PREVALENCE AND ASSOCIATED RISK FACTORS OF GROUP B STREPTOCOCCUS IN PREGNANT WOMEN ATTENDING ANTENATAL CARE IN A NIGERIAN URBAN HOSPITAL

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ABSTRACT

Background: *Group B Streptococcus (GBS) is one of the common microbial agents causing urogenital infections in women of reproductive age especially pregnant women; it is also a common cause of neonatal infections in the world. Objective: To determine the prevalence and associated risk factors of GBS colonisation in pregnant women in an Urban Hospital in Nigeria.*

Methods: A prospective cross sectional study of 150 pregnant women conducted in an Urban Hospital in Uyo, Nigeria between May and October 2013. Vaginal and anorectal swabs were collected from each participant and processed using standard microbiological methods and cultured on CHROMagar™ Strep B medium. Questionnaires for data were also used. Results: The age range of the participants was between 18 to 44years. Only 2 out of the 150 pregnant women were GBS carriers. The 2 women (1.33%) were found to be anorectal carriers, although 1 (0.67%), in addition had vaginal GBS. There was a statistically significant association between GBS colonisation and premature rupture of amniotic membranes (P<0.05). However, there was no association between GBS colonisation and risk factors such as age and gravidity.

Conclusions: *Group B Streptococcus colonisation in pregnant women in Uyo, Nigeria, is associated with premature rupture of amniotic membrane.*

Keywords: *Group B Streptococcus, urogenital infections, colonisation, antenatal care, associated risk factors.*

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INTRODUCTION

Group B *Streptococcus* (GBS) was first described as a cause of human infection in 1938. Since then, it has been implicated as the cause of illness in newborn babies, pregnant women and adults with other illnesses, such as diabetes or liver diseases. There are 15% to 40% of adult women colonised with *Streptococcus agalactiae* in the vaginal region, the neonates of the women may be infected after exposure to this bacterium before or during neonatal period[1]. About half of the cases of GBS among newborns happen in the first week of life (early-onset disease), and most of these cases start within a few hours after birth leading to sepsis, pneumonia, shock, stillbirth and perinatal mortality of 10% to 20%. Late-onset disease occurs from7 to 90 days after birth and manifest primarily as meningitis. The recognition that maternal colonisation with the organism is a key factor in the occurrence of GBS-associated illnesses and mortality was a milestone in the history of perinatal health.

Different studies have reported that risk-based or screening-based strategies recommended by the Centres for Disease Control and Prevention (CDC) had caused a significant decline in the prevalence of neonatal GBS infections[2]. When public health decisions for implementing prevention strategies are needed, a basic point is the knowledge of prevalence of maternal GBS colonisation.

In Nigeria, this prevalence varies widely between geographic areas and even between different populations. For instance, it was reported a maternal colonisation rate of 1.8% in Ibadan[4], 3.6% in Jos[5], 11.3% in Ile-Ife[6] and 14% in Zaria.

Saint Luke's Hospital is a public health institution that serves primarily the

uninsured residents of Anua and neighbouring environs- constituting important regions in Uyo. Although Saint Luke's hospital accounts for more than 90% of births in this area, no data are available about the prevalence of maternal GBS carriers.

Also in Uyo, Nigeria, the spectrum of group B *Streptococcal* disease remains a largely under-recognised problem and no guidelines have been formulated till now to curb its menace and screening is not routinely practiced due to the concentration of attention on HIV/AIDS in pregnant women and attendant consequences on neonates.

The present study was undertaken to find the prevalence of GBS in pregnant women and its relation to risk factors with the view of providing an epidemiological baseline data for policy formulators.

METHODS

A four month cross-sectional prospective study was carried out in 150 parturient women admitted at Saint Lukes' hospital, Anua after meeting the selection criteria having obtained ethical approval from the Human Research Ethics Committee (HREC), located at the Ministry of Health, Akwa Ibom State Secretariat, Uyo. The sample size of 150 was derived on the basis of women meeting the inclusion criteria. The inclusion criteria were all consenting pregnant women in their 35 to 37 weeks of gestation and not on any antibiotic treatment. The primary objective was to note the prevalence of GBS, and the secondary objective was to assess the risk factors associated with GBS colonisation.

