

## Correlation of Maternal Vaginal Flora during Pregnancy and Birth weight of Neonates

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### Abstract

### Original Research Article

Abnormal bacterial colonization of the rectum and anus during pregnancy may create an abnormal vaginal and cervical microbial environment. Identification of the abnormal colonization of the genital tract by a culture based approach has been recommended by the CDC 2000. This aids in early recognition of colonised mothers for treatment which in turn prevents newborn infections. The present study was conducted to know the maternal vaginal flora in third trimester of pregnancy and the outcome of birth weight in neonates. The study was done in the departments of OBG and Neonatology in a tertiary care hospital on 50 mothers in 3rd trimester of pregnancy and their babies were followed up till discharge. High vaginal swabs were collected under strict aseptic conditions and organisms were isolated and identified using standard conventional bacteriological techniques. Out of 50 High vaginal swabs collected, 35 organisms were isolated and commonest was Coagulase negative Staphylococcus i.e 22 (63%). Of the 50 babies born to mothers, 30 were appropriate for gestation (AGA) and 20 were small for gestation (SGA) babies. Out of 30 AGA babies, 14 (46.6%) were born to colonized mothers and 16(53.3%) were born to non-colonised mothers. Out of 20 SGA babies, 18(90%) were born to colonized mothers, 2 (10%) were born to non-colonised mothers. A significant association was found between SGA babies and maternal colonization. To conclude maternal vaginal colonization during pregnancy has significant impact on baby's birth weight. SGA babies were more among colonised mothers. Hence identification of vaginal colonization in pregnant mothers and appropriate antimicrobial treatment is essential to decrease the incidence of SGA babies.

**Key words:** Third trimester pregnancy, Fetal growth restriction, Gestational age, Normal vaginal delivery, Neonatal infections, Vaginal colonization.

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## INTRODUCTION

Neonatal deaths in developing countries are caused by infections (42%), asphyxia and birth trauma (29%), preterm babies and low birth weight (10%), congenital abnormalities (14%) and other causes (4%) [1]. Fetal growth restriction is associated with significant perinatal morbidity and mortality [2], an increased risk of neurological impairment in childhood [3, 4] Bacterial infection is the leading cause in neonatal sepsis. Exposure can occur during gestation (in utero), during labor, and after birth [5]. Abnormal bacterial colonization of the rectum and anus during pregnancy may create an abnormal vaginal and cervical microbial environment [6]. Identification of the abnormal colonization of the genital tract by a culture based approach has been recommended by the CDC 2000 [6]. This aids in early recognition of colonised mothers for treatment which in turn prevents newborn

infections. In the long run reduction in neonatal mortality and morbidity can be achieved. A better understanding of the possible impact of genital infections on fetal growth could eventually lead to clinical interventions, such as the identification and antibiotic treatment of pregnant women at high risk for infection-related IUGR [7]. The present study was conducted to know the association between the genital flora in the third trimester and the occurrence of SGA babies in a group of pregnant women.

### Objective

To study the correlation between maternal vaginal flora in pregnancy and the birth weight of neonates

## MATERIALS & METHODOLOGY

The Present study was conducted for a period of 6months (June 2018-November 2018) at Niloufer hospital for women and Children, Hyderabad after clearance from ethical committee. This study included 50 pregnant women in third trimester of pregnancy with age between 15-45yrs who attended antenatal checkups and delivery. Deliveries by caesarean section, still births, mothers with chronic medical conditions were excluded. The study was conducted after explaining in detail about the aims and objectives of the study to pregnant women and taking their consent. Detailed history of all 3<sup>rd</sup> trimester pregnant women as per antenatal proforma was taken. The babies of these mothers were evaluated for signs of sepsis. Birth weight was taken into account and followed up till discharge. High vaginal swabs were collected using Cusco's

speculum from the posterior fornix as per CDC recommendations. The swabs collected were immediately transported to the microbiology lab and cultured using standard culture methods. The swabs were inoculated onto Sheep Blood agar, Chocolate agar, Mc Conkey's agar and incubated for 48-72hrs. The organisms were identified using standard conventional bacteriological techniques.

