Prevalence Of Sexually Transmitted Diseases In Pregnant And Non-Pregnant Women In Calabar, Cross River State, Nigeria.

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Citation

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Abstract

The prevalence of sexually transmitted diseases (STDs) in pregnant and non-pregnant women in Calabar was studied. Blood, high vaginal swabs (HVS) and Endocervical swab (ECS) samples were aseptically collected from five hundred and sixty two (562) antenatal pregnant women attending two tertiary hospitals in Calabar (the General Hospital and the University of Calabar Teaching Hospital) and randomly from one hundred and eight (108) non-pregnant women in Calabar, and investigated for various etiologic agents of STDs including Neisseria gonorrhoeae, Candida albicans, Trichomonas vaginalis, Gardnerella vaginalis (Bacterial vaginosis), Treponema pallidum (Syphilis), Hepatitis B surface Antigen (HBsAg), Human immunodeficiency virus and Chlamydiae species, using standard microbiological methods. The HVS and the ECS swabs were analyzed using direct wet smear, Gram-stained smear and culture techniques while blood samples were examined serologically using standard proprietory reagents. Out of the 562 pregnant and 108 non-pregnant women examined, 250(44.5%) and 51(47.2%) were infected with various aetiologic agents respectively. In pregnant women, Candida albicans had the highest percentage of infections 121(21.5%) followed by HIV 38(6.8%) and Chlamydiae species 35(6.2%). Others were Hepatitis B surface antigen (HBsAg) 8(1.4%); Trichomonas vaginalis, 29(5.2%); Gardnerella vaginalis (Bacterial vaginosis), 12(2.1%) and Treponema pallidum (Syphilis) 7(1.2%). Neisseria gonorrhoeae was not isolated among the pregnant women. In non-pregnant women, Candida albicans also had the highest percentage of infections 23(21.3%) followed by Chlamydia species 11(10.2%) and HIV 9(8.3%). Others were Trichomonas vaginalis 4(3.7%); Hepatitis B surface antigen (HBsAg) 3(2.8) and Gardnerella vaginalis, 1(0.9). Neisseria gonorrhoeae and Treponema pallidum were not isolated. The prevalent rates of infections were inversely associated with increase in age and educational status. Increased pre/post conception screening for STDs is essential in preventing disease transmission and adverse pregnancy outcomes among these groups.

INTRODUCTION

Sexually transmitted diseases (STDs) are a group of infectious or communicable diseases in which the primary mode of transmission is through sexual contact [(1)] and are among the major causes of illnesses in the world especially in the developing countries [(2)].

The diseases caused by STDs are classified according to the type of organism causing the infection, which could be bacterial, fungal, viral or of parasitic origin [(3)]. Some of the common sexually transmitted diseases include: Bacterial vaginosis, herpes, Chlamydia, trichomoniasis, gonorrhoea, Hepatitis B virus, HIV and syphilis [(3)]. More than 25 infectious organisms are transmitted primarily through sexual activity and studies reveal that STDs are among the many related factors that affect the broad continuum of reproductive health [(4)].

STDs are characterized as hidden epidemics of tremendous health and economic consequences that can lead to pains, organs damage, serious disabilities such as blindness, deafness, infertility, insanity, paralysis and even death [(5)] [(6)]. Probably of concern to all is that STDs, especially in pregnant women, have been associated with a number of adverse pregnancy outcomes including spontaneous abortion, stillbirth, prematurity, low birth-weight, post partum endometritis, early onset of labour including premature rupturing of membranes, cervical and other cancers, chronic hepatitis, pelvic inflammatory diseases and various sequalae in surviving neonates [(7)]. In non-pregnant women, STDs can lead to chronic infertility [(7)].

