

Bacterial flora of the endocervix and anorectum of pregnant and non – pregnant women on the Jos Plateau, Nigeria

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Received, 30/4/2001; Accepted, 21/8/2001

ABSTRACT

Out of the 14 organisms isolated from the endocervix of pregnant and non-pregnant women, *Lactobacillus* species had the highest prevalence rates of 18.33%, 20.0% respectively, followed by *Candida* species (6.67%, 20.0%), *Staphylococcus aureus* (13.33%, 11.43%) and *Staphylococcus pyogenes* (11.67%, 11.43%). From the anorectum, the most prevalent were *Streptococcus agalatae*, *Streptococcus mutans* and *Candida* species with prevalence rates of 20.0% among the pregnant women and 14.29% for the non-pregnant women. Hormone based contraceptives (i.e. oral contraceptive and injection) do have a positive influence on the growth and survival of microorganism more than the physical barrier contraceptives (i.e. condoms and intrauterine device). Antibiotic intake prior to the study affected negatively the growth and survival of microorganisms in the endocervix, but not the age of pregnancy. As a result of the numerous types of microorganisms growing in the endocervix and the anorectum of both pregnant and non-pregnant women, which portends some health hazards, a routine screening of asymptomatic individuals is therefore being proposed to forestall the attendant morbidity and mortality likely to arise from resultant disease conditions.

INTRODUCTION

The cervical flora is a heterogeneous ecosystem of microorganisms, both aerobic and anaerobic (Larsen & Galask, 1980). As a

result of the suppressed immune status in pregnant women, many diseases have resulted from the microbial colonisation

that have subsequently affected both the health of the expectant mother and her baby.

Literature has revealed the bacterial flora of the cervix of both the pregnant and the non-pregnant women (Bollinger, 1964; Ansbacher *et al*, 1967; Ohm & Galask, 1975; Blythe, 1978; Nsagha *et al*, 2000). On the other hand, the intestinal tract terminating at the rectum is a primary reservoir of microorganisms. The anatomical relationship between the urethra and the vagina and their close proximity to the rectum in women suggests that the bacterial colonisation of these organs may be shared and would need further investigation. More so, human strains of *Streptococcus agalatae* found in the endocervix were also isolated from the anorectum (Christensen *et al*, 1978).

This paper examines, compares and discusses the bacterial isolates of the endocervix and anorectum of pregnant and non-pregnant women in the Jos Plateau.

MATERIALS AND METHODS

Patients and Sampling

A total of one hundred and sixty two (162) women volunteered to participate in the study. They were made up of 106 pregnant and 56 non-pregnant women attending antenatal clinics and other clinics with various health reasons of the Jos University Teaching Hospital (JUTH), Vom Christian Hospital and Plateau Specialist Hospital, all in Jos. Information was also obtained from the Patients whose consents were sought and gained regarding age, social status, gestational age, literacy, recent antibiotic treatment, family planning method and marital status among others, using a questionnaire.

Endocervical and anorectal swabs (324 in all) were collected from each of the subjects with the aid of a sterile speculum, torch light and sterile sticks by the nurses and clinicians and processed.

Processing of Samples

The endocervical and anorectal swabs were inoculated onto Blood agar plates. After 24 hours of incubation at 37°C, any growths were subsequently sub-cultured onto Blood agar, Chocolate agar and MacConkey agar plates. Blood and Chocolate agar plates were placed in a Candle extinction - jar (to achieve at least 5% carbondioxide) and incubated at 37°C overnight. MacConkey agar plates were also incubated at 37°C overnight.

The isolates were identified according to the methods described by Cowan & Steel (1974) and Chessbrough (1984).

