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VULVO-VAGINAL CANDIDOSIS IN A COHORT OF HORMONAL CONTRACEPTIVE USERS IN IBADAN, NIGERIA

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ABSTRACT

Introduction: Most women who acquire HIV and other sexually transmitted infections (STIs) are in their child bearing years and are current or potential users of contraceptive methods. The study was undertaken to provide information on the association between the hormonal contraceptive methods and vulvo vaginal candidiasis among women attending Family Planning clinics, University College Hospital, Ibadan, Nigeria.

Methods: It was a cross-sectional study in a population of women using hormonal contraceptive methods attending Family Planning clinics. Detailed medical history, endocervical and high vaginal swabs were collected from the women to establish diagnosis after clinical examination and informed consent. Aliquots of sera from venous blood samples of the women were tested for antibodies to HIV-1/2. Data was analysed using SPSS for windows' version 17.0.

Results: There were 116 women using hormonal contraceptive methods who participated in the study with mean age of 28.70 years (SD = 6.72, range = 19 –54). The mean age of sexual debut of the women was 19.2 years (SD = 2.96). The prevalence of vulvo-vaginal candidosis was 23.3%. Other associated sexually transmitted infections were bacterial vaginosis (24.1%), HIV (12.1%), trichomoniasis (10.3%), chlamydia cervicitis (7.8%), syphilis (5.2%), genital warts (6.0%) and gonorrhoea (2.6%).Younger age of sexual debut influenced the decision of selecting various forms of hormonal contraceptives especially the emergence of oral contraceptive forms (P = 0.043). Majority of the women on hormonal contraceptives had multiple sexual partners. Vulvovaginal candidosis is strongly associated with vaginal discharge and pruritus in women utilizing hormonal contraceptive methods (P = 0.001, 4.2 (1.0–13.2).

Conclusions: Women seeking contraception to prevent unintended pregnancy are as much in need of education about prevention of STIs. The study found that younger age, numbers sexual partners, and use of hormonal contraceptives could increase the risk of acquiring vulvovaginal candidosis.

CANDIDOSE VULVO-VAGINALE DANS UNE COHORTE D'UTILISATEURS CONTRACEPTIFS HORMONAUX A IBADAN, NIGERIA

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ABSTRAIT

Introduction: La plupart des femmes qui contractent le VIH et d'autres infections sexuellement transmissibles (IST) sont en âge de procréer et sont des utilisatrices actuelles ou potentielles de méthodes contraceptives. L'étude a été entreprise pour fournir des informations sur l'association entre les méthodes contraceptives hormonales et la candidose vulvo vagin chez les femmes fréquentant les cliniques de planification familiale, University College Hospital, Ibadan, Nigeria.

Méthodes: Il s'agissait d'une étude transversale menée auprès d'une population de femmes utilisant des méthodes contraceptives hormonales dans des cliniques de planification familiale.

Des antécédents médicaux détaillés, des prélèvements endocervicaux et des prélèvements vaginaux élevés ont été effectués auprès des femmes pour établir un diagnostic après un examen clinique et un consentement éclairé. Des aliquotes de sérums d'échantillons de sang veineux des femmes ont été testées pour rechercher des anticorps anti-VIH-1/2. Les données ont été analysées à l'aide de SPSS pour la version 17.0 des veuves.
Résultats: 116 femmes utilisant des méthodes contraceptives hormonales ont participé à l'étude avec un âge moyen de 28,70 ans (ET = 6,72, intervalle = 19-54). L'âge moyen des débuts sexuels des femmes était de 19,2 ans (ET = 2,96). La prévalence de la candidose vulvo-vaginale était de 23,3%. Les autres infections sexuellement transmissibles étaient la vaginose bactérienne (24,1%), le VIH (12,1%), la trichomonase (10,3%), la chlamydia cervicite (7,8%), la syphilis (5,2%), les verrues génitales et la gonorrhée. . L'âge plus jeune des débuts sexuels a influencé la décision de choisir différentes formes de contraceptifs hormonaux, en particulier l'émergence de formes contraceptives orales (p = 0,043). La majorité des femmes sur les contraceptifs hormonaux avaient plusieurs partenaires sexuels. La candidose vulvovaginale est fortement associée aux pertes vaginales et au prurit chez les femmes utilisant des méthodes contraceptives hormonales (p = 0,001, 4,2 (1,0-13,2).
Conclusions: Les femmes qui recherchent une contraception pour prévenir les grossesses non désirées ont autant besoin d'éducation sur la prévention des IST. L'étude a révélé que le plus jeune âge, le nombre de partenaires sexuels et l'utilisation de contraceptifs hormonaux pourraient augmenter le risque d'acquisition de la candidose vulvo-vaginale.