Documented evidence indicates that STDs can be

transmitted from a pregnant mother to the baby, before; during or after the baby's birth and that some STDs (like syphilis) can cross the placenta and infect the baby in-utero [7]. Other STDs (like gonorrhoea, chlamydia, hepatitis B viruses and Genital herpes) can be transmitted to the baby during delivery through the birth canal [8] [9]. HIV can cross the placenta during pregnancy, infect the baby during the birth process and unlike other STDs, can infect the baby through breast feeding [10].

It is estimated that the number of pregnant women with STDs is increasing by about 250 million a year in the developed countries [11] and double that number in the developing countries [12]. In spite of the sequalae of these infections, there is inadequate statistical data on the prevalence of STDS in pregnant and non-pregnant women in Calabar, Cross River State. The study objectives were to document the prevalence of these STD organisms before and during pregnancy among women in Calabar and to assess the role of socio-demographic and behavioral risk of the women on STDs.

MATERIALS AND METHODS

Study location: The study location was Calabar, the capital city of Cross River State. Cross River State is in the south eastern region of Nigeria and shares boundaries with Benue State to the North, Ebonyi and Abia States to the West and to the East by Cameroon Republic. The city has a population of about two million inhabitants and is nicknamed "Canaan City" because of her rich cultural, social life and designated tourist destination.

COLLECTION OF SAMPLES

The Study was prospective in nature and conducted between December 2007 to November 2008 among pregnant women attending antenatal clinic for the first time during their pregnancy and randomly among non pregnant women in Calabar metropolis. Ethical approvals were given from the hospitals included in the study. Participation was voluntary and informed consent was obtained. Information on the demographic characteristics, education, income levels of women and their partners and behavioral risk factors was obtained through a pre-designed structured questionnaire. HIV testing was unlinked and anonymous, therefore informed consent and counseling was not necessary [13] [14].

A total number of 1,686 samples were collected from 562 pregnant women attending antenatal clinics in two tertiary hospitals which offer reference, general and specialist health care services and 324 samples from 108 non pregnant women in Calabar metropolis. Endocervical swabs (ECS), High vaginal swabs (HVS) and Blood samples was collected from each pregnant and non-pregnant woman. Samples collected were transported to the laboratory immediately for processing. Where delay was inevitable, ECS and HVS specimens were put in Stuart transport medium (STM) [Oxoid Ltd, UK] [15] and processed in the laboratory within 1 -2 hours of collection.

DIRECT EXAMINATION

Wet mounts of all swab samples were made in sterile normal saline on clean slides and examined under the low power (10x) and high power (40x) magnifications for typical yeast cells with hyphae or pseudohyphae and for Trichomonas vaginalis. Gram stain was carried out on both ECS and HVS and examined with 100x objective under oil immersion for Gram negative diplococci and clue cells. Endocervcal swab specimens were inoculated into blood agar and Thayer Martin agar (prepared as described by [16]) while HVS specimens were inoculated into blood agar and sabouraud dextrose agar (SDA) [Biotec, Ipswich, UK].

IDENTIFICATION OF ISOLATES

Yeast isolates were screened for germ tube production in serum broth. Candida albicans were identified on the basis of the following features: thick-walled oval yeast cells with pseudomycelium and germ tube formation in human serum at 37C. Germ tube negative species were regarded simply as yeast species.

Gardnerella vaginalis was identified by a combination of wet preparation appearance, Gram staining reaction and the pH of the discharge. The wet preparation showed abundance of 'clue cells' [squamous epithelial cells whose surfaces were smothered with masses of micro-organisms], the pH of the saline preparation was found to vary between 5.0 - 5.6 [i.e. higher than normal pH of 3.0 - 4.5] when measured with a pH indicator paper (BDH, UK) and in a Gram stain of positive cases, the normal lactobacilli flora was almost or completely replaced with masses of Gram variable organisms.

Serological tests: Seperated serum from blood samples were dispensed into two 3 ml volumes sterile plastic containers and used within two days for screening tests of HIV, syphilis, Hepatitis B surface Antigen and Chlamydia. Others were frozen for confirmatory tests.