The mothers and their newborns were followed up till discharge after delivery in department of OBG & Neonatology.

## RESULTS

Out of 50 High Vaginal Swabs processed, 32 (64%) were Culture Positive.

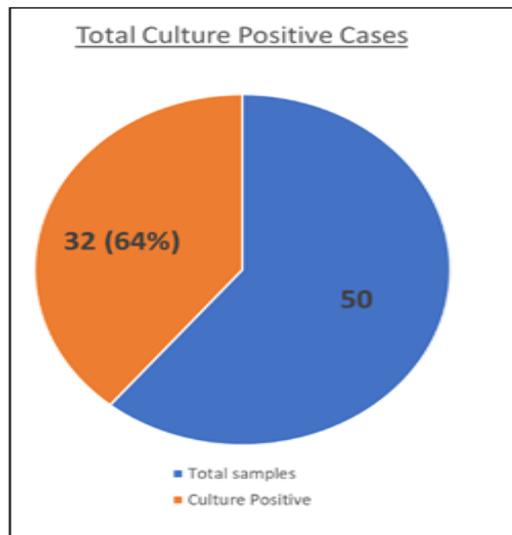


Fig-1: Total Culture Positive Cases

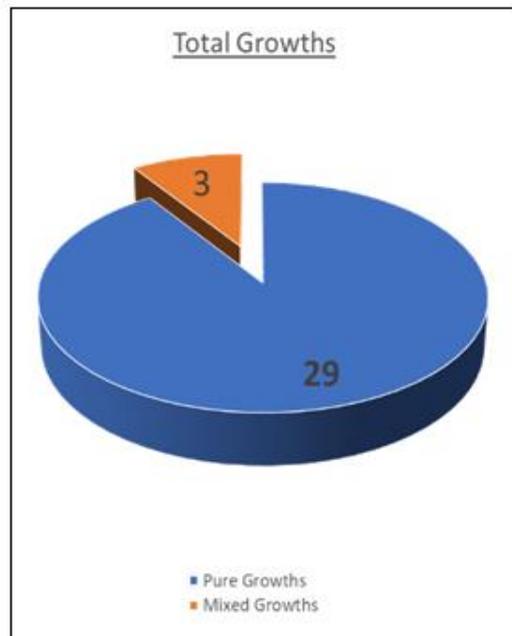


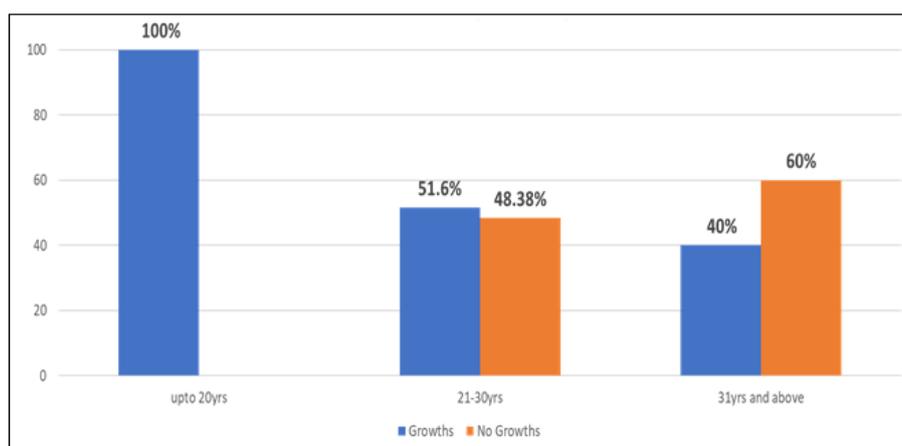
Fig 2: Total Pure and Mixed Growths

**Table-1: Distribution of various organisms**

Name Organism	Total Number n=35	Percentage
Coagulase negative Staphylococcus	22	62.8%
Candida spp	4	11.4%
E.coli	3	8.57%
Staphylococcus aureus	3	8.57%
Klebsiella	2	5.71%
Enterococcus	1	2.8%

