PREVALENCE AND FACTORS ASSOCIATED WITH VULVOVAGINAL CANDIDIASIS AMONG ATTENDEES OF THE SPECIAL TREATMENT CLINIC, UCH IBADAN.

BY

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CERTIFICATION:

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DEDICATION

This work is dedicated to God, Almighty, who makes all things possible, and to the memory my late father, Chief E. O. Olorunfemi.

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I give thanks to God, the almighty for his grace and provision

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ABSTRACT

Introduction

Vulvovaginal candidiasis (VVC) is a common female genital tract infection that has been known to affect 75 % of women at least once in their lifetime. It is a disease associated with significant morbidity and health expenditure. In this environment, there's paucity of data on factors associated with VVC.

Objectives

The objectives of the study were to determine the prevalence of Vulvovaginal candidiasis and of other reproductive tract infections/ sexually transmitted infections (RTI/STI) among female patients seen at the special treatment clinic, UCH Ibadan, to evaluate concurrent infection of VVC with other RTI/STI and to identify factors associated with VVC.

Methodology

A five year retrospective review of data collected between July 2003 and June 2008 for female attendees of the special treatment clinic University College Hospital Ibadan was carried out. Data on sociodemographic characteristics, clinical presentation, laboratory investigations, and management were collected and analysed.

Result

Four hundred and ninety four records were examined. The mean age of subjects was 30 years (SD 9.92). Commonest presentation was vaginal discharge plus vulval itching (27%). The prevalence of vulvovaginal candidiasis was 30.6%. The prevalences of bacterial vaginosis, genital warts and chlamydia cervicitis were 22.9%, 14.2%, and 11.1% respectively, while those of herpes genitalis, trichomoniasis, gonorrhoea, and syphilis were 3.8%, 3%, 1.2%, and 0.4% respectively. Co-infection was seen in 40% of subjects with VVC the highest being seen with bacterial vaginosis (19.2%) followed by genital warts (7.3%). Significant associated factor with

VVC in this population was age, less than 40 years, (OR 2.85, P= 0.035). No association was found with antibiotic ingestion nor with pregnancy.

Conclusion

Vulvovaginal candidiasis is the commonest genital infection in the study population. Young women are at higher risk and concurrent infections especially with bacterial vaginosis are quite common.

Key words: Vulvovaginal candidiasis, recurrent vulvovaginal candidiasis, reproductive tract infection, sexually transmitted infection.

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CHAPTER ONE

1.1 BACKGROUND

Vulvovaginal candidiasis (VVC) is a reproductive tract infection which remains a common cause of morbidity adversely affecting women's physical and emotional health. It is associated with recurrent episodes defined as four or more episodes of symptomatic infection annually (Mitchell, 2004) resulting in substantial chronic discomfort and which are quite difficult to eradicate (Pirotta, 2006). It has been estimated that 75% of adult women suffer at least one episode of VVC during their lifetimes and that approximately 40–50% of these will experience at least one further episode.

Generally, Reproductive Tract Infections/Sexually Transmitted Infections (RTIs/STIs) affect a lot of women worldwide. The World Health Organization estimates that each year, there are over 333 million new cases of curable STIs. RTIs that are not sexually transmitted are considered even more common (Population council).

A community-based survey done in Vietnam found a prevalence of RTI/STI of 37% in married women, and VVC was the commonest infection affecting 26% of these women (Lan et al., 2008).

Even in hospital based studies, VVC accounts for about 20- 25% of sexually transmitted/ reproductive tract infections in women (Freedman et al., 2006). Locally, it was reported by Bakare et al (2003) as the most common Sexually Transmitted Disease in women.

Vulvovaginal candidiasis is a yeast infection caused by the Candida species with 80 – 90% by *C. albicans* while non albican species account for the remaining 10- 15%. VVC is not considered a typical sexually transmitted infection as the commonest mode of transmission is endogenous from the vagina of the host where it may be present as normal vaginal flora (Garland, 2006).

Vulvovaginal candidiasis results if conditions in the vagina change so as to give the yeasts an advantage over competing normal vaginal bacteria and induce an inflammatory response. The sexual transmission of vaginal candidiasis is considerably less than that of other forms of vaginitis.

There are several factors that have been linked with the development of VVC including, ingestion of broad-spectrum antibiotics which inhibit normal bacterial flora thereby favouring the growth of yeasts and use of oral contraceptives due to the higher prevalence of vaginal carriage of candida and therefore susceptibility to vulvovaginal candidiasis.

Studies have also confirmed the increased susceptibility of pregnant women to vulvovaginal candidiasis (Limia et al., 2004; Feyi-Waboso, 2001), and some non-pregnant women preceeding each menstrual period. The presence of IUCD has been implicated as well in the development VVC probably due to adherence of Candida to different parts of the device and its formation of biofilm (Chassot et al, 2008).

VVC is also associated with poorly controlled diabetes mellitus (Ray, 2007). It has been suggested that tight, insulating clothing predisposes to VVC by increasing vulvar warmth and moisture. Acquired immunodeficiency syndrome is also a risk factor resulting in refractory and sometimes severe disease (Rein, 2000; McClelland 2005). Also, the role of VVC as a significant co-factor in HIV transmission has been documented (Hester 2003). A history of previous STI such as herpes is thought to increase the risk as well.

The presenting features of symptomatic vulvovaginal candidiasis (VVC) include vulval irritation/itching and vaginal discharge. Candidal discharge is classically thick and adherent and contains curds.

A high vaginal swab for microscopy, culture and sensitivity is the most important investigation. Microscopy alone is not sensitive enough hence the need for culture (Fernández-Limia et al 2007).

A variety of other STI/RTI may be seen in women some of which may coexist with VVC. Therefore, samples are also taken to determine co-infection with other sexually transmitted infections as indicated. These include other causes of vaginitis such as bacterial vaginosis and trichomoniasis, causes of cervicitis which include, gonorrhea, Chlamydia cervicitis, and ulcerative infections like chancroid, syphilis, herpes genitalis, and lymphogranuloma venereum. The prevalence of each of these infections varies with regions. (McClelland, 2005). Other investigations include endocervical swab for microscopy, culture and sensitivity for gonorrhoea or chlamydial cervicitis and blood for VDRL in syphilis.

The majority of *C. albicans* isolates are susceptible to azoles such as fluconazole while non albican strains are much less susceptible to this group of drugs. Recurrent episodes are more often caused by non-albicans species, for which azole agents are therefore less likely to be effective (Richter et al., 2005).

1.2 PROBLEM STATEMENT

Vulvovaginitis is common in women of all age groups. Several studies have described its association with substantial cumulative morbidity, genital discomfort, loss of productivity, psychological distress and the incurring of significant medical expenditure (Echenbach, 2004). Candida infection accounts for 40- 50% of all cases of vulvovaginitis and is also the most common cause of genital infections in general, thus, making it a public health concern. Also recurrences are frequent, especially in those at risk, worsening the burden of the disease. There is

paucity of data on vulvovaginal candidiasis and associated factors locally, therefore it is necessary to address these issues.

The syndromic approach is used for the management of STI in many healthcare institutions throughout Africa, as laboratory assays are generally unavailable or too costly and result in delays in case management while cheap generic drugs are available for the simultaneous treatment of the two or three most likely aetiological agents depending on local prevalence and clinical symptoms (Pepin et al., 2004). It is important to fully understand each RTI/STI especially in relation to clinical presentation and risk assessment in order to treat patients adequately using this approach.