HIV antibody assay was carried out with Determine HIV 1/2 rapid test strips (Abbott laboratories-USA) and HIV 1/2 Stat-Pak assay (Chembio diagnostics – USA) methods according to the standard national HIV screening algorithm in Nigeria [17], [18].These tests are qualitative membrane-based immuno assay techniques. All seropostive samples were further confirmed and differentiated into HIV 1 & 2 using immumo comb HIV 1 & 2 Biospots (Organics, Israel).

Syphilis antibodies were tested for using syphilis ultra-rapid test strips (Clinotech Diagnostics – Canada). All reactive syphilis samples (containing Treponema Pallidum antibodies were further tested and confirmed with TPHA (Teco Diagnostics – USA).

Hepatitis B surface antigen test was done using Hepatitis B surface antigen test strips (Acon^{R} laboratories – USA) while Chlamydia antibodies was tested using immunocomb Chlamydia Bivalent IgG test kit (Orgenics Medical Group – France), a semi quantitative and differential indirect solid phase enzyme immuno assay.

RESULTS

Out of the 562 pregnant women and 108 non-pregnant women tested, 250(44.5%) and 51(47.2%) were infected with various aetiologic agents respectively.

The prevalence of pathogens detected among pregnant and non-pregnant women is presented in table 1. In pregnant women, Candida albicans had the highest percentage of infection occurrence 121 (21.5%), followed by HIV 38(6.8%) and Chlamydia species, 35(6.2%). Others were Trichomonas vaginalis 29(5.2%); Gardnerella vaginalis (Bacterial vaginosis) 12(2.1%); Hepatitis B Surface Antigen (HBsAg); 8(1.4%) and Treponema pallidum (syphilis) 7 (1.2%). Nesseria gonorrhoea was not isolated.

In the non -pregnant women, Candida albicans also had the highest percentage of infections 23(21.3%) followed by Chlamydia species 11(10.2%); while others in the category were: HIV 9(8.3%); Trichomonas vaginalis 4(3.7%); Hepatitis B surface antigen (HBsAg) 3(2.8) and Gardnerella vaginalis, 1(0.9). Neisseria gonorrhoeae and Treponema pallidum were not isolated among women in that group. Only HIV- 1 was detected in all seropositive HIV samples. There was no statistical significant difference in organisms isolated among the pregnant and non-pregnant women ($P>0.05$).

Table 2 shows the age specific distribution of pathogens among pregnant women in the study. Pregnant women in the age group of 15-19 years had a higher prevalence rate of 58(74.3%), followed by 20-24 years 78(70.2%) with all of them testing positive to one or more pathogens except Neisseria gonorrhoeae. Women in the age group 25-29 years had infection rate of 54(33.8%); others in the age categories of 30-34 were, 38 (28.1%); 35-39, 17 (29.3%), while those in the age group of 40-49 were the least infected, 5(25.0%). There was a high significant association ($P<0.05$) between age groups and infection acquisition.

In table 3, the age specific distribution of actual pathogens among the non pregnant women is highlighted. Women in the age categories of 15-19 had infection rate of 3 (37.5%), while those in the age categories of 20-24 had a higher infection rate of 26 (65.0%). Distribution of infection in other age groups were 25-29, 13 (40.6%); 35-39, 3(27.2%) and those in the age group of 40-49 coincidentally like their pregnant counterpart, had the least infection rate; 1 (25.0%). There was equally a high significant association ($P<0.05$) between age groups and infection rates.

Data in table 4 is on the occurrence of infections according to the educational status of the pregnant and non-pregnant women. Three (3) pregnant women were not educated at any level and all tested positive to infections with Candida species, Hepatitis B Surface Antigen (HBsAg) and HIV giving an occurrence rate of 3(100.0%). An occurrence rate of 5(83.3%) infections was observed among women with Quranic education only and women with primary school education were 123(65.8%). Others were, secondary school certificate holders, 79(34.3%) and higher education, 40(29.4%).