INTRODUCTION

Contraception has been recognized as an important part of national efforts in many countries of the world to reduce adolescent pregnancies (1). Avoidance of unintended pregnancies requires access to, and appropriate use of effective and safe methods of fertility control (2), This invariably leads to the improvement of reproductive health of sexually active young women (2). Unhindered access to effective and safe contraceptive methods could be the key to individual and public health safety.(3) A number of safe and effective contraceptive methods are available, and these include abstinence, barrier methods, oral contraceptives, Depo-Provera, Norplant implant, Intra-uterine devices, and sterilization methods (1).

The current or potential users of different methods of contraceptives who acquire sexually transmitted infections and Human Immunodeficiency virus infections are in their child bearing years. There is a controversy over the extent to which specific contraceptive methods increase or perhaps reduce the risk of HIV infection(4). Hormonal contraception has been proven as one of the biological factors being linked to the acquisition of Human Immunodeficiency Virus (HIV) and other sexually transmitted infections (STIs).(5, 6) In a study conducted among a cohort of female sex workers in Kenya, compared with those who don't practice contraception; those who rely on oral contraceptives (OCPs) are more likely to acquire chlamydia infection or vaginal candidiasis, but are less likely to acquire bacterial vaginosis. (6, 7) The assumptions are that the cervical ectopy produced by oral contraceptives (OCPs) results in affected cervical -zone being more vulnerable to trauma and thus perhaps to HIV infection.(8). Injectable hormonal contraceptives may increase the risk by increasing bleedings and thinning of the vaginal epithelium.(4) Most hormonal contraceptives contain either or both progesterone and oestrogen.(9)

Hormonal contraceptives usually include combination of estrogen and progestin; and progestin only. Estrogen effects include inhibition of ovulation and prevention of follicular maturation through suppression of ovarian steroid production and possibly decreased responsiveness to gonadotropin-releasing hormone (9). Conversely, progestin leads to changes in the endometrium that make implantation less likely, increased thickness of cervical mucus that makes sperm penetration difficult, and impairment of normal tubal mobility.(10)

In spite of recent therapeutic advances, vulvovaginal candidiasis remains a common global problem of public health importance.(11) The prevalence of vulvo-vaginal candidiasis varies worldwide, and in community- based survey conducted among female commercial sex workers in Ibadan, Nigeria, VVC was the commonest sexually transmitted infections reported (12) in women. It has been estimated that more than 70% of women develop at least one episode in their life time, (11) 50% experience a second episode, (11, 13, 14) while 5-8% encounter recurrences.(15) Oestrogen dominance usually enhances overgrowth of *Candida spp* in the vaginal milieu; and it has also been established in previous studies that oral contraceptives may determine the possibility of recurrent vulvo-vaginal candidiasis (14, 16, 17). Other predisposing factors linked to vaginal candidiasis include HIV infection, pregnancy, diabetes and undue prolonged use of antibiotics. (14, 18) Sexual behaviour could play an important role in the acquisition of VVC since some of the risk factors have been linked to the level of sexual activities with these women. Sexual behaviour has been linked to influence both primary VVC infections and relapses.(19)

Presently there is a dearth of information of the prevalence of vulvo-vaginal candidiasis and its associated risk behaviours among hormonal contraceptive users in south western Nigeria. This study was aimed at evaluating the pattern of vulvo-vaginal candidiasis among the cohorts of hormonal contraceptive

users attending the family planning clinic, University College Hospital, Ibadan.

