



Non-classical reproductive tract infections on the rise in women in Dschang, Cameroon

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ABSTRACT

Health promotion and education, wide coverage and pinpointing impediments to the realization of prevailing measures are among primary interventions for sexually transmitted infections (STIs). This work sought to establish STIs burden and related risk factors in women consulting gynecologists and general practitioners in some health centres in Dschang, Cameroon. For seven consecutive months, in a cross-sectional study, 1009 heterosexual women were examined; 353 (35%) symptomatic patients aged 15-46 years (mean 31 ± 3.3 years) consented and were interviewed using a questionnaire. Vaginitis was diagnosed by symptoms, positive cultures, and testing of blood and cervical specimens for antibodies to *Treponema pallidum* and *Chlamydia trachomatis* respectively. Infections recorded 45% under gynecological care and 14% for general consultations ($p < 0.001$), with an alarming 84% of general consultation cases without any intention of STIs screens or having future gynecologic appointments. Multiple sexual partners, early sexual debut, poverty, poor sanitation, recurrent infections, tight underwear, no barrier protection or irregular condom use and using chemicals in the vagina were recorded risks. Infectious vaginitis was identified in 300 (30%) patients, 53(5%) cases were non-infectious and 60% had multiple infections. Bacterial vaginosis (28%) and vaginal candidiasis (21%) predominated. Rates for *C. trachomatis*, *Neisseria gonorrhoeae*, *Trichomonas vaginalis*, *Phthirus pubis*, infectious syphilis, genital warts and genital herpes were $< 2\%$. The present findings portrayed: STIs not given prime consideration under general practice, and a rising trend for non-traditional genital diseases due to poor hygiene and reproductive health knowledge deficiency. Health and sanitary campaigns, and mandatory gynecological exams for individuals of reproductive age were inevitable.

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INTRODUCTION

Sexually transmitted infections (STIs), also known as sexually transmitted diseases (STDs) and venereal diseases (VDs) or vaginitis in women, have been defined as illnesses having a significant probability of being transmitted between humans by human sexual behaviour, including vaginal

intercourse, oral sex and anal sex. Some STIs can also be contracted via childbirth, breastfeeding or the use of IV drug needles (Wikipedia, 2012). Until the 1990s, STIs were commonly known as STDs or VDs. Recently, the term sexually transmitted infections (STIs) is preferred and has broader meaning than STDs. Traditional or classical STIs have been

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long established i.e. for hundreds of years under the branch of medicine referred to as venereology, most commonly transmitted solely by sexual activity. Such typical STIs include bacterial, fungal, viral, parasitic and protozoal infections like chancroid (caused by *Haemophilus ducreyi*), chlamydia (*Chlamydia trachomatis*), granuloma inguinal or *Klebsiella granulomatis*, gonorrhoea (*Neisseria gonorrhoeae*), syphilis (*Treponema pallidum*), candidiasis, Hepatitis B virus, herpes simplex (Herpes simplex virus 1,2), AIDS (HIV), Human papillomavirus, genital warts, molluscum contagiosum, pubic lice (*Phthirus pubis*), scabies (*Sarcoptes scabiei*) and trichomoniasis (*Trichomonas vaginalis*). Over time, new or atypical pathogens have been implicated in STI etiology particularly related to bacterial vaginosis owing to high standards of medical technology, travel, invasive procedures, poor hygiene and sanitation, immunosuppression, antibiotic resistance and therapy across board, anthropogenic changes, climate change and genital practices which affect reproductive health (Adad et al., 2001; STD statistics worldwide, 2011; Hodowanec et al., 2012).

Reproductive health ensures a vibrant labour force and sustainable development. STIs or reproductive tract infections remain a growing problem for humans affecting people of all ages, backgrounds and works of life, with poor sexual health impacting most in young heterosexuals and in men who have sex with men (Ndongmo et al., 2003; Mbu et al 2005; Shiely et al., 2010; Malacova et al., 2011; Health Protection Report, 2012a and 2012b; Hodowanec et al., 2012). Getting facts about such problems and reproductive health is increasingly important since there is a need to constantly educate the society of associated dangers, initiate new and scale up existing interventions, and strategize for valuable future management programs (Mayaud and McCormick, 2001; Mayaud and Mabey, 2004; Genuis and Genuis, 2005). Clearly, STIs have resulted in untold misery world wide. An estimated 75% of women develop vaginitis at some point in their lives, and about 4 in 10