Overall, infection rates were higher in the illiterate pregnant women and in women with low educational background. In the non-pregnant women, infection occurrence was highest among the primary school leavers (FSLC) 26(60.4%), followed by those without any level of education at all, 3(50.0%) and those with secondary (WASC/NECO) 20(39.2%) while those with higher education (HND/DEGREE) were 2(25.0%). Educational status was a significant factor in infection acquisition ($P < 0.05$).

Table 5 shows the occurrence of infections among the pregnant and non-pregnant women by occupation. Infection rates among the pregnant women were as follows: Unemployed 59(66.3%); Student, 14(50.0%); Businesswomen, 66(47.1%); Civil servants, 48(45.7%) and

Housewives 68(31.5%). Housewives recorded the lowest rate of infection occurrence. In the non-pregnant women, students had the highest occurrence of infections 28(65.0%) followed by business women 8(42.1%). Others were unemployed 9(40.9%), civil servants 2(33.3%) and housewives 4(22.2%). Statistically, occupation was significantly associated with infection occurrence (P<0.05).

Influence of perception and awareness of STDs among the pregnant and non-pregnant women was tested and responses comparatively recorded as shown in table 6. Many of the pregnant women were aware of the presence of various types of infections in the general population like HIV/AIDS, gonorrhoea infections, body rashes, genital wounds, ulcers and vaginal itching with discharges. Many were also aware of various boils that women experience in their sexual organs including supposed shaving bumps.

Respondents in the group that were aware of wounds/rashes were 24(36.4%) infected. Others that knew about vaginal discharges in women were 189(51.1%) while women that knew about boils had infection rate of 32(26.7%). Persons who had no idea of what venereal diseases was all about were 5(83.3%) infected. There was a statistical significant difference among pregnant women and level of awareness/ infection perception (P<0.05).

Among the non pregnant women, awareness of STDs and venereal diseases such as wounds/rashes had an infection prevalence of 5(41.6%), knowing about boils was 5(62.5%). Others were vaginal discharges, 38(45.8%) and those that had no idea of STD infections were 3(60.0%). There was no significant difference (P>0.05) in influence and level of awareness among the pregnant and non pregnant women in infection acquisition.

Distribution of infection by circumcision status of pregnant and non-pregnant women is shown in figure 1. Pregnant women who were circumcised had infection rate of 31(77.5%). Others who were not circumcised had a rate of 219(42.0%). In the non pregnant group, circumcised women had infection distribution of 20(60.6%). Uncircumcised women had a corresponding infection distribution rate of 31(41.3%). Circumcision status was significantly associated with infection distribution in pregnant and non-pregnant women (P < 0.05).

Figure 1

Table 1

TABLE 1

Prevalence of pathogens detected among pregnant and non-pregnant women

Pathogens	Pregnant (n = 562)	Non-Pregnant (n = 108	Total	X^2
Neisseria gonorrhoeae	0	0	0	
Candida albicans	121(21.5)	23 (21.3)	144	>0.05
Trichomonas vaginalis	29(5.5)	4 (3.7)	33	P>0.05
Gardnerella vaginalis	12 (2.1)	1 (0.9)	13	P>0.05
Treponema pallidum	7 (1.2)	0	7	P>0.05
Hepatitis B surface antigen	*8 (1.4)*	*3 (2.8)*	*11*	*P>0.05*
Human immuno deficiency virus	38 (6.8)	9 (8.3)	47	P>0.05
Chlamydiae species	35 (6.2)	11 (10.2)	46	P>0.05