1.3 RATIONALE FOR THE STUDY

Vulvovaginal candidiasis though an important female genital tract infection, is frequently neglected as a research subject (Nyirjesy 2001). In the population of patients to be studied, many issues have been addressed including genital ulcers, warts, HIV etc. (Okesola et al 2000, Fawole et al 1999, Kehinde et al 2004,Ekweozor et al.1995). Even those studies are quite dated as many of them were carried out about a decade or more ago. There is thus no recent publication known to the author on current prevalence and pattern of vulvovaginal candidiasis and also other reproductive tract infections in this environment. Also, despite using the syndromic approach to treat STIs in many areas, the prevalence of co-infection of other STIs with VVC, the commonest STI, has not been ascertained.

Moreover it is important to identify risk factors for VVC and available studies have not attempted to identify factors associated with VVC locally except those carried out by Ogunbanjo

(1988) and Elegbe et al (1982). There is therefore the need to undertake this study so as to better understand and aid the management of this common ailment affecting women.

1.4 OBJECTIVES.

Broad objective.

To assess the pattern of presentation of vulvovaginal candidiasis among STC attendees.

Specific objectives.

1. To determine the prevalence of Vulvovaginal candidiasis and other RTI/STI among STC attendees.
2. To determine the pattern of concurrent infection of Vulvovaginal candidiasis with other reproductive tract infections/ sexually transmitted RTI/STI.
3. To identify factors associated with Vulvovaginal candidiasis among the attendees.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Vulvovaginal candidiasis (VVC) is a reproductive tract infection which remains a common cause of morbidity. This condition adversely affects women's physical and emotional health and is associated with recurrent episodes that can cause substantial chronic discomfort and which are quite difficult to eradicate (Pirotta, 2006).

2.2 DEFINITION OF TERMS

Reproductive tract infection (RTI):

This is a broad statement that refers to three general types of infections that affect the reproductive tract. The three types of reproductive tract infections are endogenous infections, iatrogenic infections and, the more commonly known, sexually transmitted infections. Endogenous reproductive tract infections are a result of overgrowth of organisms normally present in the vagina. Worldwide, they are the most common cause of RTIs among women. If they are not treated, they can cause problems ranging from localized irritation to more serious consequences, such as pelvic inflammatory disease. Many RTIs such as Vulvovaginal candidiasis can occur in the absence of sexual activity.

Sexually transmitted infection (STI) is an infection that has a significant probability of transmission between humans by means of sexual contact, including vaginal intercourse, oral sex, and anal sex with a classical example being gonorrhoea. Older names for STI include sexually transmitted disease (STD) and venereal disease (VD).

Though actually classified as an endogenous RTI many publications especially older ones include VVC among the classical sexually transmitted infection.

Recurrent Vulvovaginal candidiasis is defined as four or more episodes of symptomatic infection annually (Mitchell, 2004)

2.3 EPIDEMIOLOGY OF REPRODUCTIVE TRACT INFECTIONS

RTIs/STIs affect a lot of women worldwide. The World Health Organization estimates that each year, there are over 333 million new cases of curable STIs such as gonorrhoea. In addition, United Nations calculated that in 2000 alone, 5.3 million people became infected with HIV, an incurable STI. RTIs that are not sexually transmitted are considered even more common (Population council).

In general, it has been estimated that 75% of adult women suffer at least one episode of VVC during their lifetimes and that approximately 40–50% of these will experience at least one further episode. A small subgroup of women, (5%), suffers from repeated, recurrent, often intractable episodes (Irvin et al 1998).

A community-based survey done in Vietnam found a prevalence of RTI/STI of 37% in married women, and VVC was the commonest infection affecting 26% of these women (Lan et al., 2008). Even in hospital based studies, VVC accounts for about 20- 25% of sexually transmitted/ reproductive tract infections in women (Freedman et al., 2006).

Locally, Bakare et al. (2003) in Ibadan also reported it as the most common STD among both commercial sex workers whom they were studying and the control group of STC attendees. Adolescents can also be affected as Rylander et al. (2004) found a prevalence of 40% in sexually active adolescents with 22% being symptomatic.

However depending on which literature is reviewed, there are differing reports as to whether vulvovaginal candidiasis or bacterial vaginosis is the most common RTI in women (Bradshaw et al., 2005).

2.4 CAUSATIVE ORGANISM

Vulvovaginal candidiasis is a yeast infection caused by the Candida spp with C. *albicans* being the most common species (Rein, 2000). *Candida albicans* vulvovaginitis accounts for 80 – 90% of cases while non-albicans species such as C. *glabrata*, C. *tropicalis* and C. *krusei* account for the remaining 10- 15%. Several reports have corroborated this including that by Grigoriou et al (2006) with 80.2% being C. *albicans* and 19.8% C. *glabrata* and Sobel (2004) who reported 93.9% and 3% prevalence of C. *albicans* and C *glabrata* respectively.

2.5 MODE OF TRANSMISSION/ SOURCE OF INFECTIVE AGENT OF VVC

Endogenous infection:

The most common mode of transmission is endogenous from the vagina of the host. Yeasts may be considered part of the normal vaginal flora if present in small numbers and producing no symptoms and this can be found in 17- 30% of women (Garland, 2006). Vulvovaginal candidiasis results if conditions in the vagina change so as to give the yeasts an advantage over competing normal vaginal bacteria and induce an inflammatory response which results in presentation at health care facilities.

Oral cavity flora- Infections have also been associated with the practices of receptive oral intercourse as candida is a normal oral cavity flora and saliva also contains a lot of antibacterial substances (Edwards, 1998).

Rectal contamination- Also infections have been known to occur through vaginal contamination by candida which constitute rectal flora. In fact many intractable recurrent infections have been ascribed to be caused by continuous seeding of organisms from the gastrointestinal tracts of these women. (Miles, 1977)

Sexual transmission:

The sexual transmission of vaginal candidiasis is considerably less than that of other forms of vaginitis although VVC generally increases in incidence with the onset of sexual activity. Balanitis and balanoposthitis, however, have been reported in 3 to 10% of the male sexual partners of women with candidal vulvovaginitis, and these conditions are clearly sexually transmitted (Rein, 2000). They present as plaques of cheesy material on the penis and/or foreskin accompanied by severe itching and burning.

Ogunbanjo (1988) isolated yeast from the urethra of 5% of male contact of female patients with candidiasis and seminal fluid culture raised the percentage to 70% further reinforcing the role of sexual transmission in the incidence of VVC.

2.6 RISK FACTORS

Several factors have been adduced for changes that could lead to VVC and they include:

Recent therapy with antibiotics, especially broad-spectrum antibiotics, inhibit normal bacterial flora thereby favouring the growth of yeasts. Excess risk is said to occur in the first month after use of antibiotics (Xu et al., 2008). The widespread use of antibiotics has been said to be the most important factor in the emergence of candidiasis (Edwards 2000). VVC sometimes follow courses of vaginal antimicrobials used to treat other causes of vaginitis such as trichomoniasis and bacterial vaginosis. Pirrota and Garland (2006) found that after taking antibiotics, vaginal

colonization with candida increased from 21 to 37% in their study population making them more prone to symptomatic infection. Xu et al. (2008) actually found increased prevalence of colonization and also increased prevalence of symptomatic infection in their study participants.

VVC is also associated with poorly controlled diabetes mellitus. Patients with diabetes are at increased risk of developing vulvovaginal candidiasis (VVC) unlike nondiabetic women and these patients have a higher proportion of infection due to non–albicans Candida species such as *C. glabrata* and *C. tropicalis*. (Ray, 2007)

The prevalence of vaginal carriage of Candida and therefore susceptibility to vulvovaginal candidiasis is higher among users of oral contraceptives than among women using other methods of birth control. This is because of the estrogen content of these pills as oestrogen has been demonstrated to reduce the inhibitory activity of vaginal epithelial cells against Candida (Fidel et al., 2000)

The presence of IUCD has also been implicated in the development of vulvovaginal candidiasis probably due to adherence of Candida to different parts of the device, which acts as a foreign body, and thus promotes formation of biofilm (Chassot et al., 2008).