MATERIALS AND METHODS

This was a cross-sectional study carried out in a population of child-bearing age women using different types of hormonal contraceptive methods and attending family planning clinic, University College Hospital between March – December 2006.

Sampling Procedure

Women were recruited into the study as they presented to the clinic consecutively and freely gave informed consents. The women that were enrolled into the study completed structured questionnaires to obtain baseline information on their socio-demographic characteristics, reproductive health history including sexual behaviours; and different types of hormonal contraceptives being used. Pre- test counselling was done for all clients recruited into the study which emphasized on client confidentiality; reasons for screening for candidiasis and HIV testing; information about their current and previous risk behaviours and also implication of positive test results. Women were excluded from being enrolled into the study if they were menstruating or have used antifungals especially the azoles in the preceding two weeks or within six weeks post-abortion.

Physical Examination and Specimen Collection

All women who freely gave informed consent and met the inclusion criteria had a complete pelvic examination under aseptic conditions for signs and symptoms suggestive of vulvovaginal candidiasis and other signs of sexually transmitted infections (STIs). High vaginal swabs and Endocervical swabs were collected from all the participants by the attending physicians following standard procedures. These samples were transported in Amies transport medium to the Special Treatment Clinic Laboratory, University College Hospital, Ibadan for microscopy, culture and sensitivity. The colour, character and the smell of the vaginal discharge were also noted.

Laboratory Procedures

Vaginal secretions collected were subjected to wet preparation and potassium hydroxide microscopy for the identification of round to oval budding yeast cells, trichomonads and clue cells. High vaginal secretions were also cultured on Sabouraud's dextrose agar (SDA) at 37^{o}C for 24 to 48hrs. Saline wet preparation of the creamy-greyish colonies revealed the presence of multiple budding yeast cells and pseudohyphae suggestive of Candida species. Species identification was confirmed based on the results obtained from germ tube tests, sugar assimilation and fermentation tests based on standard methods. Germ tubes positive isolates were confirmed as *Candida albicans*.

Endocervical secretions were cultured for *N. gonorrhoea*e on modified Thayer Martins Agar. The media plates were incubated at 37^{0}C in 5% CO_2 humidified extinction jar. Endocervical secretions were also Gram-stained for the presence of intracellular diplococci which were later confirmed as *Neisseria gonorrhoeae* by standard laboratory methods. Endocervical secretions were also tested for *Chlamydia trachomatis* by QuickView Chlamydia test kits following standard procedures (20). Diagnosis of genital warts was based on the clinical findings of typical lesions as previously described various researchers on the external genitalia, vaginal, cervix and perianal region. (21-23)

HIV-serology testing was done by rapid immunochromatographic test strips using OraQuick ADVANCE™ rapid HIV- 1 / 2 antibody testing. Any sample positive on screening was re-tested with enzyme-linked immunosorbent assay (ELISA) and confirmed by western blot analysis. Approval for the study was obtained from UI/UCH ethics review committee.

Data Analysis

Data analysis was done using SPSS software, version 17.0 (SPSS Inc., Chicago, IL, USA). Summary statistics such as proportions for categorical variables; means and standard deviation for continuous variables were estimated. The variables included for the analysis were women's age, educational level, religion, ethnicity, marital status, occupation, age of sexual debut, numbers of sexual partners by the women, numbers of multiple partners of their spouses, types of contraceptives and prevalence of candidiasis. Frequency distribution tables for each of the variables were analysed. Odds ratio and confidence interval were calculated to evaluate the association between sexual behaviour, hormonal contraception and prevalence of candidiasis. Multivariate analysis was used to assess the effect of the confounding variables. Statistical significance was set at $P < 0.05$.