Source: Field Survey, 2007-2008

Figure 2

Table 2

TABLE 2

Age specific distribution of pathogens among pregnant women in the study

Age (Years)	No. Tested	No. (%) Positive	No. (%) Positive for actual pathogens detected							
			N.g	Ca.alb	T.V	G.V	T.P	HBsAg	HIV	Ch.sp
15-19	78	58 (74.3)	-	30 (38.5)	8 (10.3)	4 (5.1)	1 (1.3)	-	5 (6.4)	10 (12.8)
20-24	111	78 (70.2)	-	35 (31.5)	12 (10.8)	3(2.7)	2 (1.8)	2 (1.8)	16 (14.4)	8 (7.2)
25-29	160	54 (33.8)	-	25 (15.6)	4 (2.5)	3 (1.9)	2 (1.2)	2 (1.3)	10 (6.3)	8 (5.0)
30-34	135	38 (28.1)	-	21 (15.6)	4 (3.0)	2 (1.5)	1 (0.7)	1 (0.7)	3 (2.2.)	6 (4.4)
35-39	58	17 (29.3)	-	8 (13.8)	1 (1.7)	-	1 (1.7)	2 (3.4)	2 (3.4)	3 (5.2)
40-49	20	5 (25.0)	-	2 (10.0)	-	-	-	1 (5.0)	2 (10.0)	-

Foot Note:

N.g = *Neisseria gonorrhoeae*
Ca.sp = *Candida albicans*
T.V = *Trichomonas vaginalis*
G.V = *Gardnerella vaginalis*
T.P = *Treponema pallidum*
HBsAg = Hepatitis B surface antigen
HIV = Human Immunodeficiency Virus
Ch.sp = Chlamydia species
\- = Denotes that no pathogen was detected.

Source: Field Survey, 2007-2008

Figure 3

Table 3

TABLE 3

Age specific distribution of pathogens among non-pregnant women in the control group

Age (years)	No tested	No (%) Positive	No (%) Positive for actual pathogens detected							
			Ng	Ca.alb	TV	GV	TP	HBsAg	HIV	Ch
15 – 19	8	3(37.5)	-	1 (12.5)	1(12.5)	-	-	-	1(12.5)	-
20 – 24	40	26 (65.0)	-	11 (27.5)	2(5.0)	-	-	2(5.0)	4(10.0)	7(17.5)
25 – 29	32	13 (40.6)	-	7 (21.8)	1(3.1)	1(3.1)	-	-	2(6.3)	2(6.3)
30 – 34	13	5 (38.5)	-	3 (23.1)	-	-	-	-	1 (7.7)	1(7.7)
35 – 39	11	3 (27.2	-	1 (3.6)	-	-	-	-	1 (9.1)	1(9.1)
40 – 49	4	1 (25.0)	-	-	-	-	-	-	1(25.0)	-

Foot Note:

N.g = *Neisseria gonorrhoeae*
Ca.sp = *Candida albicans*
T.V = *Trichomonas vaginalis*
G.V = *Gardnerella vaginalis*
T.P = *Treponema pallidum*
HBsAg = Hepatitis B surface antigen
HIV = Human Immunodeficiency Virus
Ch.sp = Chlamydia species
\- = Denotes that no pathogen was detected.

Source: Field Survey, 2007-2008

Figure 4

Table 4

TABLE 4

Occurrence of infections according to the education status of pregnant and non-pregnant women studied.

Educational status	Pregnant		Non-Pregnant	
	No examined	No (%) infected	No Examined	No (%) infected
None	3	3 (100)	6	3(50.0)
Quranic	6	5(83.3)	-	-
Primary (FSLC)	187	123(65.8)	43	26 (60.4)
Secondary (WASC/NECO)	230	79 (34.3)	51	20(39.2)
Higher (HND/Degree)	136	40 (29.4)	8	2 (25.0)
Total	**562**	**250(44.5)**	**108**	**51(47.2)**

FSLC = First School Leaving Certificate
WASC = West African School Certificate
GCE = General Certificate of Education
NCE = National Certificate of Education
NTI = National Teachers Institute Certificate
HND = National Diploma

Source: Field Survey, 2007-2008

Figure 5

Table 5

TABLE 5

Occurrence of infections among pregnant women and non-pregnant women by occupation.