become infected more than once (Adad et al., 2001). Although STIs have been caused by pathogenic bacteria, parasites, yeasts and viruses; there is non-infectious vaginitis which involves irritations or allergic reactions from chemicals that are present in vaginal products and contaminated clothing that is in contact with the genital area or a decrease in hormones because of menopause or surgery that removes the ovaries (Mbizvo et al., 2001). Over time, inconsistent condom use, homosexuality or overlapping sexuality, poverty, many sex partners, prostitution, infidelity, teenage sex, juvenile delinquency, ignorance and inadequate healthcare have been related to increased rates of STIs (Ndongmo et al., 2003; Mbu et al., 2005; Oster, 2005; The Oklahoma, 2008; Dia et al., 2010; Shiely et al., 2010; Health Protection Agency, 2012a and 2012b). In various communities, the transmission of STIs has been effected by both symptomatic and asymptomatic individuals (Wilkinson et al., 1997; Mbizvo et al., 2001; Garcia et al., 2007). Colossal strides have been made in STI prevention and control including easy access to sexual and reproductive health services, greater STI screening, regular or annual screens for the sexually active, case finding and management among vulnerable groups, targeted periodic mass therapy, encouraging safer sexual behaviour, avoiding overlapping sexual relationships, consistent condom use, few sexual partners, requisite healthcare and facilities, and identifying barriers to prevention and control (Mayaud and McCormick, 2001; Mayaud and Mabey, 2004; Oster, 2005; Garcia et al., 2007; Health Protection Report, 2012a and 2012b; Hodowanec et al., 2012).

Genital infections have become a huge health problem in Cameroon with devastating consequences. Premature deaths, destabilization of the family, increased number of orphans, increased medical and funeral expenses, increased absenteeism from work, decreased productivity and massive loss of jobs, reduction of qualified manpower, increased misery and poverty are very glaring.

The management of such infections has been complicated by difficulties to change deeply cultivated sexual behaviour and attitude among the infected, the affected and the uninfected. In some parts of the country, most often, treatment has not been sufficient or readily available (Ndongmo et al., 2003; Genuis and Genuis, 2005; Mbu et al., 2005; Dia et al., 2010; Henry et al., 2010).

There is a dearth of knowledge on the aetiology of genital infections in Dschang. Thus, in line with global prevention efforts, the present investigation was undertaken to elucidate the types, pathogens and risk factors of vaginitis in Dschang among symptomatic individuals, as an attempt to document the burden and peculiarities in the causation of STIs, and create awareness as a means of fostering empowerment and to contain related mishaps that plague society, learning more about genital infections helps especially the woman or the girl child to better arm herself for the future.

MATERIALS AND METHODS

Patients/Study centres

Sick women included in this study visited some healthcare centres in Dschang for gynecologic and general consultation (Table 1). The Chief Medical Officers or Heads of these health institutions were officially informed about the study, which was subsequently endorsed and consulting clinicians or nurses notified. Each centre was visited once a week for data and sample collection from June to December, 2009.

Ethical clearance

Authorization to carry out this work was obtained from the Chief Medical Officer of Menoua Division.

Administration of questionnaires

Detailed information relevant to the study was collected from each patient by the examining medical personnel using the researchers' questionnaire. Such data included the age, area of residence, religion, tribe, marital status, type of marriage, occupation

and that of spouse, the number of sexual partners, whether or not the patient was a commercial sex worker, underlying clinical condition, whether or not a patient has suffered from a genital infection in the past, vaginal morphology and the presence or absence of discharge. Other data collected were the use of preservatives, contraceptives, antibiotics and tight-fitting synthetic above-the-knee fashionable panty-hose without a cotton panel popularly referred to as "coolant" or "cyclise". More data were collected on genital hygiene-whether or not the patient uses soap particularly medicated soap or antiseptics for bathing the outer genitalia, whether or not the patient douches and the types of douching ingredients.