RESULTS

The results showing the endocervical and the anorectal flora in the pregnant and non-pregnant women are in Table 1. A total of 12 (56.6%) and 10 (23.59%) isolates were recovered from the endocervix and anorectum of the pregnant women respectively, while 10 (62.5%) and 7 (25.0%) were isolated from the endocervix and anorectum of non-pregnant women respectively. The prevalence rates of *Lactobacillus* species being the highest was 18.33% and 12.0% for the endocervix and the anorectum of pregnant women and 12.0% and 14.29% for the endocervix and anorectum of the non-pregnant women. Total prevalence rates for *Lactobacillus* species was 14 (23.33%) and 9 (25.7%) for the endocervix and anorectum respectively. This was followed by total prevalence of 13 (21.67%) and 9 (25.71%) in the same order. The endocervix had significantly more organisms isolated from it than the anorectum ($P < 0.05$). Although it appeared that from both the endocervix and anorectum put together, there were more organisms isolated from the non-pregnant women (8.19%), the difference was however not significant ($P > 0.05$).

Among the non-pregnant contraceptive users, the injectables and

Table 1. Endocervical and anorectal bacterial flora in pregnant and non-pregnant women

Organism	Endocervix		Anorectum			
	Pregnant (%) n=106	Non-pregnant n=56	Pregnant (%) n=106	Non-pregnant n=56	Pregnant (%)	Non-pregnant
1. Gram positive organism						
<i>Staphylococcus aureus</i>	8 (13.33)	4 (11.43)	2 (8.0)	0	10 (16.67)	4 (11.43)
<i>Staphylococcus epidermidis</i>	2 (3.33)	3 (8.57)	1 (4.0)	2 (14.29)	3 (5.0)	5 (14.24)
<i>Streptococcus agalatae</i>	2 (3.33)	0	5 (20.0)	2 (14.29)	7 (11.67)	2 (5.71)
<i>Streptococcus pyogenes</i>	7 (11.67)	4 (11.43)	1 (4.0)	2 (14.29)	8 (13.33)	6 (17.14)
<i>Streptococcus mutans</i>	4 (6.67)	3 (8.57)	5 (20.0)	2 (14.29)	9 (15.0)	5 (14.29)
Diphtheroids	3 (5.0)	1 (2.86)	0	0	3 (5.0)	1 (2.86)
<i>Lactobacillus sp</i>	11 (18.33)	7 (20.0)	3 (12.0)	2 (14.29)	14 (23.33)	9 (25.71)
Total	37 (34.91)	22 (39.29)	17 (16.04)	10 (17.86)	54 (50.94)	32 (57.14)
2. Gram negative organism						
<i>Escherichia coli</i>	5 (8.33)	3 (8.57)	3 (12.0)	2 (14.29)	8 (13.33)	5 (14.29)
<i>Pseudomonas sp</i>	2 (3.33)	1 (2.86)	1 (4.0)	0	3 (5.0)	1 (2.86)
<i>Klebsiella sp</i>	4 (6.67)	2 (5.71)	0	0	4 (6.67)	2 (5.71)
<i>Proteus sp</i>	2 (3.33)	0	1 (4.0)	0	3 (5.0)	0
Total	13 (12.26)	6 (10.71)	5 (20.0)	2 (14.29)	18 (16.98)	8 (14.29)
3. Yeast						
<i>Candida sp</i>	10 (16.67)	7 (20.0)	3 (12.0)	2 (14.29)	13 (21.67)	9 (25.71)

oral contraceptives had greater influence in the flourishing of microorganisms in the endocervix in comparison to the condom and intrauterine device (IUD). 100% and 66.7% of the injectable and oral contraceptive users had microorganism isolated respectively, while 50% and 33.33% of condom and IUD users had microorganisms isolated from their endocervix respectively (Table 2).

Both pregnant and non-pregnant women that were not taking antibiotics at the time of the study had more microorganisms isolated from their endocervix (26(66.67%) and 6 (85.71%)) respectively (Table 3). Those who used

antibiotics had percentage isolations of 34 (50.75%) and 29 (59.18%) in that order.

Table 4 shows that rates of isolation of microorganism were similar in the first, second and third trimester of pregnancy. The difference was not statistically significant (>0.05). Comparison of isolation of microorganism from the anorectum with contraceptive methods, antibiotic treatment and gestational age were not carried out.