Occupation	Pregnant		Non-Pregnant	
	No examined	No (%) infected	No Examined	No (%) infected
Unemployed	89	59 (66.3)	22	9 (40.9)
Students	28	14 (15.0)	43	28 (65.0)
Business	140	66 (47.1)	19	8 (42.1)
Civil servants	105	48 (45.7)	6	2 (33.3)
Housewives	200	63 (31.5)	18	4 (22.2)
Total	562	250 (44.5)	108	51 (47.2)

Source: Field Survey, 2007-2008

Figure 6

Table 6

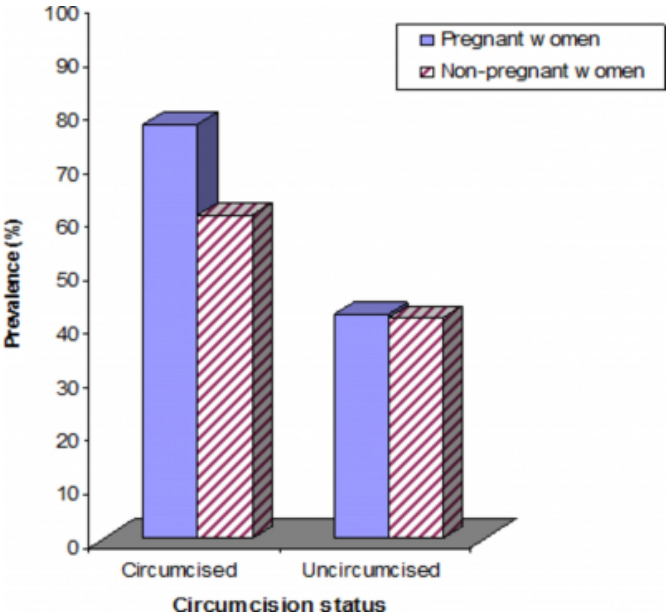
TABLE 6

Influence of and level of perception / awareness of STDs among pregnant and non-pregnant women.

Pregnant women Awareness of STD / VD	No tested	No (%) Positive	Non-Pregnant women No tested	No (%) Positive
Yes, Wounds/rashes	66	24 (36.4)	12	5(41.6)
Yes, Boils	120	32 (26.7)	8	5 (62.5)
Yes, Vaginal discharges	370	189 (51.1)	83	38 (45.8)
No idea	6	5 (83.3)	5	3 (60.0)
Total	562	250(44.5)	108	51(47.2)

Figure 7

FIG. 1: Distribution of infections by circumcision status of pregnant and non-pregnant women in the study.



DISCUSSION

The results of this study have demonstrated the endemicity and occurrence of significant levels of sexually transmitted infections in pregnant and non-pregnant women in Calabar, Cross River State.

Pregnant women have been accepted as a low risk group in terms of STD transmission and as such prevalence level of these infections in them are employed globally as a yardstick for evaluating the trend of such infections within the general population at low risk of getting infected [(14)].

A study of the prevalence of STDs in pregnant women is an approximation of the prevalence of these infections in their male counterparts and sexually active non pregnant women [(14)]. This study has demonstrated that there are no clear disparities with respect to organisms isolated and subsequently STDs among the pregnant and non-pregnant women (P>0.05) in the study as shown in table 1.

The commonest organism encountered in this study was Candida albicans 121(21.5%). This finding is comparable with previous studies on STDs amongst pregnant and non-pregnant women in Illorin [(20)], Ife [(21)] and Jos, Nigeria [(22)].