Collection of samples

Cervical swabs were collected from all symptomatic cases by a laboratory worker, the consulting nurse or clinician. Two swabs were collected per patient-one for a direct examination, and the second for culture and serology. Blood was collected from 12 patients suspected for syphilis and tested for antibodies to *Treponema pallidum*. All specimens were packed in leak-proof plastic bags and immediately transported to the laboratory of Applied Biology and Ecology of the Department of Animal Biology of the University of Dschang for analysis.

Processing of specimens

All specimens were processed according to recommended techniques (Murray et al., 1995). The pH of each sample was determined using the swab specimen for direct examination. The second cervical swab was cultured on a set of blood, chocolate, MacConkey and Sabouraud Dextrose agar media. One set each of blood and chocolate agar plates were incubated in an atmosphere of enhanced carbon dioxide (5-10%), that is, in a candle extinction jar for 24-48 hours at 37 °C. The second set of blood and chocolate agar plates were incubated anaerobically at 37 °C using a Gas-Pak anaerobic jar (BBL anaerobic systems) with a palladium catalyst

and a gas generating kit. The MacConkey agar plates (only one plate of this medium was used per patient) were incubated in air at 37 °C for 24-48 hours. One set of Sabouraud Dextrose agar was incubated at 37 °C for up to 7 days, while the second set of plates for this medium was incubated at room temperature (25-30 °C) for up to 14 days. Gram staining and biochemical tests including the germ tube test for yeasts were used to identify isolates. Streptococci and enterococci were identified by Lancefield grouping.

The presence of *Chlamydia trachomatis* infection was tested using the CHLAMY-CHECK-I kit (KENZA DIAGNOSTICES, KYA SAND). The Rapid Plasma Reagin (RPR) test and the Wellcosyh HA 100 VD B5 8E 59-01 kit were used to detect *T. pallidum*.

Statistical analysis

A two sample t test in Genstat 9.2 for windows was used to compare means of infections.

RESULTS

The study involved 1009 heterosexual women with ages ranging between 15 and 65 years (mean 33.13±8.4 years) who visited some health centres in Dschang for care. Many more women consulted gynecologists (60.2%) than general practitioners (Gyps) (39.8%). In total, 353 symptomatic women, aged 15-46 years (mean 31±3.3years) characterized by vaginal discharge and /or bleeding with one or more of the following symptoms: vaginal soreness, irritation or itching, rashes, warts or maps (white patches), lice on the vulva, pain or discomfort during sexual intercourse, abdominal pain and burning during urination (dysuria); gave their consent to the study. The percentage of SV under gynecologic care (45.25%) was significantly ($p<0.001$) higher than that under general consultation (14.12%). Fifty-two (83.9%) symptomatic patients established consulted Gyps primarily for other health issues than those of the genital tract, and did

not intend to test for STIs nor had any planned gynecologic appointments.

Analysis of information obtained from the questionnaires revealed that vaginitis was no respecter of age, profession, background, vocation, place, religion or ethnic group. Due to multiple sexual partners, the 15-25 and the 31-35years age groups, students, women in polygamous marriage or women married to drivers or frequent travellers and those who had extra-marital affairs were slightly more vulnerable to vaginitis. Women with new sexual partners, those with a history of prior or recurrent genital infections, those who douched with chemicals or used medicated soap or antiseptics to wash the vagina and a few commercial sex workers identified in the study population were also hard hit. Though a limited population was examined, widows and divorcees were highly susceptible. Antibiotic therapy, constant wearing and exchange of synthetic fashionable tights, the non-usage of condoms, not screening new partners before intercourse, and sexual promiscuity or prostitution were other risk factors identified.

Significant growth of pathogens was identified in 300 cases, giving a rate of 29.7% infectious vaginitis in the 1009 initial study population, 53 (5%) patients were non-infectious. The pH of the cervical swabs ranged from 3.5 to 8.5 for infected specimens and from 3.7 to 4.5 for samples void of pathogens. A total of 579 types of vaginitis were identified in the 353 women (Table2). Only 142(4.1%) patients had one type of vaginitis. Many 207(20.5%) of the infected patients had two types of vaginitis, while three types were identified in only 4(0.4%) patients.

Bacterial vaginosis (6%) and yeast vaginitis (2%) singly and in combination (18.4%) predominated ($p<0.05$). Majority of the patients with bacterial vaginosis, yeast vaginitis and *Chlamydia* were highly associated with past genital infection, poor personal and environmental hygiene which led to the use of chemicals in the vagina, constant wearing and exchange of tights without frequent washing, antibiotic therapy and sexual promiscuity or prostitution,.