Studies have also confirmed the higher susceptibility of pregnant women to vulvovaginal candidiasis than non-pregnant women, and occurs in 10% of pregnant women in their first-trimester and 36 to 55% of women in their third trimester. Limia et al (2004) in Cuba found a prevalence of 42% about the same as a Nigerian study in Aba (Feyi-Waboso, 2001)

Some non-pregnant women note recurrent or increasing symptoms at the second half of the menstrual cycle, preceding each menstrual period. This is because of the increased levels of hormones, especially oestrogen, accompanying the luteal phase of the cycle.

It has been suggested that tight, insulating clothing especially the wearing of nylon undergarments predisposes to VVC by increasing vulva warmth and moisture enabling candida to thrive.

Acquired immunodeficiency syndrome due to impairment of both cell mediated immunity and local mucosal immunity which occurs in this condition is said to predispose women to VVC (Rein, 2000). Such patients have higher incidence and more persistent infections than their counterparts but there are conflicting reports as to whether infection is actually more severe in them (Duerr et al., 2003).

A history of previous STI such as herpes is thought to increase the risk as well. Corticosteroids and immunosuppressive therapy are also thought to predispose to VVC due to the deficiency in immunity that accompanies them (Arya et al,. 1989)

2.7 CLINICAL PRESENTATION

The presenting features of symptomatic vulvovaginal candidiasis (VVC) include vulval irritation, vulval itching and vaginal discharge. There could also be dysuria which is described as external and dypareunia can be distressing (Arya et al. 1989). In the study by Sonnex and associates, (1999) irritation alone was found as the commonest symptoms of VVC (27%) followed by irritation plus vaginal discharge (25%).

Candidal discharge is classically thick and adherent and contains curds. However, this symptom is not specific as it may, however, be thin and loose and thus resemble the discharge of other vaginitis such as bacterial vaginosis and trichomoniasis

2.8 INVESTIGATIONS

A high vaginal swab specimen for microscopy, culture and sensitivity is the most important investigation. Microscopy of either a Gram stained or wet mount preparation is then carried out. This shows moderate to abundant yeast cells, epithelial cells and relatively few polymorphonuclear neutrophils. Many infections may be missed if microscopy alone is done due to its low sensitivity of about 60% (Fernández-Limia et al 2007). It is therefore important to do a culture as well. Culture is done on a directly plated solid fungal media such as sabourauds agar. The vaginal pH is generally normal (approximately 4.5) in women with VVC in contrast to the pH in trichomoniasis or bacterial vaginosis, in which it is characteristically elevated.

"Whiff" test, the production of a fishy odour on addition of 10% potassium hydroxide (KOH) to vaginal discharge on a slide or in the speculum, is negative in most women with VVC. Such an odour suggests trichomoniasis or bacterial vaginosis.

Samples are also taken to investigate the presence of other pathogens which may cause a co-infection with Candida as indicated, e.g. endocervical swab for microscopy, culture and sensitivity when gonorrhea or chlamydial cervicitis is suspected and blood for VDRL in syphilis.

2.9 OTHER STI/RTI

A variety of other STI/RTI may be seen in women some of which may coexist with VVC. In a study carried out in the United States in 2006, a prevalence rate of 17% coinfection with STI was found among women being treated for vulvovaginal candidiasis (Gable, 2006). These infections include other causes of vaginitis such as Bacterial Vaginosis and trichomoniasis, causes of cervicitis which include, gonorrhoea, Chlamydia cervicitis, and ulcerative infections like chancroid, syphilis, herpes genitalis, and lymphogranuloma venereum. There could also be

genital swelling from such conditions as genital warts which is caused by human papilloma virus.

Bacterial vaginosis results when the local vaginal environment is disturbed by the effect of antibiotics, hormonal imbalance, contraceptives, stress etc. The etiology is not well defined; however there are decreased quantity of the normal flora of *lactobacillus spp* and increased *Gardnerella vaginalis* associated with other bacteria such as *Peptostreptococcus spp*, *Bacteroides spp*, and *Mycoplasma spp*.

Trichomoniasis is caused by the flagellated protozoan *Trichomonas vaginalis* and is sexually transmitted. It presents as vaginal discharge with a characteristic fishy odour.

Gonorrhoea is sexually transmitted, due to infection by *Niesseria gonorrhoeae* and in women causes mucopurulent cervical discharge.

Chlamydia trachomatis is a cause of nongonococcal cervicitis. Genital herpes is caused by herpes simplex virus type II and presents as initial vesicles which later ruptures then ulcerates.

The prevalence of these infections vary with regions. In Nigeria, in 1992, Oni et al while studying herpes simplex virus (HSV) infection among both male and female STC attendees at the University College Hospital, Ibadan, found that the prevalence of HSV was 4.6% The prevalence of other STIs were genital herpes 31.6%, Neisseria gonorrhoeae urethritis 15.8%, nonspecific urethritis 15.8%, candidiasis 21%, genital warts 10.5% and, trichomoniasis was 1%. No one in the study group had syphilis.

There seems to be a reciprocal relationship between HIV and VVC as HIV infection is said to increase the risk of infection with candida leading to VVC, oral candidiasis etc. (McClelland, 2005). Recent reports have also postulated infection with VVC as a significant co-factor in HIV transmission (Hester 2003).

2.10 MANAGEMENT

A wide variety of agents are available for the treatment of VVC as recommended by the Centres for Disease Control and Prevention, (CDC), (2006). Treatment could be topical and/or oral as oral and intravaginal agents are said to be equally effective in the treatment of uncomplicated vulvovaginal candidiasis. The "-azole" antifungal agents, for example fluconazole, are used for empirical therapy of uncomplicated candidal vulvovaginitis. The majority of C. *albicans* isolates are susceptible to fluconazole while non albican strains are much less susceptible to this drug. Other azole antifungals are butoconazole, miconazole, tioconazole etc. Recurrent episodes are more often caused by non-albicans species, for which azole agents are therefore less likely to be effective (Richter et al., 2005). Other classes of agents used are nystatin, boric acid and gentian violet amongst others, however, some authorities recommend long term fluconazole therapy for this group of patients (Sobel JD et al 2004).

The syndromic approach is used for the management of STI in many healthcare institutions throughout Africa, as laboratory assays are generally unavailable or too costly and result in delays in case management while cheap generic drugs are available for the simultaneous treatment of the two or three most likely aetiological agents depending on local prevalence and clinical symptoms (Pepin et al., 2006)

2.11 COMPLICATIONS

Recurrent Vulvovaginal candidiasis (RVVC) as mentioned earlier is the most bothersome complication Also Vulvar Vestibulitis (VVS) which is a chronic genital pain syndrome,

characterised by vestibular pain, tenderness and erythema, is a problem that is associated with earlier recurrent vulvovaginal candidiasis. (Sarma et al, 1999)

Endometritis due to candida infection has also been reported and the urethra may be secondarily affected as well resulting in urinary tract infection (Edwards, 2000)

2.12 PREVIOUS WORKS

A previous local study on factors associated with candidiasis was carried out by Elegbe et al in 1982. They studied female undergraduates and found that those who wore tight clothing had a higher incidence of candidiasis than females who wore loose dresses. Also, Ogunbanjo et al evaluated the role of sexual partners in the transmission of vaginal candidiasis in 1988.