RESULTS

During the study period, a total of one hundred and sixteen women attending family planning clinic at the University College hospital; that fulfilled the inclusion criteria and using different hormonal contraceptives were included in the analysis. Table 1 shows the sociodemographic characteristics and the rate of candidiasis of the women. The mean age of the women was 28.70 years (SD = 6.72, range = 19 –54). Sixty-six (66, 56.9%) were in the 20-29 age range and more than half (16 of 27, 59.3%) of this age group were infected with candidiasis. Nearly half of them also (57, 49.1%) were

secondary school leavers and fifty of them (50, 43.1%) were neither married nor living with a partner. Table 1.

The mean age of sexual debut of the women was 19.2 years (SD = 2.96) Fifty-five of them had their sexual debut with their casual friends and school mates while only 30 (25.9%) initiated sex with their spouses. (Table 2)

TABLE 1: SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

Characteristics	Category	Frequency (n=116) (%)	Candidiasis (n=27) (%)	P -value
Age in years	**10-19** **20-29** **30-39** **40-49** **50-59**	**4 (3.4)** **66 (56.9)** **38 (32.8)** **6 (5.2)** **2 (1.7)**	**0 (0.0)** **16 (59.3)** **9 (33.3)** **2 (7.4)** **0 (0.0)**	**0.557**
Level of Education	**No formal education** **Primary school** **Secondary school** **Polytechnic / Colleges of Education** **University**	**2 (1.7)** **15 (12.9)** **57 (49.1** **21 (18.1)** **21 (18.1)**	**0 (0.0)** **2 (7.4)** **14 (51.9)** **4 (14.8)** **7 (25.9)**	**0.576**
Marital Status	**Not married, Not living with a partner** **Not married, Living with a partner** **Married , Not living with a partner** **Married , Living with a partner**	**50 (43.1)** **9 (7.8)** **17 (14.7)** **40(34.5)**	**10 (37.0)** **1 (3.7)** **5 (18.5)** **11 (40.7)**	**0.614**
Social Class	**Class I** **Class II** **Class III** **Class IV** **Class V** **Class VI**	**2 (1.7)** **27 (23.3)** **9 (7.8)** **1 (0.9)** **33 (28.4)** **44 (37.9)**	**1 (3.7)** **9 (33.3)** **2 (7.4)** **1(3.7)** **8 (29.6)** **6 (22.2)**	**0.160**

Choice of hormonal contraceptives was statistically significant for younger women (Mean= 22.5 years). Younger age of sexual debut also influenced the choice of hormonal contraceptives especially the emergency contraceptives pills. Table 3 shows that thirty-six (31.0%) of the women preferred injectable hormonal contraceptives while thirty (25.9%) were taking oral contraceptives. Those women on oral contraceptive had the highest rate of VVC (11 of 27, 40.1%). The odds of women on oral contraceptive having VVC are slightly higher but are not statistically significant. (Table 3)

The prevalence of vulvo-vaginal candidosis in this study was 23.3% (27 of 116), Nineteen (70.4%) were *C. albicans* while eight were non-albicans Candida.

TABLE 2: SEXUAL AND REPRODUCTIVE HISTORY OF THE WOMEN

Variables	Categories	Frequency N=116 (%)	Candidiasis n=27(%)	P- value
Age of sexual debut	**11-15** **16-20** **21-25** **26-30**	**4 (3.4)** **81 (69.8)** **26 (22.4)** **5 (4.4)**	**1 (3.7)** **19 (70.4)** **6 (22.2)** **0 (0.0)**	**0.457**
Age of co-habiting with a partner	**16-20** **21-25** **26-30** **31-35** **No cohabiting**	**22 (19.0)** **49 (42.2)** **14 (12.0)** **1 (0.9)** **30 (25.9)**	**4 (14.8)** **15 (55.6)** **3 (11.1)** **0 (0.0)** **5 (18.5)**	**0.934**
No of sexual partners in the last one month	**0** **1** **2** **3** **4**	**13 (11.2)** **62 (53.4)** **33 (28.4)** **6 (5.2)** **2 (1.7)**	**2 (7.4)** **12 (44.4)** **9 (33.3)** **3 (11.1)** **1 (3.7)**	**0.345**
Spouses with multiple partners	**Yes** **No** **Don't know**	**23 (19.8)** **33 (28.4)** **60 (51.8)**	**6 (22.2)** **10 (37.0)** **11 (40.7)**	**0.400**

