PREVALENCE OF GROUP B STREPTOCOCCUS (GBS) COLONIZATION AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC OF A TERTIARY HOSPITAL IN NORTHEASTERN, NIGERIA

Okon KO, Usman H, Umar Z, Balogun ST

Department of Medical Laboratory Sciences, College of Medical Sciences University of Maiduguri , Department of Obstetrics and Gynaecology, University of Maiduguri Teaching Hospital , Department of Pharmacology and Clinical Therauptic , College of Medical Sciences, University of Maiduguri
Corresponding author: Okon, K.O. E-mail: Okonkenneth@gmail.com

Abstract

Group B streptococcus (GBS), is one of bacterial pathogen responsible for serious infection in neonatal population, that present as septicemia and meningitis. The study assessed the prevalence of GBS colonization among pregnant women attending antenatal clinic. A total of 133 pregnant women were recruited for the study, with lower vagina swab collected and examined using standard bacteriological procedures. Of the 133 lower vaginal swabs examined, 13(9.8%) yielded positive culture result for GBS isolates. Age-group-wise distribution of GBS positive isolates 5(3.8%) were within 20-29years, 4(3.0) 40-49 years, and 1(0.8) 10-19years ($p<0.05$). Demographic characteristic of pregnant women with positive GBS culture, 9(6.8%) with tertiary education, 7(5.3%) were housewives, and majority were multiparious and in the third trimester stage. Previous clinical signs and symptoms, 6(4.5%) isolates were from pregnant women who once had infant with neonatal septicemic case and 7(5.3%) previous preterm labour. Statistical significance difference was observed in both demographic variables assessed ($p<0.05$).In conclusion, the GBS colonization prevalence of 9.8% might be considered high, which signifies needs for awareness among pregnant women seen at the antenatal clinic. Therefore, this GBS level might necessitate the needs for adoption of routine GBS screening procedure of all pregnant attending antenatal clinic.

Keywords; Group B streptococcus, pregnant women, carriage, tertiary hospital

{**Citation:** Okon KO, Usman H, Umar Z, Balogun ST. Prevalence of group B Streptococcus (GBS) colonization among pregnant women attending antenatal clinic of a tertiary hospital in northeastern Nigeria. American Journal of Research Communication, 2013, 1(6): 54-66} www.usa-journals.com, ISSN: 2325-4076.

Introduction

Lancefield group B streptococcus (*Streptococcus agalactiae*), a gram-positive bacterium of the phylum, firmicutes, spherical in shape, and demonstrate β-heamolysis blood agar plate prepared with horse erythrocytes. It is widely distributed in nature, and normal flora of the gastrointestinal tract and female gential tract. In women, GBS infections is usually asymptomatic as they are either colonizer or carrier of the pathogens (Moyo et al, 2000), however clinical disease conditions involves bacteremia, chorioaminotitis endometritis and urinary tract infection(Perovic 1998). The GBS infection in neonatal population is acquired through vertical transmission in utero or vaginal canal delivery(Moyo et al 2000), also responsible for neonatal meningitis, pneumonia and sepsis, with associated high morbidity and mortality rate. Neonatal septicemia due to GBS infection could either occurred within 7 days postpartum (as early onset disease(EOD), or between one week and three months is termed as late onset disease (Moyo et al 1995, 1996).

Majority of GBS cases occurs as a result of peripartum vertical transmission from GBS colonized mother (Aber et al, 1976, Persson et al, 1987). In most cases of neonatal sepsis presented in our hospital, primary clinical diagnosis focuses on malaria, septicemia or meningitis of other commonly isolated bacterial pathogens with less possible implication of GBS infection. Because of paucity of epidemiological information on GBS infection, and low awareness of GBS

infection in neonatal population. We decided to examine the prevalence of GBS carriage among pregnant women attending the antenatal clinic.