Two swab samples were taken from the lower one third of the vagina and anal regions using sterile cotton swabs by the attending gynaecologist. These were transported to the medical microbiology laboratory of the University of Uyo Teaching Hospital in Amies transport medium (oxoid, UK) from where they were directly inoculated onto the surface of CHROMagar™ Strep B medium containing supplements and incubated at 37°C for 18 to 24 hours under aerobic conditions. All colonies appearing with a mauve coloration suggestive of GBS were identified using standard microbiological techniques (Gram's staining, catalase test and CAMP test). Colonies positive to CAMP test were further confirmed using Streptococcal grouping reagent B (oxoid, UK). Detailed information on socio-demographic characteristics of the women like age, occupation, ethnicity and educational attainment was noted by means of a standard questionnaire. Also, risk factors (previous maternal colonisation, gravidity, contraception use, gestational diabetes and premature rupture of amniotic membranes) were noted. Analysis was done using Statistical Package for Social Sciences (SPSS) VERSION 16. All statistical comparisons were done using chi-square analysis. Probability values less than 0.05 were considered as statistically significant.

RESULTS

A total of 150 pregnant women were screened for GBS out of which 104 were multigravids and 46 were primigravids. However, GBS was isolated in 2 (1.92%) multigravid women (Table 1). Two out of the 150 women (1.33%) were colonised in the anorectum and only 1 (0.67%) was colonised in the vagina (Figure 1). The age range of this pregnant population was between 18 to 44 years (mean age of 31 years) where the maximum number of pregnant women was in the age group of 21 to 30 years but the proportion of women with GBS carriage was highest in the age group of 31 to 44 years (2.44%) (Table 1). As regards the educational attainment of the women, rectovaginal colonisation was higher (3.23%) in women with higher educational attainment (Dip/NCE and HND/BSc.) than in those without higher education (FSLC and SSCE) (Table 2). On occupation, rectovaginal carriage was higher (1.75%) among women who were unemployed and students than those employed (1.08%) and this was statistically significant (Table 3).

Non-diabetic women were found to have rectovaginal colonisation (2 (1.33%)) when compared with the diabetic women who were found to have none (Table 4). Previous GBS colonisation was not associated with current GBS colonisation and rectovaginal colonisation of GBS was higher (2.33%) in women with history of contraception use than (0.93%) in those without (Table 4). The percentage of women with premature rupture of amniotic membranes and GBS colonization (25%) was found to be statistically significant when compared to women without premature rupture of membrane (0.68%) as shown in Table 5.

Table 1: GBS colonisation in relation to gravidity and age

Characteristics	**No. of women N = 150**	**GBS Positive n (%)**
Gravidity		
Multigravida	104	2 (1.92)
Primigravida	46	0 (0)
Age group (years)		
Below 18-20	28	0 (0)
21-30	81	1 (1.23)
31-44	41	1 (2.44)

Table 2: GBS colonisation in relation to Education attainment

Educational attainment	**No. of women N = 150**	**GBS Positive n (%)**
FSLC	34	1 (2.94)
SSCE	63	0 (0)
Dip/NCE	31	1 (3.23)
HND/B.Sc	22	0 (0)
Women with higher education	53	1 (1.89)
Women without higher education	97	1 (1.03)

χ^2=0.188; p=0.664

Key: FSLC= First School Leaving Certificate; SSCE= Senior School Certificate Examination; Dip= Diploma; NCE= National Certificate in Education; HND= Higher National Diploma; B.Sc= Bachelor of Science.

Table 3: Prevalence of GBS colonisation in relation to Occupation

Occupation	**No. of women N = 150**	**GBS Positive n (%)**
Professionals	31	1 (3.23)
Service, sales and agricultural workers	62	0 (0)
Students	11	0 (0)
Unemployed	46	1 (2.17)
Employed	93	1 (1.08)
Unemployed and students	57	1 (1.75)

χ^2=0.122; p=0.727

Table 4: GBS colonisation in relation to previous colonisation, contraception use, still birth and gestational diabetes