Furthermore, several studies have been carried out among patients attending the special treatment clinic investigating various subjects which include: the prevalence of genital ulcer disease (Fawole et al 2000), also, Okesola and associates (2000) studied genital warts in the same population and found a prevalence of 8%

Sociodemographic characteristics of adolescent attendees has been described by Fawole et al (1998) who found that they constituted between 3.3 and 4.8% of the clinic population.

In addition, Bakare and associates have done a lot of work on gonococcal infections in this population (Bakare et al, 1997; 2001; 2002).

The issue of HIV has been extensively studied in this population by investigators such as Kehinde et al (2004) who found a prevalence of 30% HIV co-infection with STIs. Ekweozor and associates have also described the clinico-epidemiological patterns of HIV amongst this population (1995)

However, no recent study as has addressed vulvovaginal candidiasis as its subject.

CHAPTER THREE

METHODOLOGY

3.1 STUDY DESIGN:

This is a retrospective review of records.

3.2 STUDY SITE:

The Special Treatment Clinic, University College Hospital, Ibadan was the study site. The University College Hospital, Ibadan where the clinic is situated is a tertiary health facility and is accessed by those within the city and also receives patients referred from neighbouring cities and states.

This clinic was established to manage both males and females with sexually transmitted infections and some related endemic diseases such as other treponematoses apart from syphilis. It is operated mainly by the department of Medical Microbiology, in conjunction the departments of Community Medicine and Obstetrics and Gynaecology as these departments have important contributions to the management of sexually transmitted diseases.

The clinic is open every week day from 8am to 4pm except on public holidays. Most of the patients are those referred with related symptoms from general outpatient departments mainly and also from other clinics in the hospital. Many patients are also referred from outside healthcare facilities; however, the clinic is open to the general public with symptoms even without prior referral.

Between fifteen and forty and old and new patients are seen per week. Patients presenting for the first time pay about N1500 for registration consultation and laboratory investigations.

3.3 STUDY POPULATION:

The study population consisted of female patients who were presenting for the first time at the Special Treatment Clinic in a five year period preceding the study.

3.4 SAMPLE SIZE:

Minimum sample size required for this study was calculated using the formula

$$n = \frac{z^2 pq}{d^2}$$ (Kish, 1965)

where-

n= the desired sample size.

z= standard normal deviate, 1.96, which corresponds to 95 percent confidence level.

p= proportion in the target population estimated to have a peculiar characteristic, therefore, 21%, the prevalence of vulvovaginal candidiasis reported by Oni et al (1992) was be used.

q= 1.0 - p

d= the desired difference (5%)

$n= (1.96)^2(0.21)(0.79)/0.05^2$

=254.8 ~255

A total population survey of cases of reproductive tract/ sexually transmitted infections seen in the last 5 years between July 2004 and June 2008 at this facility was actually carried. This yielded a sample size of 494 after exclusion of undesired cases.

3.5 EXCLUSION CRITERIA:

Records of females containing grossly incomplete data defined as having less than 50% of data especially age and clinical presentation were excluded.

Also female attendees whose presentation was not related to RTI/STI were excluded from the study.

3.6 DATA COLLECTION PROCEDURE:

Records of all those presenting for the first time at the facility during the period of study were retrieved from the records department of the University College Hospital, Ibadan. A questionnaire was created for data collection with the following sections: demographic information, clinical details, sexual practices, gynaecologic history, past history, investigations done, diagnosis and treatment given. Data was then extracted from the case notes and filled in the appropriate sections of the questionnaire.

3.7 DATA MANAGEMENT

Data extracted from the records were entered into SPSS version 15 computer software. It was checked for errors and cleaned. Data was first summarized by descriptive statistics such as frequency tables and charts. The proportions with different sexually transmitted infections were computed. The relationship between characteristics of respondents and diagnosis of vulvovaginal candidiasis were tested using the chi-squared test. Logistic regression analysis was carried out for significant associations and 95% confidence interval for odds ratio computed. Level of significance was put at 5%.

3.8 LIMITATIONS

1. Insufficient data: Secondary data was used to carry out this research work therefore parameters not routinely collected at this facility could not be explored. Also, a good number of subjects had no records for many characteristics most especially reproductive history parameters, resulting in a lot of missing data.
2. Information on marital status was inadequate as only "single or married" was obtained, it was not broken down into "never married, divorced, separated, widowed etc". This information is important as marital situation is likely to affect the risk of exposure to sexually transmitted infections

CHAPTER FOUR

RESULTS

4.1 SOCIODEMOGRAPHIC CHARACTERISTICS

Table 1 shows the sociodemographic characteristics of the patients

Five hundred and eighty three new female patients were seen at the special treatment clinic UCH between July 2003 and June 2008. Of these, eighty nine records (15.3%) were excluded due to grossly incomplete data or presentation not related to genital tract infection and the remaining four hundred and ninety four cases were recorded. The mean age of subjects was 30.6 years (SD 9.92) with a range of 2- 65 years. About 8% (40) were adolescents, 73.4% (373) were young women while the remaining 18.6% (87) were middle aged women. Those who had never been married constituted 43.5% and those who were married, separated or widowed were 56.5%. About twenty seven percent of the population were professionals, 30.5% were sales and service workers while students constituted 35.3% of subjects. Nearly all subjects were Nigerians (99%) with 84.2% being Yoruba. Close to half of the subjects lived in high density areas, about two fifth in moderate density area and only one tenth in low density areas.

Table 2 shows the sociodemographic characteristics of subjects with vulvovaginal candidiasis. There were 151 subjects with vulvovaginal candidiasis. The age range of subjects was from 9- 60 years with a mean of 29.56 years (SD 8.55). About 7.3% (11) were adolescents, 12.7% (19) were middle aged women while the remaining 80% were young women. Those who had never been married constituted 49.53% and those who were married, separated or widowed were 50.7%. Twenty five percent of the population were professionals, 29% were sales and service workers while 39.3% of the population were students. Most subjects were Nigerians (99.3%) with 83.8%

being Yoruba. Forty eight percent of subjects with VVC lived in high density areas, 39.8% in moderate density area and 12.2% in low density areas.

4.2 CLINICAL FEATURES

Table 3 shows the clinical features (presenting complaints and history of previous medications) of all cases reviewed. About two thirds of the population presented with vaginal discharge while 46.4% presented with itching. Other clinical presentations include offensive odour (16.2%), genital swelling (12.1%) and abdominal/ suprapubic pain (10.3%). Before presentation, 45.4% of subjects had taken antibiotics and 18.9% had taken antifungals.

Figure 1 shows the presenting features of those with vulvovaginal candidiasis as the only diagnosis. Of those who had VVC as the sole diagnosis, vaginal discharge and itching was the commonest presentation (27%) followed by vaginal discharge alone (21.3%).

4.3 REPRODUCTIVE HISTORY

Table 4 shows some reproductive history parameters including sexual exposure, last sexual exposure, contraceptives method employed, period of cycle, number of previous reproductive tract infections, and number of children (parity). Over 90% of subjects had been sexually exposed and 29.8% had sexual intercourse within one week of presentation while about one third had not been sexually active for over one month. More than half of the population did not use any form of contraception while about one third (29.4%) claimed regular condom use. Fifty six percent had not had any previous reproductive tract infections while the remaining 44% had had at least one infection in the past. More than half of the population (55.9) was nulliparous and the

remaining 44.1% had at least one child. Pregnant women constituted 5.7% of the population and 6.4% were menopausal.

4.4 LABORATORY RESULTS

Table 5 shows the laboratory results of all subjects. More high vaginal swabs were carried out than endocervical swabs. The most common cells found on microscopy of both HVS and ECS were secondary organisms and epithelial cells.

Candida was found more in the HVS specimen, gonococcal cells more in the ECS specimen and Trichomonas vaginalis more in the wet preparation specimen than other specimens for microscopy.

