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Prevalence of Asymptomatic Genital Infection among Pregnant Women in Benin City, Nigeria

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ABSTRACT

The prevalence of asymptomatic genital infection among pregnant women and their susceptibility to antibacterial agents was investigated to provide baseline data on common asymptomatic genital microorganisms and identify potentials for development of clinical disease among this cohort of patients. High vaginal swabs were obtained from five hundred consecutive and consenting pregnant women attending the antenatal clinic of the University of Benin Teaching Hospital (UBTH) and the Central Hospital, both in Benin City, Nigeria. A total of three hundred specimens showed significant microbial growth, giving a prevalence rate of 60% for asymptomatic genital infections. *Candida albicans* (65%), *Staphylococcus aureus* (51.8%) and Enterobacteriacae (*E. coli* and *Klebsiella* species) were predominantly isolated, followed by *Trichomonas vaginalis* and *Neisseria gonorrhoea*. Most of the bacterial isolates were susceptible to ciprofloxacin, ceftazidime, cotrimoxazole, norfloxacin and augmentin. All the

isolates except *Streptococcus faecalis* were resistant to ampicillin. These results show a high rate of asymptomatic genital tract infections among pregnant women in Benin City, which have implications for adverse maternal and neonatal outcomes. (*Afr J Reprod Health* 2002; 6[3]: 93–97)

RÉSUMÉ

Prévalence de l'infection génitale asymptomatique chez les femmes enceintes à Benin City. Nous avons étudié la prévalence de l'infection génitale asymptomatique chez les femmes enceintes et leur susceptibilité aux agents antibactériens, afin de fournir des données de base sur les micro-organismes génitaux asymptomatiques. Nous avons voulu aussi identifier les capacités pour le développement de la maladie clinique chez les cohortes de patients. Des écouvillons vaginaux de haute densité ont été obtenus de 500 femmes enceintes consécutives et consentantes qui fréquentent la consultation prénatale au Centre Hospitalier Universitaire à Benin City (UBTH) et à l'Hopîtal Central, également à Benin City, au Nigéria. Au total, 300 échantillons ont manifesté une croissance microbienne, indiquant un taux de prévalence de 60% pour les infections genitales asymptomatiques. *Candida albicans* (65%), *Staphylococcus aureus* (51,8%) et enterobacteriaceac (les espèces *E. coli* et *Klebsiella*) ont été en grande partie isolés, suivis de *Trichomonas vaginalis* et *Neisseria gonorrhoea*. La plupart des isolates bactériens étaient susceptibles au ciprofloxacin, au ceftazidime et à l'augmentin. Tous les isolates sauf *Streptococcus faecalis* étaient résistants à l'amplicillin. Les résultats ont montré un taux élevé des infections de faisceau genital asymptomatique chez les femmes enceintes à Benin City, ce qui a des implications pour les conséquences néo-natales et maternelles défavorables. (*Rev Afr Santé Rerod* 2002; 6[3]: 93–97)

KEY WORDS: *Genital infection, pregnant women, antibacterial agents, Nigeria.*

INTRODUCTION

There is evidence to suggest that pregnancy may increase the risks of genital and urinary tract infections.[1] Many asymptomatic genital infections have been associated with preterm birth, a common cause of neonatal morbidity and mortality.[2] There are genital infections caused by *E. coli, Klebsiella, Aerobacter, Proteus, Providencia, Pseudomonas, Facultative anaerobes, Staphylococci* and *Streptococci* have been reported.[3] Vaginal discharges caused by *Trichomonas vaginalis* and *Neisseria gonorrhoea* are commonly reported genital infections.[4]

The prevalence of asymptomatic genital tract infection has been widely reported in pregnant women.[3-5] Kaitz and Hodder[6] reported that the prevalence of asymptomatic genital infections in pregnant black women is appreciably

higher than in pregnant white women. Turch et al[7] found no significant difference in the prevalence of genital infection among black and white patients of the same socioeconomic group. High prevalence of symptomatic infections has also been reported in women attending public clinics who are financially indigent.[8] The report of Rantz[9] show that women in the high socioeconomic strata with relatively minor symptoms of genital infections are more likely to seek medical aid.