A total of 538 (53.8%) pathogens from 16 genera were identified in the 300 infectious cases (Table 3). Eighty-nine (8.8%) cervical samples harbored one pathogen, while two or more pathogens were identified in 211 specimens. *Candida albicans* had 19.5% isolation ($p < 0.05$), a rate twice higher than that for *Staphylococcus aureus* (8.2%) and

Escherichia coli (8.1%) which ranked second and third in prevalence respectively. Rates were $< 2\%$ for traditional pathogens. *C. albicans* and *S. aureus* 49(4.9%), *C. albicans* and *E. coli* 35(3.5%), and *C. albicans*, *S. aureus* and *C. trachomatis* 2(0.2%) occurred most in mixed cultures.

Table 1: Incidence of Symptomatic Vaginitis in the study population.

Health centres	No of Patients examined				Total	No (%) with SV
	Gynecologic care		General consultation			
	N	No (%) with SV	N	No (%) with SV		
Dschang District Hospital	394	181(45.9)	155	27(17.4)	549	208(37.9)
Hospital Saint Vincent de Paul	150	83(55.3)	119	18(15.1)	269	101(37.5)
Fiangep Polyclinic	36	15(41.7)	51	9(17.6)	87	24(27.6)
Clinique Bienveillance de Foto	18	9(50)	40	6(15.0)	58	15(25.9)
Centre de Santé Fometa	9	3(33.3)	37	2(5.4)	46	5(10.9)
Total	607	291(47.9)	402	62(15.4)	1009	353(35.0)

SV = symptomatic vaginitis.

Table 2: Types of Vaginitis identified in the Study Population.

Type of Vaginitis identified	No (%) recorded (n=1009)
Bacterial vaginosis	279 (27.7)
Yeast vaginitis	211 (20.9)
Chlamydia	11 (1.1)
Gonorrhoea	7 (0.7)
Trichomonas vaginitis	7 (0.7)
Genital warts	4 (0.4)
Pediculosis (Pubic lice)	3 (0.3)
Active syphilis	2 (0.2)
Genital herpes	2 (0.2)
Non- infectious vaginitis	53 (5.3)

Table 3: Aetiologic Agents of Vaginitis identified in Study subjects.

Pathogens	Total No (%) identified (n=1009)
<i>Candida albicans</i>	197 (19.5)
<i>Staphylococcus aureus</i>	83 (8.2)
<i>Echerichia coli</i>	82 (8.1)
<i>Proteus mirabilis</i>	41 (4.1)
<i>Gardnerella vaginalis</i>	26 (2.6)
<i>Enterobacter spp.</i>	15 (1.5)
<i>Sporothrix schenkii</i>	14 (1.4)
<i>Klebsiella pneumoniae</i>	10 (1.0)
<i>Chlamydia trachomatis</i>	11 (1.1)
<i>Pseudomonas aeruginosa</i>	10 (1.0)
<i>Streptococcus pyogenes</i>	8 (0.8)
<i>Enterococcus spp.</i>	8 (0.8)
<i>Neissera gonorrhoeae</i>	7 (0.7)
<i>Trichomonas vaginalis</i>	7 (0.7)
<i>Pseudomonas spp.</i>	6 (0.6)
<i>Phthirus pubis</i>	3 (0.3)
<i>Streptococcus agalactiae</i>	3 (0.3)
<i>Treponema pallidum</i>	2 (0.2)
<i>Klebsiella spp.</i>	2 (0.2)

DISCUSSION

In the present study, the screening of 353 women with SV in some health institutions in Dschang gave a proportionate infectious rate of 85%, with bacterial vaginosis and yeast vaginitis significantly on the lead. These results conform with findings in Brazil (Adad et al., 2001) and in Zimbabwe (Mbizo et al., 2001) and tend to agree with reports that although yeast is the name most women know and think about when they hear of vaginitis, bacterial vaginosis is actually the most common vaginal infection in women of reproductive age. Traditional STIs recorded very low rates in this study and similar results are reported elsewhere (Stauffer et al., 2012; Varma, 2012). Chlamydia has been reported to be increasing in older women, while syphilis is on the decline (Chiduo et al., 2012; Cumming et al., 2012).