Candida was the most frequently isolated organism on culture though the most prevalent result was "no significant growth"

Table 6 shows the proportion of positive yield for candida on microscopy and culture amongst subjects with VVC Candida, the causative organism of VVC, was seen in 78.5%, 79.7%, 61.7% and 95% of Wet preparation, High Vaginal Swab Gram Stain ,Endocervical swab Gram stain and culture respectively.

4.5 DIAGNOSIS

Table 7 reveals the pattern of RTI/STI among the attendees of the STC, UCH.

Patients' diagnosis showed that 30.6% had Vulvovaginal candidiasis, 22.9% had Bacterial vaginosis, 14.2% Genital warts, 11.1% Chlamydia cervicitis. Also, 3.8% had Herpes genitalis 3.4% G. ulcer ? cause, 3.0% Trichomoniasis and 1.2% Gonorrhoea. There were only two cases each of Chancroid and syphilis while no case of lymphogranuloma venereum was recorded.

Table 8 shows the prevalence and pattern of co-infection of VVC with other infections among those with vulvovaginal candidiasis. About 60% of subjects with VVC had no concurrent infection. About 40% of subjects had other infection: 19.2% Bacterial vaginosis, 7.3% Genital warts and 6% Chlamydia cervicitis amongst others

4.6 CORRELATES OF VVC

Table 9, 10, 11 and 12 explore the relationship between characteristics of subjects and diagnosis of VVC.

Table 9 shows the relationship between sociodemographic characteristics and VVC. Being young was significantly associated with VVC as opposed to being middle aged (X^2=4.181, P=0.041). Being single showed an association with VVC which was almost significant (X^2=2.968, P=0.052). Area of residence, which was used as a projection socioeconomic status, did not reveal any association with VVC (X^2= 0.52, P= 0.92). Patients occupation and ethnicity also did not show any association with vulvovaginal candidiasis (P= 0.618 and 1.0 respectively)

Table 10 shows the relationship between reproductive history parameters and VVC. Reproductive history parameter associated with VVC was a history of previous RTI which was elicited in about 36% of those with VVC compared with 26% in those without it (X^2=4.515, P=0.034). Nulliparity appears to be less likely associated with VVC than being parous (X^2=2.61, P=0.066), though this failed to reach statistical significance

Sexual exposure, contraceptive method employed and pregnancy did not show any significant association with VVC (P = 0.55, 0.26 and 0.20 respectively)

Table 11 shows the relationship between clinical history parameters and VVC. A significant association was found between previous use of antibiotics and development of VVC (X^2=3.426, P = 0.040). There was no association with retroviral status (X^2= 0.46 P= 0.50)

Table 12 is the logistic regression analysis for variables significant on bivariate analysis at 10% significance, which were entered into a logistic regression model. There was a statistically significant association of young age, less than 40 years, with development of VVC (OR 4·96, CI 1.11, 22.28). No association was found with previous antibiotic use (OR 1.32, CI 0.79, 2.22) and previous reproductive tract infection (OR 1.52, CI 0.90, 2.55).

Table 1: Sociodemographic characteristics of the subjects

Characteristic	Frequency (n)	Percentage (%)
Age (years) n=493*		
Less than 20	40	8.1
20 -24	91	18.5
25- 29	138	28.0
30- 34	82	16.6
35- 39	55	11.2
40- 44	45	9.1
45 and above	42	8.5
Marital status n= 483*		
Single	210	43.5
Ever married (married, divorced etc)	273	56.5
Occupation n= 482*		
Professionals	128	26.6
Service and sales workers	147	30.5
Students	170	35.3
Others	37	7.7
Nationality n=492*		
Nigerian	487	99.0
Others	5	1.0
Ethnicity n=474*		
Yoruba	399	84.2
Hausa	13	2.7
Igbo	62	13.1
Area of residence n=446*		
Low density	48	11.9
Medium density	170	42.1
High density	186	46.0

Table 2: Sociodemographic characteristics of subjects with candidiasis.

Characteristic	Frequency (n)	Percentage (%)
Age (years) n=150*		
Less than20	11	7.3
20 -24	32	21.8
25- 29	42	28.0
30- 34	25	16.7
35- 39	21	14.0
40- 44	12	8.0
45 and above	7	4.7
Marital status n= 148*		
Single	73	49.3
Ever married	75	50.7
Occupation n=145*		
Professionals	37	25.5
Service and sales workers	42	29.0
Students	57	39.3
Others	9	6.2
Nationality n= 150*		
Nigerian	149	99.3
Others	1	0.7
Ethnicity n= 142*		
Yoruba	119	83.8
Hausa	4	2.8
Igbo	19	12.8
Area of residence n=137*		
Low density	15	12.2
Medium density	49	39.8
High density	59	48.0

Table 3: Clinical presentation of all subjects.

	Frequency (n)	Percentage (%)
Presenting complaints n=494		
Vaginal discharge	324	65.6
Vulval itching	229	46.4
Genital rashes	49	9.9
Genital Sores	48	9.7
Offensive genital odour	80	16.2
Genital swelling	60	12.1
Sexual contact of infected patient	28	5.7
Dysuria	42	8.5
Abdominal /suprapubic pain	51	10.3
Other symptoms	12	2.4
Previous use of antibiotics n= 471*		
Yes	214	45.4
No	257	54.6
Previous use of antifungals n=472*		
Yes	89	18.9
No	383	81.1

Table 4: Distribution of reproductive history parameters of all subjects

	Frequency (n)	Percentage (%)
Sexual exposure N=486*		
Yes	444	91.4
No	42	8.6
Last sexual exposure N= 409*		
1-6 days	122	29.8
1-2 weeks	83	20.3
3-4 weeks	66	16.1
5 weeks and more	138	33.7
Contraceptives method employed N=374*		
None	200	53.5
Condom	110	29.4
IUCD	36	9.6
Hormonal	26	7.0
Others	2	0.5
Period of cycle N= 242*		
First half (day 1- 14)	112	46.3
Second half (day 15 and above)	130	53.7
Previous reproductive tract infections N=419*		
Nil	234	55.8
One	157	37.5
Two or more	28	6.7
Number of children (parity) N=374*		
None	209	55.9
One	50	13.4
Two	39	10.4
Three	32	8.6
Four or more	44	11.8
Pregnancy N= 494		
Yes	28	5.7
No	466	94.3
Menopause N= 374*		
Yes	24	6.4
No	350	93.6

Table 5: Laboratory results of all subjects.

	Absent		Present	
	Frequency(n)	Percentage(%)	Frequency(n)	Percentage(%)
Gram stain				
HVS (n=401)*				
Gonococcal cells	397	99.0	4	1.0
Secondary organisms	9	2.2	392	97.8
Pus cells	227	56.6	174	43.4
Epithelial Cells	9	2.2	392	98.7
T. vaginalis	390	97.3	11	2.7
Candida/Yeast cells	282	70.3	119	29.7
Clue cells	205	51.1	196	48.9
ECS (n=357)*				
Gonococcal cells	351	98.3	6	1.7
Secondary organisms	7	2.0	350	98.0
Pus cells	173	48.5	184	51.5
Epithelial Cells	6	1.7	351	98.3
T. vaginalis	346	96.9	11	3.1
Candida/Yeast cells	278	77.9	79	22.1
Clue cells	201	56.3	156	43.7
Wet prep (n=348)*				
Trichomonas vaginalis	335	96.3	13	3.7
Candida/Yeast cells	242	69.5	106	30.5
Culture (n= 287)*				
Candida			114	39.7
Niesseria gonorrhoeae			2	0.7
Others			3	1.0
No significant growth			168	58.5

Table 6: Proportion of positive yield for candida on microscopy and culture amongst subjects with VVC

	Frequency	Percentage (%)
Microscopy		
Wet prep (N=130)	102	78.5
HVS Gram Stain (N=143)	114	79.7
ECS Gram stain (N=128)	79	61.7
Culture (N=119)	113	95.0

Table 7: Pattern of RTI/STI among the female attendees of the STC, UCH N=494

Diagnosis	Frequency (n)	Percentage (%)
Vulvovaginal candidiasis	151	30.6
Bacterial vaginosis	113	22.9
Genital warts	70	14.2
Chlamydia cervicitis	55	11.1
Herpes genitalis	19	3.8
PID	18	3.6
Trichomoniasis	15	3.0
Gonorrhoea	6	1.2
Chancroid	2	0.4
Syphilis	2	0.4
LGV	0	0.0
Urinary Tract Infection	10	2.0
G. ulcer ? cause	17	3.4
Vaginitis from other causes	49	9.9
Others	34	6.9

Table 8: Prevalence and pattern of co-infection of VVC with other infections among those with vulvovaginal candidiasis.

