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# A Prospective Study To Determine The Association Of Vaginal Group B Streptococcal Colonization In Mother And Its Effects On Labour In India

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**Abstract**

**Background-** GBS colonizes the lower genito-urinary and gastro intestinal tracts in adults, with the colonization being chronic or intermittent. In the United States of America (USA), it is estimated that 15-40% of pregnant women are carriers of GBS. In a colonized woman, the bacteria can be transmitted to the fetus in the intra-uterine or perinatal period. This transmission from the mother to the newborn occurs variably and the transmission rate is estimated to be between 40-73%. Of the babies born to colonized mothers, 1-2% develop infection in the immediate neonatal period (early onset sepsis), rest as late-onset disease (LOD) after 7–90 days. Maternal colonization has been described as a prerequisite for EOD and a risk factor for LOD. Intrapartum colonization is strongly associated with early onset GBS sepsis, resulting in ~4% of reported fatalities and serious morbidities including sepsis, pneumonia, meningitis, illness, and death in infants, along with long-term disabilities.

**Methods-** The study was a prospective hospital based observational study in which 200 pregnant women attending antenatal clinic at the Department of Obstetrics and Gynaecology, SMS Medical College, Jaipur were included after taking written informed consent. Vaginal swabs were taken at the time of admission to the labour room for GBS culture and the outcome of pregnancy was followed till the early perinatal period.

**Results-** In our study significant association was found between GBS positive mothers and the incidence of preterm labor. A total of 33% mothers who were GBS positive had preterm labor whereas only 5.8% of the GBS negative mothers suffered a preterm delivery. Also, there were higher number of cases with PROM in mothers who tested positive for GBS colonization.

**Conclusion-** Epidemiological spectrum of Group B Streptococcus is underestimated in India; hence, the present study was undertaken to determine the prevalence, risk factors and neonatal outcome associated with colonization by GBS in pregnant women.

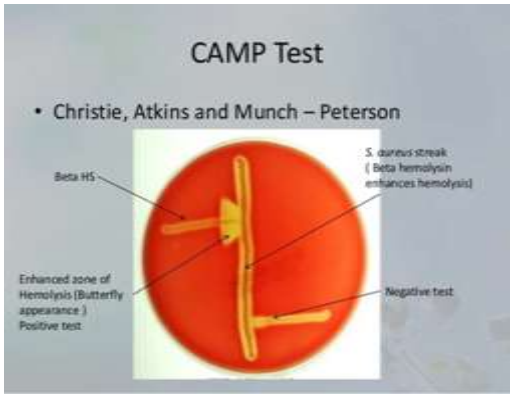
**Keywords**: NIL

## Introduction

Group B Streptococci are a constituent of the normal vaginal bacterial microflora. During pregnancy there are optimal conditions for GBS multiplication in the vagina, which may have serious consequences for both the mother and her child. The gastrointestinal tract serves as the natural reservoir for GBS and is the chief source of vaginal colonization. Group B Streptococcus (GBS) is one of the major causes of perinatal infections. It causes sepsis, meningitis, and pneumonia in the newborn and young infants. In the mother, it is one of the important causes of chorioamnionitis, postpartum endometritis, urinary tract infections, post cesarean febrile illness, and rarely, endocarditis. GBS carrier state was positively related to several adverse pregnancy outcomes, including intrauterine infection,

premature rupture of membranes, postpartum haemorrhage, foetal distress and puerperal infection in different studies conducted worldwide. Documenation of maternal carriage rates among pregnant women would help to decide whether universal screening should be offered during pregnancy to prevent maternal and neonatal morbidity.

**Materials And Methods:** The study was conducted in the Obstetrics and Gynecology department of a tertiary level hospital in India. All pregnant women with singleton pregnancies above 28 weeks of gestation who reported to the Labor Room were approached for screening and those who consented to take part were recruited. Swabs were taken from the lower vagina only. Center for Disease Control and Prevention guidelines recommend use of both vaginal and rectal swabs but in our study rectal swabs were excluded because it can be both painful and embarrassing for the mother. A total of four samples were collected from each newborn infant immediately after birth. Swabs were taken from the external ear, nose, throat and umbilical region. These swabs were transported to laboratory after placing the swabs in selective broth medium. The swabs were transported immediately in Amies Transport Medium to the Clinical Microbiology Department where they were plated directly on quality passed 5% sheep blood agar plates prepared in-house and incubated in Todd – Hewitt broth supplemented with nalidixic acid 15microgram/ml and gentamicin 8microgram/ml. Following incubation for 24 hours at 37 °C under 5% CO2 atmospheric air, the plates were checked for growth at 24 and 48 hours. Plates were then classified as showing no growth or growth of GBS. Organism identification was confirmed using the Christie, Atkins, and Munch-Petersen test. Beta-hemolytic ATCC 12386 Streptococcus agalactiae and non-hemolytic ATCC 13813 S. agalactiae were used as quality control strains.