Materials and Methods

The study was a collaboration between department of Medical Microbiology and department of Obsteristic and Gyneacology, Unversity of Maiduguri Teaching Maiduguri. The pregnant women involved in the study were those attending clinic and the study period was between the months of May and October 2009. The criteria of inclusion, pregnant women without no apparent signs and symptoms of bacterial infection, no antibiotic therapy for the past two weeks and no signs of erosion in the vagina or cervix. Ethical clearance for the conduct of this study was approved by the management of the hospital. The pregnant women recruited were properly informed about the objective of the study by verbal communication. Based on the agreed consent to participate in the study, study questionnaire was administered before the specimen collection. A lower vaginal swab per subject was collected, using sterile speculum, and the labeled swab was transported to laboratory for prompt analysis. Rectal swab could not be collected as the subjects were unwilling to be subjected to such procedure, also significant number decline to be part of lower vaginal swab. The lower vaginal swab was plated on blood agar plate (prepared with horse blood), incorporated with colistin and nalidixic acid, incubated anaerobically at 37^{o}C for 24 hours. Bacteria colonies that showed beta-heamolysis were futher identified using standard bacteriological procedures, gram stain,catalase and bactracin sensitivity testing.

Data analysis

Data were analysed using SPSS version 15.0, values expressed in means and percentages. Statistical significance difference between the variables were determined by chi-square test($p<0.05$).

Results

Of the 133 lower vaginal swabs examined, 13(9.8%) yielded positive bacterial growth of group B streptococcus isolates, while 120(90.2%) proved negative. The mean age of pregnant women was 28.71±6.06 years (range 18-42). Distribution of GBS isolates in accordance with the age-group of the subjects as presented in Table I, showed high frequency of occurrence in the age-group 20-29years, 5(3.8%), followed by 40-49years, 4(3.0%), 30-39years 3(2.3%) and the least 10-19years 1(0.8%) respectively. Statistical significance difference was observed between the age-group and GBS isolates ($p<0.05$). Assessment of the demographic characteristic of pregnant women and GBS isolates as presented in Table II, 9(6.8%) had tertiary education and 7(5.3%) were housewives respectively. Obstetric history, 12 of the 13 GBS isolates were recovered from multiparious pregnant women, all within the third trimester stage. Previous clinical outcome of the foetus, 6(4.5%) had previous neonatal septicemic case, and one each with case of preterm and premature delivery. Similarly, previous clinical signs and symptoms with pregnant women showed that high prevalence of GBS isolates were from those with preterm labour, 7(5.3%), and 3(2.3%) each with PV discharge. Statistical significance difference were observed in both previous neonatal clinical outcome and clinical signs and symptoms with GBS isolates($p<0.05$).

Table I; Age-group-wise distribution of GBS positive pregnant women

Age-group(years)	GBS(+)	GBS(-)	Total
10-19	1(0.8)	5(3.8)	6(4.5)
20-29	5(3.8)	65(49.6)	70(52.6)
30-39	3(2.3)	43(32.3)	46(34.6)
40-49	4(3.0)	7(4.5)	11(8.3)
Total	13	120	133

X^2=0.0001, df=3

Discussion

To the knowledge of the authors, this is the first preliminary study on GBS colonization among pregnant in study area and had provided a baseline information on the bacterial pathogen. The prevalence level of GBS colonisation among pregnant women of 9.8%, may be considered high in view of no previous epidemiological data for comparison.However, the level is higher than 1.8% reported in Ibadan, southwest Nigeria (Olanisebe and Adetosoye, 1984).

Comparison of the level with studies conducted outside Nigeria showed that the level is low. In multicenter studies conducted in Netherland, 29% reported in among African women, 13% Asian and 21% European(Van der Berg, 2006), 15%-40% in US and Canada(Anthony et al 1981, Campbell et al 2000), 27.6% in Saudi Arabia(El-Kersh et al ,2002), 9.1% in Iran (Namavar et al, 2008), 20.4% in Brazil(Costa et al, 2008) and 31.4% in Trindad(Orrett and Olagundoye,1994).