	Frequency (n)	Percentage (%)
VVC only	91	60.3
VVC + other infections	60	39.7
All VVC cases	151	100.0
Other infections		
Bacterial vaginosis	29	19.2
Genital warts	11	7.3
Chlamydia cervicitis	9	6.0
Genital ulcer, ?cause	4	2.6
Trichomoniasis	3	2.0
PID	2	1.4
Herpes genitalis	1	0.7
UTI	1	0.7
		39.7

Table 9: Relationship between sociodemographic characteristics and VVC.

Characteristic	Diagnosis-VVC		Total	Chi-square	P-value
	No	Yes			
Age				4.181	0.041
<40	286(68.1)	134(31.9)	420		
40 and above	35(83.3)	7(16.7)	42		
Marital status				2.968	0.052
Single	137(65.2)	73(34.8)	210		
Ever married	198(72.5)	75(27.5)	273		
Ethnicity				0.000	1.000
Yoruba	277(69.4)	122(30.6)	399		
Hausa	9(69.2)	4(30.8)	13		
Igbo	43(69.4)	19(30.6)	62		
Area of residence				0.516	0.915
Low density	33(68.8)	15(31.3)	48		
Medium density	121(71.2)	49(28.8)	170		
High density	127(68.3)	59(31.7)	186		
Unknown	28(66.7)	14(33.3)	42		
Occupation				1.787	0.618
Professionals	91(71.1)	37(28.9)	128		
Service and sales	105(71.4)	42(28.6)	147		
Students	113(66.5)	57(33.5)	170		
Others	28(75.7)	9(24.3)	37		

Table 10: Relationship between reproductive history parameters and VVC.

Characteristic	Diagnosis-VVC		Total	Chi-square	P-value
	No	Yes			
Sexual exposure				0.000	0.557
No	29(69.0)	13(31.0)	42		
Yes	307(69.1)	137(30.9)	444		
Last sexual exposure				0.540	0.910
1-6 days	8(70.5)	36(29.5)	122		
1-2 weeks	55(66.3)	28(33.7)	83		
3-4 weeks	45(68.2)	21(31.8)	66		
5 weeks and more	97(70.3)	41(29.7)	138		
Contraceptives method				4.041	0.257
None	131(65.5)	69(34.5)	200		
Condom	79(71.8)	31(28.2)	110		
IUCD	26(72.2)	10(27.8)	36		
Hormonal	20(83.3)	4(16.7)	24		
Period of cycle				0.841	0.218
First half (day 1-14)	74(66.1)	38(33.9)	112		
Second half (day >14)	93(71.5)	37(28.5)	130		
Previous RTI				4.515	0.034
Nil	173(73.9)	61(26.1)	234		
One or more	119(64.3)	66(35.7)	185		
Number of children				2.61	0.066
None	137(65.6)	72(34.4)	209		
One or more	121(73.3)	44(26.7)	165		
Pregnancy				1.063	0.204
No	326(70.0)	140(30.0)	466		
Yes	17(60.7)	11(39.3)	28		
Menopause				0.299	0.368
No	244(69.7)	106(30.3)	350		
Yes	18(75.0)	6(25.0)	24		

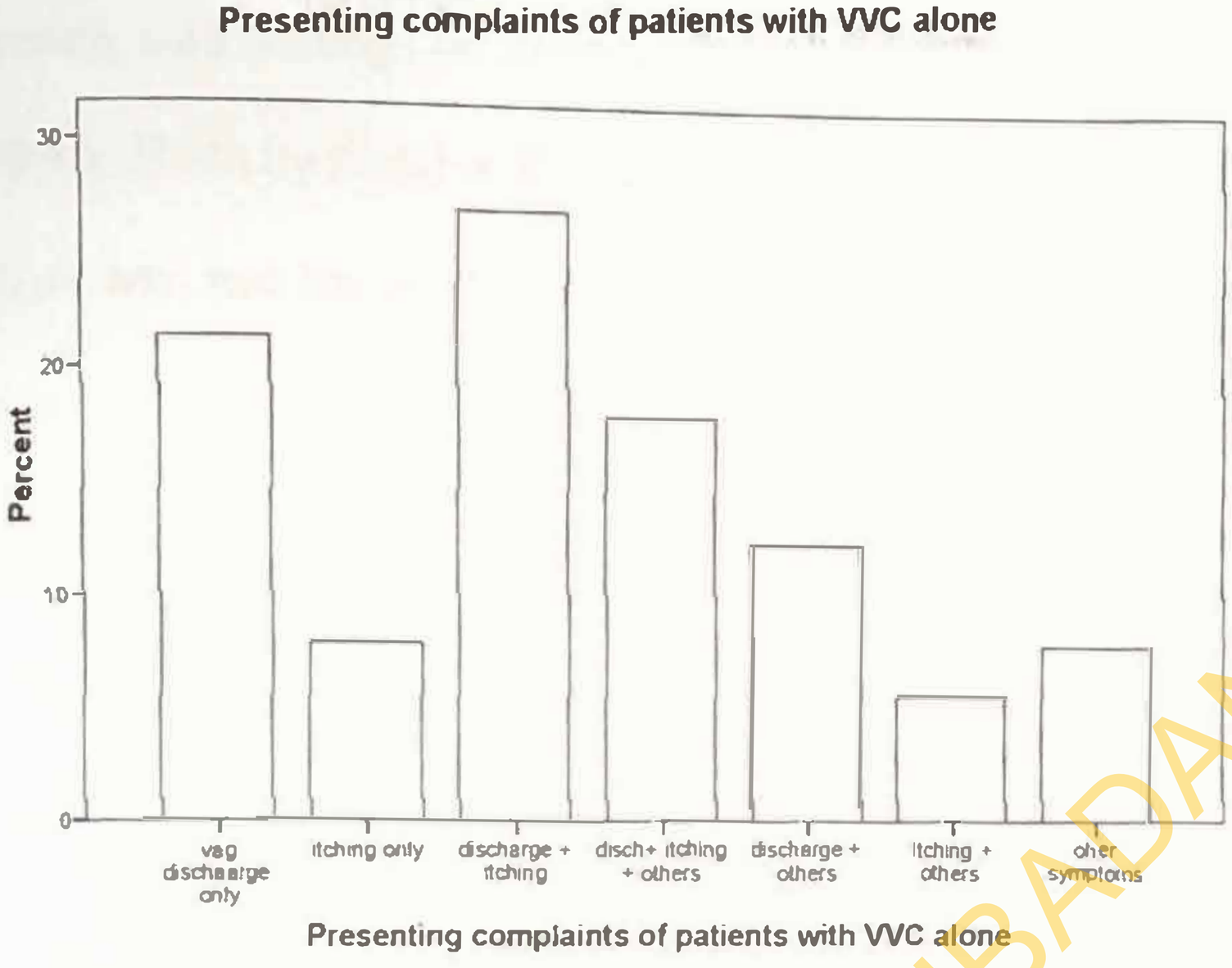
Table 11: Relationship between clinical history parameters and VVC.