**Results:** A total of 200 pregnant women who were admitted to the labour room in SMS Hospital from February 2020 to January 2021 were screened for GBS. Maternal swabs were taken at the time of admission to the labour room, and swabs from the neonates were taken after delivery. Both samples were cultured separately. All the samples were from singleton pregnancies. Analysis was done using SPSS 13.5. Prevalence rates in the study were calculated as percentage. The study was approved by the research review board of our hospital and it complied with the ethics committee of research using human subjects.

The mean age of patients in our study was 26.76 years with majority of cases (81.5%) in age group 21-30 years followed by 14.5% in age group ≥31 years. 54.5% mothers were multiparous followed by 45.5% were primiparous. The primary cultures were positive in 12 out of the 200 women, i.e., Group B Streptococcus colonization was present in 6% mothers and in the neonates, colonization was present in 2.5%. The surface swabs from 6 new-born babies were positive for GBS on primary cultures. The rate of preterm labour was found to be significantly higher in GBS positive mothers (33%) compared to negative mothers (5.8%). PROM rates were also found to be significantly higher in the colonized mother (58.3%) as compared to non-colonized women (6.3%). Our study did not find any significant difference in post-partum complications in the GBS positive versus GBS negative mothers, although the incidence of UTI was found to be slightly higher in the positive group. Chorioamnionitis and other serious complications like sepsis were not reported in



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the study despite being known complications. This might be because of routine antibiotic coverage given to all the mothers and early diagnosis and hospitalization in cases with PROM.

**TABLE 1: Association of Group B Colonization in Mother with Preterm Labour (n=200)**

| Labour Onset | GBS Positive | GBS Negative |
|---|---|---|
| Preterm | 4 | 11 |
| Term | 8 | 177 |
| Percentage of Preterm Labour | 33% | 5.8% |

The difference was statistically significant with p-value 0.0033. Significant at $p < 0.05$

**TABLE 2: Association of Group B Colonization in Mother with PROM (n =200)**

| PROM | GBS Positive | GBS Negative | Total |
|---|---|---|---|
| Present | 7 | 12 | 19 |
| Absent | 5 | 176 | 181 |
| Percentage | 58.3% | 6.3% | |

The difference was statistically significant at P value 0.00001, significant at $p < 0.05$.

**Discussion:** GBS has been identified as an important cause of infection in the perinatal period in both the mother and newborn. This is of particular interest because of the fact that intrapartum antibiotics given to colonized mothers can reduce the burden of early-onset disease in the newborn. Thus, screening of pregnant women late in pregnancy or in labor is required to reduce the possible adverse outcomes caused by the infection by proper antibiotic coverage. The prevalence of colonization varies with geographic region, socio-economic status, race and sexual activity. In low prevalence areas, it might be more cost effective to give intrapartum antibiotics to mothers in labor with certain identified risk factors that place their newborn at higher risk of early-onset infection. Epidemiological spectrum of Group B Streptococcus is underestimated in India; hence, the present study was undertaken to determine the prevalence, risk factors and neonatal outcome associated with colonization by GBS in pregnant women. Prevalence of colonization of GBS was found to be 6% in the pregnant women after term gestational age. Although the prevalence rate is not high, the effects on labour were significant, with infected mothers delivering a much greater percentage of preterm babies and having higher incidence of PROM. Those preterm infants born to infected mothers irrespective of their colonization status would be at a much higher risk of developing complications due to the perils of prematurity other than being at high risk of developing the early onset and late onset GBS disease. Therefore, it appears that universal maternal screening for GBS may, at present, be cost-ineffective in India. Risk-based antibiotic prophylaxis to mothers and selective sepsis examinations in newborn would be the best choice in this scenario to prevent early-onset GBS disease in newborn.

**Ethics Committee Approval:** This study was approved by the Institutional Research Review Board, SMS Medical College, Jaipur. All procedures performed in this study were in accordance with the ethical standards of the institutional and national research committee.

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

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