Pregnant women carriers of group B *Streptococci* are known to have greater risk of early onset of invasive disease.[10] Significant association of some lower genital tract organisms and infections with preterm birth or preterm rupture of the membrane has been reported.[11] The human host response to genital microorganisms through the elaboration of cytokines and proteolytic enzymes has also been reported.[12] Aerobic vaginitis with aerobic microorganisms like group B *Streptococci* and *E. coli* has been hypothesised to be mostly responsible for pregnancy complications.[13]

The objective of this study is to provide baseline data on the common asymptomatic genital microorganisms and the potentials for development of clinical disease in pregnant women from this area of research.

MATERIALS AND METHODS

Patients and Specimens Collection

A total of 500 consecutive and consenting pregnant women attending antenatal clinics at the University of Benin Teaching Hospital (UBTH) and the Central Hospital, both in Benin City, were enrolled in the study. All the women were attending the clinics for the first time in pregnancy. They were non-smoking and had not taken any antibacterial agent for any reason at least two weeks prior to the study. The women were aged 15–35 years (mean = 28 years). There was no history of symptoms of genital tract infections or recent use of any antibiotics. The study was approved by the UBTH ethical review committee.

Microscopy

High vaginal and endocervical swabs were obtained from each of the women with the assistance of a nurse/ midwife. The swabs were streaked onto blood agar, saboraud-dextrose agar, McConkey agar and chocolate agar plates in duplicates. A set of the inoculated plates was incubated aerobically and a second set incubated

anaerobically using a properly operated anaerobic jar. The aerobic plates were incubated at 37ºC for 18–24 hours and the anaerobic plates for 72 hours. Colonies of bacteria from media plates that showed significant growth (10^5 Cfu) were identified by appropriate gram stain and biochemical methods following the protocol of Cowan and Steel.[14] A broth culture of each of the bacterial isolates was prepared and subjected to antimicrobial susceptibility using the multidisc diffusion method.[15]

RESULTS

A total of 300 specimens showed significant microbial growth, representing prevalence rate of 60% for asymptomatic genital microbial growth. The distribution of isolates among the specimens is as shown in Table 1 while their sensitivities to various antibacterial agents are listed in Table 2. *Candida albicans* (65%) and *Staphylococcus aureus* (15.8%) were predominantly isolated, followed by *Trichomonas vaginalis* and *Neisseria gonorrhoea*. Combined infection with *E. coli* and *Klebsiella* appeared frequently in our study.

Staphylococcus aureus and *E. coli* were sensitive to all the tested antibacterial agents except ampicillin. *Staphylococcus faecalis and Neisseria gonorrhoea* were sensitive to norfloxacin, co-trimoxazole and ciprofloxacin. *Klebsiella pneumoniae* was sensitive to only augmentin and ciprofloxacin.

DISCUSSION

The commonly reported infections associated with pregnancy are urinary tract infections (asymptomatic bacteriuria, cystitis and pyelonephritis), which are frequently encountered as medical complications of pregnancy.[16] Although the majority of infections in pregnancy are asymptomatic, the mother is placed at high risk for low birth weight and preterm birth. Pyelonephritis, for instance, could cause significant maternal and fetal morbidity and mortality.[16] The organisms commonly isolated in asymptomatic pregnant women are E. coli, Klebsiella pneumoniae and Proteus mirabilis.[17] However, our study showed the preponderance of *Candida albicans* and *Staphylococcus aureus*, which corroborates the observations of Lewis[18], who reported the common occurrence of *Candida albicans* during pregnancy with the associated white patches of thrush on the vaginal wall. Stanley[19] also observed that *Candida albicans* occurred more frequently in pregnant patients with glycosuria, but our study did not investigate the underlying possible biochemical status of the patients. As a result of lack of facilities in our laboratory, the study design could not detect other clinically important pathogens such as *Chlamydia trachomatis*, Group B *Streptococcus* and *Gardnerella vaginalis*.