Characteristic	Diagnosis-VVC		Total	Chi-square	P-value
	No	Yes			
Prev use of antibiotics				3.426	0.040
No	185(72.0)	72(28.0)	257		
Yes	137(64.0)	77(36.0)	214		
Prev use of antifungals				0.188	0.376
No	263(68.7)	120(31.3)	383		
Yes	59(66.3)	30(33.7)	89		
Retroviral status				0.462	0.497
Negative	40(78.4)	11(21.6)	51		
Positive	23(71.9)	9(28.1)	32		

Table 12: Logistic regression analysis for variables significant on bivariate analysis.

Variable	β	Odds Ratio	95% CI OR	P value
Middle aged vs young	1.602	4.963	1.105, 22.281	0.037
Married vs Single	-0.237	0.789	0.382, 1.628	0.521
Parous vs nulliparous	-0.081	0.922	0.433, 1.965	0.834
Previous infection vs none	0.417	1.518	0.903, 2.551	0.115
Previous antibiotics vs. none	0.281	1.324	0.793, 2.221	0.282

FIGURE 1



CHAPTER FIVE

5.1 DISCUSSION

The prevalence of Vulvovaginal candidiasis in the study population was 30.6%. This is in keeping with findings of 20-45% cited in previous works such as 21% by Oni and associates (1999), 23.5% by Jindal et al. in 2007 and 45% by Namkinga et al. (2005)

Those who had Bacterial vaginosis (BV) made up 22.9% of the total population making it the second most common RTI in these women. This finding is also similar to reports of VVC and BV as the two most common RTI in women worldwide with the prevalence of one superseding the other depending on the population studied. (Eckert, 2006)

In the study population, the prevalence of genital warts was 14.2% and it's interesting to note that at least 40% of these people were retroviral positive. This corroborates findings that HIV is a risk factor for genital warts and also, genital warts are worsened in the presence of HIV. (Conley et al, 2002; Doley et al, 2008). There is therefore the need to screen anyone presenting with genital warts for HIV.

Chlamydia cervicitis was seen in 11.1% of the study population and this figure is probably much lower than the actual prevalence due to the less sensitive method of microscopy being used in making a diagnosis in these subjects. This is important as *Chlamydia trachomatis* infection is a known cause of infertility in women and efforts should be geared towards accurate diagnosis and prompt treatment of cases.

Trichomoniasis, a typical sexually transmitted cause of vaginitis was seen in 3.0% of the subjects while herpes genitalis was found in 3.8% of attendees.

The prevalence of Gonorrhoea was quite low, 1.2%, in comparison with existing literature in which the records are those of both male and female patients combined. This is probably because

the population was made up of only women and many women usually have asymptomatic infection and may therefore not seek medical attention unlike in their male counterparts in whom symptomatic infection is the norm and therefore present for treatment. It might also be because a high percentage had taken antibiotics before presentation which might affect the yield of culture in spite of the presence of the infection. Namkinga et al also noticed a similar low prevalence of 1.5% in their study population of women.

Syphilis was also rare in these women with a prevalence of 0.4%. Also, no case of lymphogranuloma venereum (LGV) was detected throughout the period of study which differs from what was found about ten years ago in the same population by Fawole et al (2000).

Unfortunately, many cases of genital ulcer 3.4% could not be fully diagnosed due to insufficient clinical history and/or lack of adequate laboratory back-up which may sometimes be due to financial constraints on the part of the patient. It is actually possible that some of the undiagnosed cases were chancroid or LGV for which there was no record.

The age range of all attendees was quite wide, 2- 65 years, as all patients who had symptoms related to reproductive tract infections are seen at the clinic. There were more married women than single, which could be a reflection of the fact that the mean age was 30 years and in this environment, most women marry before this mean age.

Adolescents constituted 8% of the study population, 42% of them were sexually active and the prevalence of VVC in all adolescents was 27.5%, while it was 43.8% among the sexually exposed ones. This is similar to the report by Rylander et al. (2005) that 40% of sexually active adolescents had genital candida infection. The high proportion of Yoruba's among the study population is most likely a reflection of the predominant ethnic group of the catchment area of the hospital where the study is carried out and not because RTIs are commoner in this ethnic

group. The fact that over 80% of the population came from medium and high density abodes is also reflective of what obtains within the city and not a higher predisposition.

Close to half of the women had taken one antibiotic or the other previously. Antibiotic misuse is one of the causes of antibiotic resistance which is a growing problem making many infections difficult to treat. This habit should be seriously discouraged to ensure continued efficacy of available antibiotics. This study could, however, not demonstrate whether the antibiotics were prescribed, implying appropriate use, or not.

Also, more than half of the subjects studied were not using any form of contraceptives probably because the population has a high percentage of married individuals who are still having children. However, among the single females the proportion remained the same as more than half of these women were also having unprotected intercourse. Similar findings were noted by Sabitu et al (2007) and Sunmola et al (2007) in this environment and in their studies also only 4- 20% of young women used condoms consistently. This is of public health significance in view of the risk of contracting STIs through unprotected intercourse.

Those who had had sexual exposure constituted more than 90% of the study population which is not surprising since these RTIs affect mostly sexually active people, however, only about 30% had been active within one week of presentation which might be related to the fact that they had an on-going infection.

There was a remarkably high rate of co-infection of VVC with other RTIs. About 40% of women with VVC had other infections with the highest rate of half of co-infections seen with bacterial vaginosis. Most related literature mention the fact that there could be co-infections with VVC but those citing actual prevalence are scarce except for the study by Gable et al (2006), where they found a prevalence of 17% of co-infections with predominantly trichomoniasis. It is therefore

important to realize a woman presenting with symptoms of VVC may have other infections, most often Bacterial vaginosis in this setting, especially in resource poor settings where the syndromic approach is applied.

The study revealed that a combination of vaginal discharge and vulval itching was the commonest presentation of VVC in these women (27%) followed by vaginal discharge alone (21.3%) which is quite different from what was described by Sonnex (1999) with itching alone being the commonest symptom (27%) although it was closely followed by itching and discharge (25%). In this study, only about 8% presented with itching alone. Dysuria, which as earlier cited as being an occasional symptom, was found in about one in ten of the subjects with VVC.

A comparison between microscopy and culture showed that the percentage of microscopy positive ranged from 61.7- 79.7% as opposed to the 95% of culture. The apparently higher sensitivity of culture is in keeping with publications citing about 60% (Fernández-Limia et al., 2007, Omar, 2001) though in this study, microscopy seems to have a higher sensitivity than published records.

Several characteristics have been discovered as risk factors for developing VVC and this study also investigated characteristics that could be associated with vulvovaginal candidiasis in this population. The odds of having VVC was found to be about 1.5 times higher in those with a previous RTI than those without any suggesting a possible association, however, this could not be substantiated as the relationship was not statistically significant.

Also the relationship between antibiotic and VVC proved not to be statistically significant despite several reports of antibiotic use triggering VVC (Foxman, 1990; Edwards, 2000; Pirrota and Garland, 2006; Eckert, 2006; Xu et al., 2008). Reasons adduced for this could be because available data for this study did not specify how long ago the antibiotics were taken. The usual

time frame for recent ingestion is usually within about 4- 6 weeks so that if more than that, it might not be relevant thus affecting the testing of this hypothesis (Xu et al., 2008).