DISCUSSION

It was expected that the microorganisms isolated from the pregnant women should have been higher than from

Table 2. Carriage of microorganism by the endocervix in relation to contraceptive methods in non-pregnant women

Contraceptive method	Number of user (%)	No. positive for microorganisms (%)	No. negative for microorganisms (%)
Oral contraceptive	6 (46.15)	4 (66.67)	2 (15.38)
Condoms	2 (15.38)	1 (50.0)	1 (7.69)
Intrauterine contraceptive device	3 (23.08)	1 (33.33)	2 (15.38)
Injection	2 (15.38)	2 (100)	0
Total	13 (100)	8 (61.54)	5 (38.46)

Table 3. Carriage of Microorganisms by the endocervix in relation to antibiotic treatment

Antibiotic treatment	No. of patients tested (%)		No. with Microorganisms (%)		No. without Microorganisms (%)	
	Pregnant	Non-pregnant	Pregnant	Non-pregnant	Pregnant	Non-pregnant
	Antibiotics not taken	39 (36.79)	7 (12.5)	26 (66.67)	6 (85.71)	14 (35.9)
Antibiotics taken	67 (63.21)	49 (87.5)	34 (50.75)	29 (59.18)	33 (49.25)	20 (40.82)
Total	106	56	60 (56.6)	35 (62.5)	47(44.34)	21 (37.5)

the non-pregnant because of their suppressed immune status. The reverse was however the case, although the difference was not statistically significant ($P > 0.05$). The endocervix as expected had higher number of microorganisms isolated than the anorectum. The reason may not be unconnected with the ecological conditions of the cervix. *Lactobacillus* species also had the higher prevalence rates in the endocervix. This

can be traced to the acidic environment and the glycogen – rich mucosa which is conducive for the growth of this organism (Reid, 1975). The lower prevalence rates in the anorectum of this bacterium can equally be said to be due to the absence of these ecological conditions.

The microbial flora isolated in this study agrees with the studies of Ohm & Galask (1975) and Blythe (1978). The presence of *Escherichia coli* and other commensals of the gastrointestinal tract in the endocervix could be an indication of

Table 4. Carriage of Microorganisms in the endocervix in relation gestation period

Gestational age (weeks)	No. of women tested (%)	No. of bacterial flora(%)	No. without bacterial flora (%)
4 – 12	16 (15.09)	9 (56.25)	7 (43.75)
13 – 24	35 (33.02)	22 (62.86)	13 (37.14)
> 24	55 (51.87)	29 (52.73)	26 (47.27)
Total	106 (100)	60 (56.6)	26 (43.4)

infections from the anorectum especially considering that *E. coli* and *Pseudomonas* species were both isolated from the endocervix and anorectum. Other organisms like *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Streptococcus agalactiae*, *Streptococcus mutans* and *Streptococcus pyogenes* were all isolated from both sites. This dual presence suggested that organisms from these sites could originate from the same source in women because (as stated earlier) of the proximity between the rectum and the urethra.

The fact that contraceptive alter the normal genital flora, has been reported (Wilson & Chenwald, 1974). In the present study however, comparison was made only between different contraceptive methods. Since the oral contraceptive and injection methods had higher percentage isolation of microorganism, it is likely that some hormones may have a positive influence on the growth of microorganisms.

Our study has indicated that pregnancy did not affect the rate of percentage isolation of microorganisms. This is because rates of isolations were similar during the first, second and third trimesters. This result is similar to that of Baker et al (1980), but at variance with those of Onile (1980) and Nsagha et al (1997).

The organisms isolated from this study can be a health hazard to the women

harbouring them, to the neonates and even to the spouses when sexually transmitted. The disease that could be caused by these organisms include vaginitis, urinary tract infections, candidiasis, preterm prerupture of the membranes, premature labour, puerperal sepsis, pyelonephritis, septic abortion among others (Onile, 1985).

As a result of the above, this paper recommends the importance of screening asymptomatic women in the community to reduce these health implications and subsequently reduce the associated morbidity and mortality. This will be a necessary public health preventive measure.

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