Table II; Demographic characteristic of pregnant women studied

Primary	0(0)	4(3.0)	4(3.0)
Secondary	3(2.3)	29(21.8)	32(24.1)
Tertiary	9(6.8)	61(45.9)	70(52.9)
Quaranic	1(0.8)	24(18.0)	25(18.8)
None	0(0)	2(1.5)	2(1.5)
X^2=0.67, df=4			
Occupation			
Housewives	7(5.3)	54(40.6)	71(45.9)
Business	2(1.5)	12(9.0)	14(10.5)
Civil servant	4(3.0)	30(22.6)	34(25.6)
Student	0(0)	21(15.8)	21(15.8)
NYSC Corper	0(0)	3(2.3)	3(2.3)
X^2=0.20, df=4			
Parity			
None	1(0.8)	24(18.0)	25(18.8)
Single	0(0)	25(18.8)	25(18.8)
Double(2)	6(4.5)	27(20.3)	33(24.8)
Multiple(>2)	6(4.5)	44(33.1)	50(37.6)
X^2=0.08, df=3			
Gestational age			
First	0(0)	9(18.8)	9(6.8)
Second	0(0)	27(20.3)	27(20.3)
Third	13(9.8)	84(33.1)	97(72.9)
X^2=0.62, df=3			
Previous neonatal clinical outcome			
Preterm delivery	1(0.8)	7(5.8)	8(6.0)
Neonatal admission	6(4.5)	6(4.5)	12(9.0)
Premature	1(0.8)	19(14.3)	20(15.0)
None	5(3.8)	88(66.2)	93(69.9)
X^2=0.0001, df=3			
Previous clinical signs and symptoms			
PV discharge	3(2.3)	42(31.6)	45(33.8)
Preterm labour	7(5.3)	9(6.8)	16(12.0)
Premature rupture membrane	0(0)	1(0.8)	1(0.8)
None	3(2.3)	68(51.1)	71(53.4)
X^2=0.0001, df=3			

However, difference observed in the prevalence level of most reported studies may be attributed to difference in the geographic location and other demographical variables that could influenced the level. These demographic variables includes, age, parity, gestational age, obstetrics history,

culture techniques, geographical location, sampling procedures, studied population and isolation techniques. (Collins et al 1998,Van der Berg, 2006).Similarly, racial and genetic factors are known contributory factors as documented in most studies (Aber et al 1976, Anthony et al 1978).Some studies had reported higher level among black pregnant women in South Africa and US ranged between 10-30%(CDC2002, Blanckart et al 2003).

In this study, the frequency of positive GBS isolates with the age-group and parity of pregnant women depicited no definitive pattern or relationship. Although, some studies had observed association between GBS isolates and increased in age and number of parity(. Baker et al 1975,Anthony et al 1978,Yow et al, 1980,).In addition, the assesment of educational status of the women effect on GBS positivity, revealed that those with tertiary education had high prevalence, and those with Quranic education were the least, the reason for such pattern is unclear. Our findings differs with report of Regan et al (1991) in which they observed that GBS is less common among pregnant women with higher educational status. The occupation of the pregnant women with positive GBS culture, showed housewives 7(5.3%), civil servants, 4(3.0%) and those into business 2(1.5%). This pattern is in contrast with the study conducted in New Zealand showed that there is high predisposing factor of GBS colonization among socially disadvantage women(Regan et al, 1991).

The sampling for GBS carriage among pregnant women is recommended to be done at the third trimester stage(35-37 weeks) (Persson et al, 1987),that could provides the information necessary for antibiotics prophylaxis before delivery. In this study, the 13 positive GBS culture were recovered from pregnant women at the third trimester stage, result that is consistent with other reported findings(Regan et al 1991,Baker et al 1975, McDonald and Chamber, 2000), while their obsteristic history revealed previous preterm labour and vaginal discharge episodes

which are consistent with clinical manifestion of positive GBS infection(Kubota 1998). Our findings had further strengthen the need for GBS screening as routine procedure for pregnant women attending our antenatal clinic as a safeguard measures against possible neonatal complications.