This study also did not demonstrate any association between the use of hormonal contraceptives and VVC and also between the presence of IUCD and VVC though some previous studies have reported such associations (Eckert, 2006; Chasssot et al., 2008)

Age was significantly associated with VVC as the study demonstrates that younger females, who were less than 40 years, were about five times more likely to develop VVC than their middle aged and older counterparts. The finding of age being associated with VVC has been documented earlier and is said to be highest between the ages of 15 to 19 years (Eckert, 2006). This could be because younger women are more likely to be more sexually active than older knowing that the incidence is higher with sexual activity. Also younger women have higher levels of hormones than older women whose levels begin to dwindle as they approach menopause.

Although many studies including those by Grigoriou (2006) have reported pregnant women to be at higher risk of VVC, an association between VVC and pregnancy was not detected. This might be due to the small proportion of pregnant women present in this study making such a demonstration difficult.

Retroviral infection is known to have an important relationship with vulvovaginal candidiasis (Namkinga, 2005) however, this study did not reveal such. More than 90% of the attendees did not have their retroviral status determined as this is not a routine investigation at the facility except when indicated in cases such as genital warts and ulcer. This should not be so especially with the knowledge that those who have STIs are at a higher risk of HIV than the general population.

Presentation in the luteal phase of the cycle, the second half, did not reveal any relationship with VVC probably because the onset of symptoms may not have coincided with the time of presentation hence the difficulty in establishing an association.

5.3 CONCLUSION

This five year review shows vulvovaginal candidiasis to be the commonest reproductive tract infection in female attendees of the special treatment clinic, University college Hospital Ibadan with a prevalence of 30.6%. It is followed by bacterial vaginosis which has a prevalence of 22.9%. The mean age of subjects was 30 years. Most patients with VVC presented with vaginal discharge plus vulval itching. Co-infection of VVC with other genital infections was high mostly with bacterial vaginosis. Identified factor associated with VVC in these women was age less than 40 years.

5.4 RECOMMENDATIONS

1. Young females have a higher risk of VVC than older patients and also, co-infections should be borne in mind when managing subjects with vulvovaginal candidiasis.
2. The opportunity of counselling and testing of those with genital infections for human immunodeficiency should also not be missed.
3. This study should be carried out prospectively so that data pertaining to all variables required especially in testing associations can be adequately collected.
4. Adequate record keeping should be emphasized for epidemiological purposes and also to aid patient management

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QUESTIONAIRE

VULVOVAGINAL CANDIDIASIS AMONG STC ATTENDEES

A. DEMOGRAPHIC INFORMATION

1. S/N ..... STC No.....

2. Date of first attendance .....

3. Age .....

4. Area of residence.....

(1) Low density (2) Medium density

(3) High density (4) Unknown

5. Marital status (1) Single (2) Married (3)Widowed

6. Occupation .....

1)Managers (2) Professionals

(3)Technicians & associate professionals (4)Clerical support workers

(5) Service and sales workers (6)Skilled agric, forestry and fishery workers

(7) Craft and related trades workers (8) Plant & machine operators, & assemblers

(9) Elementary occupations (10) Armed forces occupations

(11) Student (12) Unemployed

7. Nationality (1) Nigerian (2) Others (specify)

8. Place of origin .....

(1)Western Nigeria (2) North (3) East (4) Not applicable

9. Referred by (1) Doctor (2) Hospital staff (3) Patient

B. CLINICAL PRESENTATION

10. Presenting complaints.....

(1)Vaginal discharge (2) Vulval itching (3) Vaginal irritation

(4) Rashes (5) Genital Sores (6) Foul genital odour

(7) Genital swelling (8) Dysuria (9) Abd /suprapubic pain

(10) Contact (sexual partner) of patient (11) Others

C. SEXUAL PRACTICES

11. Sexual exposure (1)Yes (2) No

12. Recent intercourse.....

(1) 1- 6days ago (2) 1- 2 wks (3) 3-4 wks

(4) 5- 7 wks (5) 2- 3 mths (6) > 3mths

13. Nature of intercourse (1) Vaginal (2) Rectal

(3) Oral (4) Others(specify)

14. Precautions (1) Condom (2) Pills (3) IUCD

(4) Spermicides (5) Implants/Injectables

(6) Emergency contraception (7) None (8) Others

15. No of sexual partners.....

1 (2) 2 (3) 3 (4) 4 (5) 5 or more (6) not applicable

D. GYNAECOLOLOGIC HISTORY

16. Menarche.....

17. Menstrual cycle..... (1) Regular (2) Irregular

18. Last menstrual period ..... Day of cycle.....

19. Menopausal (1) Yes (2) No

20. Pregnancy (1) Yes (2) No

21. Previous infections.....

No of infections (1) 1 (2) 2 (3) 3 (4) >3 (5) Nil

E. PREVIOUS HISTORY

22. Past medical history.....

23. Family history/No of children (1) 1 (2) 2 (3) 3 (4) 4 (5) 5 or > (6) None

24. Previous antifungals.....

(1) Yes (2) No

25. Previous antibiotics.....

(1) Yes (2) No

26. Allergies..... (1)Yes (2) No

F. EXAMINATION

27. Genital examination.....

(1) No abnormality seen (2) Vaginal discharge (3) Vulval irritation

(4) Rashes (5) Genital Ulcer (6) Foul genital odour

(7) Genital swelling (8) Hyperaemia (9) Others

G. INVESTIGATIONS

28. High Vaginal Swab

(a) GC..... (1) Nil (2) + (3) ++ (4) +++

(b) Sec org..... (1) Nil (2) + (3) ++ (4) +++

(c) Pus cells..... (1) Nil (2) + (3) ++ (4) +++

(d) Epithelial Cells..... (1) Nil (2) + (3) ++ (4) +++

(e) Trichomo vaginalis..... (1) Nil (2) + (3) ++ (4) +++

(f) Candida/Yeast cells..... (1) Nil (2) + (3) ++ (4) +++

(g) Clue cells..... (1) Nil (2) + (3) ++ (4) +++

29. ECS

(a) GC..... (1) Nil (2) + (3) ++ (4) +++

(b) Sec org..... (1) Nil (2) + (3) ++ (4) +++

(c) Pus cells..... (1) Nil (2) + (3) ++ (4) +++

(d) Epithelial Cells ..... (1) Nil (2) + (3) ++ (4) +++

(e) Trichomo vaginalis..... (1) Nil (2) + (3) ++ (4) +++

(f) Candida/Yeast cells..... (1) Nil (2) + (3) ++ (4) +++

(g) Clue cells..... (1) Nil (2) + (3) ++ (4) +++

30. Wet prep- T vaginalis (1)Yes (2) no

Yeast cells (1) yes (2) no

31. Urine microscopy (a) WBC..... (b) RBC.....

(c) Epithelial cells..... (d) Deposits (1) Yes (2) No

32. Culture (1) Candida (2) N. gonorrhoea

(3) others (4) No growth

33. VDRL (1) Positive (2) Negative (3) Not done

34. Retroviral status (1) Negative (2) Positive (3) Unknown

35. Other investigations.....

F. DIAGNOSIS AND MANAGEMENT

36. Diagnosis.....

(1) Vulvovaginal candidiasis (2) Bacterial vaginosis (3) Trichomoniasis

(4) Genital warts (5) Gonorrhoea (6) Syphilis

(7) Chancroid (8) LGV (9) PID

(10) Chlamydia cervicitis (11) Herpes genitalis (12) Nonspecific vaginitis

(13) G. ulcer ? cause (13) UTI (14) No abnormality seen

(15) Others

37. Treatment .....

38. Contact tracing (1) Yes (2) No