPs are factors reportedly associated with HIV infection [26]. However, no woman reported CSW but HIV infection among women with MSPs was 30.6% ($p < 0.001$). Underreporting and/or refusal to report MSPs [27] were not problems in this study. Personal information considered relevant to their care was willingly divulged by the patients. In the United States of America, MSPs and STI were implicated risk factors for HIV infection

with injection drug use accounting for about 20% of new infections [28]. Injection drug use was not reported among the participants in this study as herbal vaginal medication / scarifications were not known factors in American studies [28, 29].

Cervical cancer was the most common gynaecological malignancy in this study (Table 3 and Figure 2). The Center for Disease Control and Prevention did classify cervical cancer as AIDS defining illness [9]. The proportion of HIV infection in women with cervical cancer (17.8%) compared with other malignancies (16.7%) was not statistically significantly; $P = 0.17$. When proportion of women with HIV and gynaecological malignancies were compared with HIV and other GSDs, cervical cancer was a significant factor; $p < 0.003$ while non-cervical malignancies were not. Cervical cancer or abnormal cervical cytology was associated with HIV infection a Zimbabwean study [27]. The lack of association with other cancers in this study was probably due to the small sample size.

Except for flord genital warts ($p < 0.000$), benign gynaecologic tumors were not associated with HIV infection. Human papilloma virus (HPV) is a risk factor for high-grade squamous intraepithelial lesions, cervical cancer and genital warts, and especially among immuno-compromised women [30]. In this study, no woman was screened for HPV. However, other STIs and harmful socio-cultural practices including traditional medications that can reduce the protective barrier of genital epithelium to HIV were associated factors. The determining factors for seeking care by the women in this study were GSDs. Screening for HIV and linkage to HIV care and treatment were additional benefits.

LIMITATIONS OF THE STUDY

The small sample size and being a hospital-based study were some limitations that precludes the findings from being generalised to the Nigerian public.

CONCLUSION

The proportion of HIV infection among women admitted for gynaecological surgeries was high. Due to low level of testing, prior knowledge of HIV status among these patients was low. The study has highlighted the need to provide a window of opportunity for screening, diagnosis and linkage to early care and treatment for HIV infected GSPs. Integration of HIV

counseling and testing into gynaecological services is recommended.

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