The major problem confronting most medical microbiology laboratories at different hospital especially in developing countries is the difficulty encountered in the GBS isolation procedures due to the fastidious natures of the organism and lack of basic facilities. Appropriate sampling procedures influenced significantly on the isolation rate, as sampling also depends on the time of culture, the anatomic swabbed, the laboratory procedure used for culture and detection of organism(CDC 2002).

In this study, we employed the lower vaginal swabbing, as GBS prevalence level of 15%-20% are present at the lower vaginal tract(Hoogkamp-Korstamic et al 1982) and 0.47%-23.3% GBS colonization as vaginal flora of pregnant women(Arora et al 1994,Lakshani et al 1998).However, the prevalence level of 9.8% obtained in our study still falls within the stipulated range for studies that employed either vaginal or cervicovaginal swab(Yow et al 1980, Kubota 1998) One of the difficulty we encountered in the course in this study, was the unwillingness of some pregnant women to be subjected to lower vaginal swab procedure despite verbal briefing and consent, this is also responsible for relatively small number samples analysed.

In conclusion, the prevalence level of 9.8%, signifies that GBS infection might be a silent clinical problem that is undiagnosed at our hospital antenatal clinic, therefore, requires needs for awareness and concerted effort for intervention preventive measures. While the CDC recommendation of administration of prophylaxic antibiotic agents of pregnant women is still

adopted, it is necessary that routine screening of pregnant women are carried out and identified positive mother are closely monitored after delivery , of infant for possible early onset disease. The limitation of this study is the inability to evaluate the neonatal outcome of GBS positive mothers.

References

Aber,RC, Allen, N, Howell JT, WilkensonHW, FacklamRR. Nosocomial transmission of group B streptococci. Pediatrics 1976;58(3):346–53.

Anthony BE, Okada DM, Hubel CJ, Epidemiology of group B streptococcus; longitudinal observation during pregnancy. J.Infect. Dis. 1978, 137(5); 524-30.

Anthony BF, Eisenstadt, R, Carter J, Kim KS, Hobel CJ.Gential and maternal carriage of group B streptococci during pregnancy . J Infect Dis 1981;143;761-6

Arora S, Jindal, N, Wahl G, Gulari, VL. Presumptive denification and antibiotic susceptibility of Group B streptococci. Indain Journal of Pathology and Microbiology 1994, 37(2);185-190.

Baker CJ, Barrett FF, Yow MD. The influence of advancing gestation on group B streptococcal colonization in pregnant women. Am J .Obstet Gynecol 1975;122(7):820–3.

Blackart, H,Frans J, Bosteels, J. Hansen M, Verhaegen, J. Optimization of perinatal group B streptococcal screening .European Journal of Clinical Microbiology and Infectious Diseases.2003, 29(10);619-621.

Campbell JR, Hiller SI, Krohn MA, Ferrieri P, Zalenik DF, Baker CJ, Group B streptococci colonization and serotype-specific immunity in pregnant women at delivery. Obstet. Gynecol.2000, 96, 498-503.

CDC publication. Perinatal Group B streptococcus Diseases Backgroud. Epidemiology and Overview of Revised CDC Prevention Guidelines 2002.

Collins TS, Calderon M, Gilman RH, Vivar A, Charache P. Group B streptococcal colonization in developing country: its association with sexually transmitted disease and socioeconomic factors. Am J Trop Med Hyg 1998; 59: 633-6.

Costa, AL Lany Filho, Chein MB, Brito LM, Lamy ZC, Andrase KL. Prevalence of colonsation by group B streptococcus in pregnant women from public maternity of northwest region of Brazil. Rev Bras Gynecol. Obstet. 2008,30;274-80.