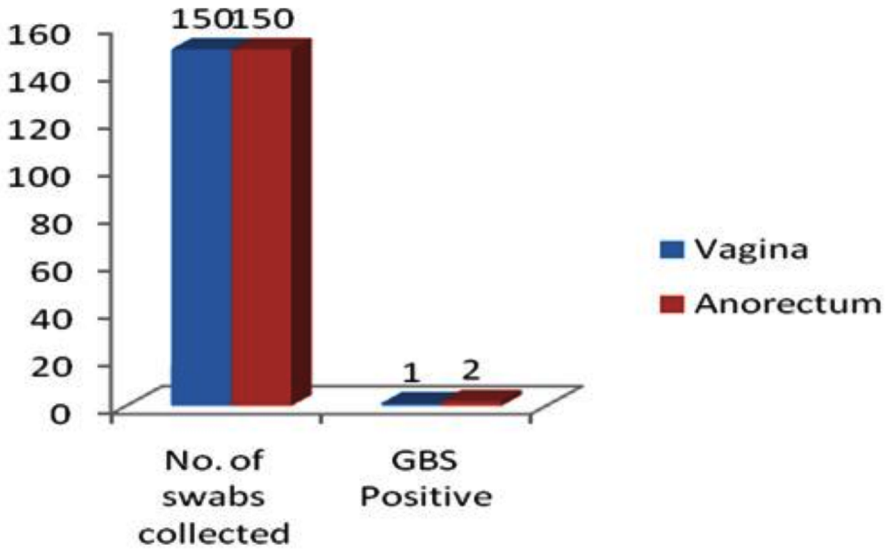
Characteristic	No. of women N = 150	GBS Positive n (%)
Previous GBS colonisation	0	
No previous GBS colonisation	150	2 (1.33)
Use of contraception	43	1 (2.33)
No use of contraception	107	1 (0.93)
Previous stillbirth	4	1 (25)
No previous still birth	100	1 (1)
Gestational diabetes	0	0 (0)
No gestational diabetes	150	2 (1.33)

Table 5: GBS colonisation in relation to membrane rupture

Premature rupture of membranes	No. of women	GBS Positive n (%)
Presence	4	1 (25%)
Absence	146	1 (0.68%)
Total	**150**	**2 (25.68%)**

χ^2=17.264; p=0.000

Figure 1: GBS colonisation in relation to site of sample collection



DISCUSSION

Group B *Streptococcus* is one of the common microbial agents causing urogenital infections in women of reproductive age group especially pregnant women and also a cause of neonatal infections globally.[7] The infection by this microorganism may lead to urinary tract infection (UTI), bacteremia, and endometritis in women of reproductive age group. In pregnancy, it can cause UTI, endometritis, amnionitis, post-partum wound infections and neonatal complications such as prematurity, preterm labour, GBS pneumonia and meningitis[7.8].

Only 2 samples out of the 150 samples yielded the growth of GBS which accounted for a prevalence rate of 1.33%. Although it is comparable to 1.62% and1.8% gotten from studies done in India, Maputo and Mozambique respectively[9-14] it is however lower when compared with the report of findings in other parts of Nigeria like 9% in Calabar[15] 8.5% in Ibadan[5] 11.3% in Ile-Ife[6] 14% in Zaria[16] and 11% in Abeokuta.[17] This might be due to the more specific nature of the medium used.[18]

The premature rupture of amniotic membranes was the only risk factor significantly associated with current GBS colonisation. This risk factor could be used as a preliminary diagnostic marker for GBS colonisation as neonates born to these mothers may be at a greater risk of neonatal and infant disease. This observation was also in accordance with studies done in other countries.[19,20]

This study also corroborated the results of some studies[21, 22] which showed increased GBS colonisation in multigravidity. It was found that women were more often colonised with GBS if they had been pregnant before (1.92%). This perhaps may be due to the likelihood of these multigravida women been exposed to multiple sexual partners thereby exposing them more to this organism and the likelihood of the primigravida maintaining a monogamous long term partnerships therefore and hence less likely to be exposed to this organism.

The pregnancy history or reproductive history, including the use of contraception during or prior pregnancy and recurrent gestational diabetes during pregnancy may be potential risk factors associated with GBS colonisation.[23- 28] However no woman admitted having gestational diabetes and as such no inference could be made regarding recurrent gestational diabetes as a potential risk factor associated with GBS colonisation. This however may not be unrelated to health education especially preventive measure against excess weight during their antenatal visits. The lower colonisation rate (0.93%), amongst women using no method of contraception when compared to the higher rate (2.33%) in women using contraceptive may be attributed to the fact that women trying to achieve pregnancy are more likely to stick to one partner compared to women using contraception.

CONCLUSION

The prevalence rate of Group B Streptococcus colonisation is lower in Uyo when compared to some other cities in Nigeria. However premature rupture of amniotic membrane is a significant associated risk factor with this colonisation which may be used as a preliminary diagnostic marker for GBS colonisation in pregnant women.

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