Some 53 patients (5%) who had common symptoms of vaginitis such as

itching, burning and vaginal discharge did not harbour any causative agents. However, most of these patients douched with chemicals or made use of medicated soap or antiseptics for genital hygiene. Thus, vaginitis in such cases might have been caused by allergies or irritations resulting in the loss of normal vaginal pH. Chemicals in medicated soap or antiseptics, and bleach in water or clothes or inner wears not thoroughly rinsed out may harm friendly bacterial in the genitalia that check yeast. In this study population, douching might have accounted for the marked deviation of vaginal pH from the normal acid range of 3-3.5 to 3.6-8. This can in turn lead to an alteration in the natural organisms in the vagina thereby favouring the growth of yeasts and other pathogens. The wearing of synthetic under wears or tight clothing could generate heat in the genital region which also favours the growth of yeasts and other pathogens. In Dschang generally

speaking, due to non-constant flow of pipe borne water which often leads to poor personal and environmental hygiene, the use of medicated soap or antiseptics for bathing or the addition of chemicals such as bleach or mercryl to bathing water is common place. This habit is hereby discouraged as it could be greatly contributing to genital infections in this locality.

Other risk factors of vaginitis identified in this study were early engagement in sexual life for pleasure, procreation or to make ends meet without using preservatives and without screening partners; having multiple sexual partners; past genital infections, constant wearing and exchange of tights; and antibiotic therapy. Despite the enormous sensitization on venereal diseases particularly on HIV/AIDS in the last two decades, the behaviour of study respondents towards these diseases did not seem to have changed much. These findings are in accordance with reports in other countries (Ekert et al., 1998; Reed et al., 2000; Sullam et al., 2001; Kalinka et al., 2003; Ward and Day, 2006; Chiduo et al., 2012; Shao and Williamson, 2012). Else where, infectious vaginitis has been attributed to the use or insertion of leaves and other materials into the vagina to boost male sexual pleasure, frequent intercourse (more than four times a month), and oral-genital –anal contact (Wilkinson et al., 1997). In this study, students were highly vulnerable to vaginitis probably due to no resources to treat themselves, unlike the civil servants who could easily treat themselves and recorded lower infection rates. The findings obtained herein further indicated that genital diseases were not given due consideration or priority attention under general consultation, thus gynecological care is encouraged for all females of reproductive age. Also, health campaigns to arouse public interest of the morphology and functioning of the reproductive tract, and recognition and

reporting of changes were deemed necessary. STIs prevention through delayed sexual debut and partner reduction was also encouraged.

In most developing countries, drug abuse is rampant and it is not unusual for patients to stop medication as soon as symptoms disappear without taking the full dose (Kesah et al., 1999). Thus, it was not surprising that some patients with recurrent vaginitis in this study were at high risk since some actually confessed poor drug compliance and the use of herbal concoctions for treatment. The leading pathogens identified in this study were *C. albicans*, *S.aureus* and *E.coli*. These results compare favourably with other studies (Wilkinson et al., 1997; Shafer et al., 1985; De Seta et al., 2000; Bayo et al., 2001). The traditional sexually transmissible pathogens are easily treated nowadays, thus, it was not surprising that their prevalence was very low in this study. Poor personal and environmental hygiene might have exposed some patients to infections with *Sporothrix schenckii*. In Dschang, many people out doors tend to urinate and/or defaecate in open environments due to the deplorable state or absence of public toilets, thereby exposing the vagina to contamination. As a matter of fact, municipal water supplies are often interrupted partly due to incessant light cuts and/or rationing so much so that environmental hygiene particularly in homes and institutions needs to be periodically examined as of old by community leaders and sanitary inspectors.

Since vaginitis can have many causes, a clinical examination and laboratory tests are necessary for accurate diagnosis of the cause of symptoms. There is a great need to continuously educate or inform society, especially the girl child or women in the Dschang community on the aetiology of genital infections, their impending dangers and preventive measures. The present findings were disseminated at the various study centres

hoping that they would inform and contribute to the optimal management of vaginitis in Dschang. Further studies, taking into account asymptomatic cases and antibiotic abuse were embarked on to further expatiate on the risk of exposure of the population to genital infections.

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