In an earlier analysis of urine specimens from the same patients, there was a high prevalence of *E. coli*, *Klebsiella* species and *Staphylococcus* species.[17] Our results are similar to literature reports, where cultures from symptomatic pregnant women yielded *E. coli, Klebsiella* species and *Proteus mirabilis.*[20]

In the absence of DNA amplication tests, which are employed in similar studies in developed countries, our data show some correlations between organisms found in endocervical swabs and urine of pregnant women in this area of study.

Our results show that *Staphylococcus* isolates were highly sensitive to ciprofloxacin and augmentin, just as *E. coli* was sensitive to norfloxacin, ciprofloxacin and augmentin. *Streptococci faecalis* was very sensitive to co-trimoxazole, norfloxacin and ciprofloxacin. *Proteus mirabilis* and *Neisseria gonorrhoea* were very sensitive co-trimoxazole, norfloxacin and ciprofloxacin.

Co-trimoxazole was very effective against all the bacterial isolates. This observation corroborates the works of Peter et al[21] and Delzell and Lefevre[3], who reported that most of the isolates encountered asymptomatically in pregnancy were highly sensitive to co-trimoxazole. It is plausible to recommend in the light of these observations that co-trimoxazole regime could be part of the routine drug management of pre-natal genital infections among pregnant women in general. The rationale for this strategy would be the avoidance of selection pressure occasioned by careless administration of broad spectrum antibacterial agents, as it is often and usually the case in this area, without prospective study.

We observed in this study that *Staphylococcus aureus* and *E. coli* were resistant to ampicillin, a finding that is at variance with earlier observations[20], where ampicillin was the most useful first line antimicrobial agent. Our findings support the recommendation of Delzell and Lefevre[3], which discourages the use of ampicillin in the treatment of asymptomatic genital infections because of high rates of resistance. The high resistance to ampicillin could possibly be due to the high prevalence of self-medication and misuse of ampicillin, usually without prescription, with the resultant emergence of resistance gene pools, following the selection of resistant bacterial strains. *Neisseria gonorrhoea* was found to be sensitive to all the antibacterial agents tested in this study. This is a welcome development since *Neisseria gonorrhoea* infection is a common complication of pregnancy.

This study has provided baseline data on symptomatic genital microorganisms, which can cause neonatal mortality and morbidity. Since abundant clinical and laboratory information suggests that subclinical infection is a major

cause of preterm birth, new approaches including systematic screening and antibacterial coverage should be developed to prevent prematurity.

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Table 1 **Asymptomatic Microorganisms Isolated from High Vaginal Swabs**

Microorganisms	No. of specimens with significant growth (%)
Candida albicans	198 (65)
Staphylococcus aureus	48 (15.8)
Escherichia coli	41 (13.5)
Klebsiella pneumoniae	9 (3.0)
Streptococcus faecalis	3 (1.0)
Proteus mirabilis	2 (0.7)
Trichomonas vaginalis	1 (0.3)
Neisseria gonorrhoea	1 (0.03)

Table 2 **Sensitivity Profile of HVS Bacteria Isolates from Asymptomatic Pregnant Women**

Antibacterial agents	Microorganisms (% sensitivity)					
	S. aureus	*E. coli*	*S. faecalis*	*P. mirabilis*	*N. gonorrhoea*	*K. Pneumoniae*
TET	60.4	50.0	66.7	100.0	00.0	33.3
AMP	10.4	62.5	66.7	00.0	Nil	00.0
GEN	62.5	65.0	33.3	50.0	00.0	44.4
AU	91.7	92.5	66.7	100.0	100.0	100.0
NB	72.9	90.0	100.0	50.0	100.0	88.9
SXT	89.6	80.0	100.0	100.0	100.0	77.7
CIP	100.0	100.0	100.0	100.0	100.0	100.0
COL	85.0	85.0	66.7	50.0	100.0	66.6
CZ	62.5	80.0	66.7	50.0	100.0	88.8

Key to antibacterial agents: *Tetracycline (TET) 25μg; Ampicillin (AMP) 25μg; Gentamycin (GEN) 10μg; Augmentin (AU) 20μg; Norfloxacin (NB) 10μg; Cotrimoxazole (SXT) 50μg; Ciprofloxacin (CIP) 5μg; Colistin sulphate (COL) 25μg; Ceftazidime (CZ) 30μg*