El-Kersh TA, Al-Nuaim LA, Kharty TA, Al-Shammary FJ, Al-Saleh SJ, Al-Zamah FA. Detection of gental colonization of group B streptococcal during late pregnancy. Saudi Med J. 2002, 23; 56-61.

Hoogkamp-Korstanje JA, Gerards LJ, Cats BP. Maternal carriage and neonatal acquisition of Group B streptococci. The Journal of Infectious Disease, 1982, 145(6);800-3.

Kubota T. Relationship between maternal group B streptococcal colonization and pregnancy outcome. Obstet Gynecol 1998;92(6):926–30.

Lakshimi, V Das S, Shivannda PL, Savitri P, Rao K. Incidence of group B beta heamolytic streptococci in the vagina flora of pregnant women.Indain Journal of Pathology and Microbiology.1988, 31(3);240-244.

McDonald HM, Chambers HM. Intrauterine infection and spontaneous midgestation abortion: is the spectrum of microorganisms similar to that in preterm labor? Infect Dis Obstet Gynecol 2000;8(5/6):220–7.

Moyo S.R., Modzori J., Tswana S.A., Macland J.A., (2000). Prevalence , capsular type, distribution, anthropometric and obstetrics factor of group B streptococcus(streptococcus agalactiae) colonization in pregnancy. Central African Journal Medicine.4(5);115-120.

Moyo, S.R., Tswana S.A., Nystrom, L., Bergstrom, S, Blomberg, A., Ljungh, A.(1995).Intrauterine death and infection during preganacy. International Journal of Obsterics and Gynaecology.5;211-218

Moyo, SR, Hageretrand I., Nystrom, Tswana SA, Bloomberg, J Bergstrom, S, Ljungh, A.(1996).Stillbirth and intra-uterine infection; histological choriamontits and microbiological findings.International Journal of Obstetrics and Gynaecology54;115-123.

Namavar Jahromi B, Poorarian S, Poorbarfehee S. The prevalence and adverse effect of group B streptococcus colonization during preganacy. Arch Iran Med. 2008, 11;654-7.

Olanisebe SB,and Adetosoye AL. Determination of asymptomatic carrier rate of beta-heamolytic group B streptococcus in vagina of pregnanat women in Ibadan, Nigeria.Zentral blast fur Bakteriologic Mikrobiologie und Hygiene(serie A Medical Microbiology, infectious Diseases, Virology, Parasitology).1986,261(12);248-253.

Orrett FA, Olagundoye V.Prevalence of group B streptococcal colonization in pregnant third trimester women in Trindad. J.Hosp. Infect. 1994, 27, 43-8

Perovic O. (1998). Group B streptococcus infection. South Africa Journal of Epidemiology and Infection.13(1); 26-33.

Persson K, Bjerre B, Elfstrom L, Forsgren A. Longitudinal study of group B streptococcal carriage during late pregnancy. Scand J Infect Dis 1987;19(3):325–9.

Regan JA, Klebanoff MA, Nugent RP. The epidemiology of group B streptococcal colonization in pregnancy. Vaginal Infections and Prematurity Study Group. Obstet Gynecol 1991;77(4):604–10.

Van der Berg, Sprij AJ, Ootrvigel FM,Mutsaers JAEM, Renes NB, Rosendeal FR, Derr PJ, Prevalence of colonization with group B streptococcus in pregnant women of a multi-etnic population in the Netherland. European Journal of Obstetrics and Gyneacology and Reproductive Biology, 2006, 124;178-183.

Yow MD, Leeds LJ, Thompson PK, Mason Jr EO, Clark DJ, Beachler CW. The natural history of group B streptococcal colonization in the pregnant woman and her offspring. I. Colonization studies. Am J Obstet Gynecol 1980;137(1):34–8.