The prevalence rate of 6.8% recorded for HIV in this study compares favourably with that of the Federal Ministry of Health [(18)] Sentinel Study on HIV in pregnant women in Nigeria where a seroprevalence rate of 6.1% was recorded

for Cross River State. Elsewhere, higher seroprevalence rate among pregnant women have been reported, for instance, 14.7% in Iquita-Oron in Akwa Ibom State; 13.0% in Makurdi (Benue State) and 10.0% in Saminka (Kaduna State) [18].

Qualitative TPHA test of the 7 reactive strip samples found significant treponemal antibodies in 5 0f them, absence of significant treponemal antibodies in 2 of these samples tested with TPHA may suggest a non syphilitic reagin antibody production or cross reactions with endemic treponemal infections such as yaws,(T. pertenue), pinta (T. carateum) or bejel (T. endemicum) [23]. The detection of these false positives clearly reveals the non specificity of the rapid test strips and the need for a specific confirmatory test

for syphilis [24], especially as this is not the practice in most hospitals.

Neisseria gonorrhoeae was not isolated among the pregnant and non-pregnant women in this study. This could be attributed to abuse of broad spectrum antimicrobials which can easily be obtained over the counter of patent medicine dealers and pharmacy shops without authorized prescriptions. Non isolation of the organism could also be partly incidental arising from a pool of lightly infected population because of increase condom use and awareness of current incurable HIV pandemic in the world. In contrast, others have found rates ranging from 0.1% in Jos [22] to o.5% in Kano, Nigeria [25].

Amongst the different age groups investigated, infection distribution was highest in women aged 15-19 years, 58(74.3%) followed by those aged 20-24years, 78(70.2%). The results of this survey is in agreement with generally observed fact that the incidence of STDs by the number of cases treated each year is highest among the 15-24 years old [10], [26], [27]. Similarly, earlier data from studies by Aboyeyi & Nwabuisi [20], Jombo et al., [22], Enabulele & Kemajou [28], and Adekanle et al., [29] reported that those in the age group of 15-30 years were the most infected (100%) by one STD or the other in their separate studies. The World Health Organization [3] concludes that this age groups, (15-30years) are persons with the greatest sexual activity and that incidence decreases with age.

The lowest infection rate occurred in housewives in both pregnant and non-pregnant women examined by occupational status and suggests that family life structure could be a major influence.

The high rates observed in applicants, students and other unstable social groups may suggest indiscrete sexual life patterns and multiple sexual partners for monetary rewards. This collaborates the finding by Harding et al., [30] that even though Nigerian students were knowledgeable about STDs, they were not deterred in engaging in risky behaviors.

In many published studies, female circumcision (eg. Female genital mutilation) is always reported to be associated with infection acquisition, especially HIV and syphilis infection [3]. Since circumcision is done in traditional settings in many African countries including Nigeria, there is increased risk of exposure to crude, un-sterilized or poorly sterilized instruments which increases the risk of getting infected.

These circumcisions are reported to often involve the removal of the prepuce (clitoral hood) sometimes along with the entire clitoris [31]. Female circumcision however, in whatever form, has been suggested to facilitate the transmission of sexually transmitted diseases most especially HIV [3]. Some of the reasons advanced are that female circumcision may result in genital mutilation which may enhance the transmission of STDs or may present complications during childbirth if labour is obstructed and there is perineal tearing and laceration (32).

Educational status, occupation, circumcision status, use of contraceptive methods, influence and level of perception / awareness of STDs, income levels of pregnant and non-pregnant subjects studied were all significantly linked with infection occurrence and distribution ($P<0.05$). Meanwhile, marital status, length of union and religion were not significantly associated with infection occurrence ($P>0.05$).

High STD infection rate among pregnant and non-pregnant women are clear signs that ways to reach those at risk must be developed and promotion of early recourse to health services, especially routine mandatory and early screening of all women for STDs cannot be over emphasized. Proper treatment of all STDs like use of correct and effective medicines, contact tracing and treatment of sexual partners and education of the general populace should not be overlooked in our locality.

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