TABLE 4:

TABLE 3: TYPES OF HORMONAL CONTRACEPTIVES

Types of Hormonal Contraceptives	Frequency (N=116)	Percentage (%)
Oral Contraceptives	**30**	**25.9**
Injectable	**36**	**31.0**
Emergency contraceptives	**48**	**41.4**
Norplant implant	**2**	**1.7**

TABLE 4: PATTERN OF VULVO-VAGINAL CANDIDIASIS AND OTHER STIS AMONG WOMEN USING HORMONAL CONTRACEPTIVES.

Infections	Frequency (N=116)	Percentage (%)
Vulvo-vaginal candidiasis	27	23.3
Bacterial vaginosis	28	24.1
Trichomoniasis	12	10.3
Chlamydia trachomatis	9	7.8
Gonorrhoea	3	2.6
Genital warts	7	6.0
HIV infection	14	12.1

Other sexually transmitted infections diagnosed include bacterial vaginosis (24.1%), trichomoniasis (10.3%), *Chlamydia trachomatis* infection (7.8%), Gonorrhea (2.6%), genital warts (6.0%) and HIV infection (12.1%) as shown in Table 4. There was no significant association between the women infected with candidiasis and acquisition of HIV infection. Five (18.5%) of the women with vulvovaginal candidiasis were diagnosed with HIV infection. (P =

0.24). However, two (66.7%) of the patients with gonorrhoea were infected with HIV infection. Gonorrhoea was found to be significantly associated with HIV acquisition P = 0.003). The odds ratio of hormonal contraceptive users infected with gonorrhoea acquiring HIV infection was 16.8 (1.4-199.8). Other STIs were not associated with acquisition of HIV. (Table 5)

TABLE 5: ASSOCIATION OF VULVOVAGINAL CANDIDIASIS AND OTHER STIS WITH HIV INFECTION

Infection	HIV Infection		P Value	OR (95% CI)
	Negative Frequency (%)	Positive Frequency (%)		
Vulvo-vaginal candidiasis	**22 (81.5)**	**5 (18.5)**	**0.24**	**2.02 (0.61-6.6)**
Bacterial vaginosis	**25 (89.3)**	**3 (10.7)**	**0.801**	**0.84(0.22-3.2)**
Trichomoniasis	**9 (75.0)**	**3 (25.0)**	**0.146**	**2.82 (0.66-11.9)**
Chlamydia trachomatis	**7(77.8)**	**2 (22.2)**	**0.330**	**2.2 (0.421-12.1)**
Gonorrhoea	**1(33.3)**	**2 (66.7)**	**0.003***	**16.8 (1.4-199.8)**
Genital warts	**6 (85.7)**	**1 (14.3)**	**0.850**	**1.23 (0.137-11.05)**

TABLE 6: ASSOCIATION OF VULVO-VAGINAL CANDIDIASIS WITH HORMONAL CONTRACEPTIVES TYPE AND OTHER RISK FACTORS

Infection	Vulvo-vaginal candidiasis		P Value	OR (95% CI)
Types of Contraceptives / Risk factors	Positive Frequency (%)	Negative Frequency (%)		
Oral Contraceptives	**8 (26.7)**	**22 (72.3)**	**0.610**	**0.78 (0.30-2.03)**
Injectable Contraceptives	**8 (22.2)**	**28 (77.8)**	**0.857**	**1.06(0.426-2.78)**
Norplant implant	**0 (0.0)**	**2 (100.0)**	**0.432**	**2.82 (0.66-11.9)**
Emergency Contraceptives	**11 (22.9)**	**37 (77.1)**	**0.939**	**1.04 (0.43-2.46)**
Multiple sexual partners	**26 (42.6)**	**35 (57.4)**	**0.261**	**1.04 (0.96-1.12)**
Douching	**7 (16.3)**	**36 (83.7)**	**0.171**	**1.94 (0.74-5.06)**
Vaginal discharge	**23 (45.1)**	**28 (54.9%)**	**0.001**	**12.5 (3.9.-39.5)**
Vaginal pruritus	**17 (53.1)**	**15 (46.9)**	**0.001**	**2.2 (1.4- 3.7)**
HIV Infection	**5 (35.7)**	**9 (64.3)**	**0.24**	**2.02 (0.61-6.6)**
Trichomoniasis	**3 (25.0)**	**9 (75.0%)**	**0.88**	**1.01(0.87-1.18)**
Bacterial vaginosis	**10 (35.7)**	**18 (64.3)**	**0.56**	**2.3 (0.91-5.9)**
Chlamydia Cervicitis	**3 (33.3)**	**6 (66.7)**	**0.46**	**1.7 (0.42-7.4)**

In this study, Eleven (40.7%) of the women infected with vulvovaginal candidiasis were regular emergency oral contraceptive users. Acquisition of VVC was observed more in women who had multiple sexual partners in the preceding one month before the study, though not statistically significant (P = 0.068). 96.3% (26 of 27) of women infected with VVC had multiple sexual partners. Douching was also found to increase the risk of acquisition of VVC. 25.9% of women with VVC usually practice douching (P= 0.171). (Table 6)

DISCUSSION

Vulvovaginal candidiasis is a common gyneacological health problem that is usually diagnosed in women of child bearing age;(24) and it has been associated with profound morbidity in all strata of women all over

the world.(11) In our study, the prevalence of vulvovaginal candidosis was 23.3% among women attending the family planning clinic in University College Hospital, Ibadan, Nigeria. This is the second most common infection after bacterial vaginosis (24.1%). The results of previous studies have confirmed similar rates that ranged from 18.5-30%. (25, 26) However, this rate is much lower than 84.5% discovered in Kano, Nigeria (27); 45.0% obtained by Namkinga et al in Dar es Salaam (28) and 40% found by Ibrahim and his colleagues in Maiduguri, Nigeria (29). This finding may not be unconnected with the fact that some of the women could have some underlying asymptomatic co-morbidity especially diabetes mellitus. The prevalence of yeast infections has also greatly increased worldwide because of indiscriminate use of antibiotics and immunosuppressive treatment.(30) Tarry et al have established that the use of oral contraceptives with high oestrogen content could encourage increased vaginal colonisation with *Candida* spp (31)

In this study, we found out that more than half (56.9%) of those seeking contraceptive use are in their active reproductive age (20-29 years old) and only 6.9% are in the 40-59 years age bracket. The mean age of women in this study is 28.7 years. This result is not unexpected as most of these young women were single, sexually active and prefer hormonal contraceptives. The finding is in concordance with previous study by Fisher and Boroditsky that examined sexual activity of single Canadian women aged 15-29.(32). Vulvovaginal candidiasis (VVC) was more common in women aged 20-29 years (59.3%) and lowest in 40-59 years (7.4%). This finding was also in agreement with other study that showed that the incidence of vulvovaginal candidiasis usually peaks in the third decade of life and reduces in women older than 40 years of age.(19) Despite the higher number of single women using hormonal contraceptives, prevalence of VVC was noticed more in married women living with their spouses. This might not be unconnected with increased sexual activities with married women. This finding agreed with Okungbowa et al who reported similar findings among married women.(19)

Sexual risk behaviours that have been documented to influence the acquisition of VVC were not statistically significant in our study. Early age of sexual debut (16-20 years) accounted for higher rate of VVC (16 of 27, 70.4%) but is not significantly associated with the infection. Women that engage with at least two or more casual sex partners also had increased rate of VVC (13 of 27, 48.1%) with no significant association for the acquisition of VVC. This was not in agreement with the findings of Hellberg *et al* and Rathod *et al* that reported age of sexual debut; casual sex partners and regular oral sex being associated with repeated VVC. (33, 34) However, this is in agreement with the findings of Corsello et al that believed that increased number of sexual partners, age of sexual debut and increased frequency of sexual intercourse were not significantly risk factors associated with VVC.(35) Douching has been documented to be an important risk factor for the acquisition of vulvovaginal candidosis in previous studies (34, 36) .In our study, seven (25.9%) of the women who had VVC usually practice douching , however, this was not found to be statistically significant (p=0.171). Vaginal discharge was the commonest presentation (51 of 116, 44.0%) closely followed by vaginal pruritus (32 of 116, 27.6%). Some of these women also presented with the combination of vaginal discharge and vulvo-vaginal pruritus at the time of study. Almost all women that presented with vaginal pruritus (31 of 32, 96.9%) also had vaginal discharge. It was noticed that more than half of women (17 of 27, 53.1%) that presented with pruritus had VVC. Vaginal pruritus has been found to be significantly associated (p=0.001) with the occurrence of VVC in our study. These findings were in tandem with the results of similar studies that reported either combination of the symptoms or vaginal pruritus alone. (27, 37) (Table 6)

Types of hormonal contraceptives could also influence the acquisition of VVC. In this study, it was found that usages of oral and emergency contraceptives were found to be the commonest; however none of the hormonal contraceptive methods in this study was significantly associated with the acquisition of VVC. Eleven (22.9%) of the 48 women using emergency contraceptives had VVC and this is not statistically significant. This finding is similar to some studies that believed oral contraceptive alone may not influence the recurrence of VVC (16, 38). However, this is not in agreement with the findings of another study that found that users of oral contraceptive pills are at increased risk for acquisition of VVC.(6)

Vulvo-vaginal candidiasis has been linked as risk factor for the increased acquisition of HIV in hormonal contraceptive users. However, in our study there was no significant association between VVC and acquisition of HIV (P=0.24), only five (18.5%) of those women infected with VVC were seropositive for HIV infection. Our finding is not in agreement with the study of Martins *et al* that found a strong trend of association between the use of high dose of oral contraceptive pills and HIV acquisition. (5) The prevalence of Chlamydia cervicitis and gonococcal cervicitis in this study was 7.8% and 2.6% respectively. There was no significant association between the acquisitions of VVC and Chlamydial infection (P= 0. 46). This result was in tandem with

the previous studies regarding use of combined oral contraceptives and cervical Chlamydia infections (6, 39, 40). However, few of these studies reported conflicting results. In a prospective cohort study in the U.S. it was found that women using COCs were not at increased risk of developing gonorrheal or chlamydial cervical infection compared with women using non-hormonal contraception (39). Other infections like bacterial vaginosis, genital warts and trichomoniasis were not strongly associated with development of VVC in women using hormonal contraceptives in this study.

Young age, education, Christianity, non-marital status, and lower social class; influenced the choice and use of different hormonal contraceptive method though no significant association. Hormonal contraceptives users were associated with increased prevalence of vulvovaginal candidiasis in this study though not statistically significant. Vaginal discharge and vulvovaginal pruritus are the commonest symptoms that are strongly associated with VVC. There is need for public health enlightment programme to educate women using hormonal contraceptives methods to adopt safer sexual behaviours, as well as seeking early diagnosis and treatment of VVC and other sexually transmitted infections. The main limitation in this study was the lack of speciation of the non-albicans strains of *Candida* and was due to unavailability of Chromogenic Agar (CHROM agar) and other molecular diagnostic facilities in our center then. Temporal causality could not be established since this is a cross sectional study. Our small size limitation could also have interfered with the ability to fully explore the various associations.

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