Of the 50 pregnant women, 14 were below 20 years and all of them (100%) were found to have vaginal colonization. Out of 31 mothers in the age group of 21-30yrs, 16 (51.6%) showed vaginal

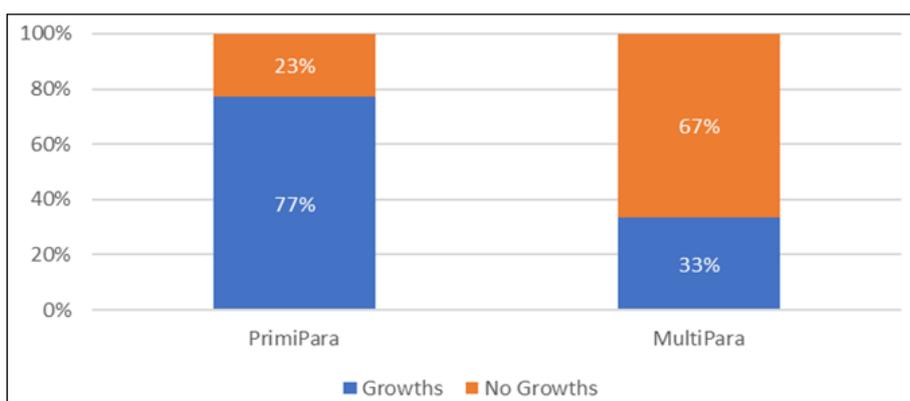
colonization and out of 5 mothers above 31yrs of age, 2 (40%) showed vaginal colonization thus reflecting a decrease in vaginal colonization with increasing age-(Fig3).



**Fig-3: Relation between Age and Vaginal colonization.**

Out of the 50 pregnant women, 35 were primipara with 27 (77.1%) of them having vaginal colonization, whereas among the 15multipara mothers,

5 (33.3%) showed colonization. This study showed a significant association between primipara mothers and vaginal colonization-(Fig 4).



**Fig-4: Relation between parity and vaginal colonization.**

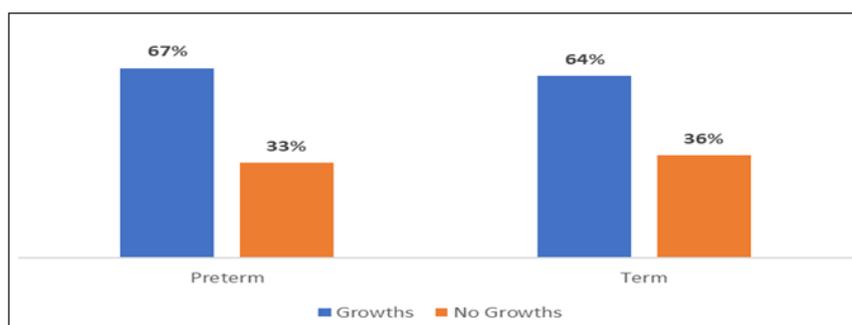
Most of the mothers in this study were of the lower class and 73.6% of them had colonization

followed by middle class mothers. There were no mothers of upper class in this study.-Table2.

**Table-2: Relation between socio-economic status and vaginal colonization**

Socioeconomic class	Growth	No Growth	Total (n=50)
Upper	---	---	---
Middle	4(33.3%)	8(66.6%)	12
Lower	28(73.6%)	10(26.3%)	38

In this study, of the 32 mothers with vaginal colonization 30 (63.8%) had term deliveries and 2 (66.6%) had preterm deliveries-Fig 5.



**Fig-5: Relation between maternal colonization and gestational age**

Of the 50 babies, 20 were small for gestational age and of these 18 (90%) were born to colonized

mothers; whereas among the 30 AGA babies, 14 (46.6%) were born to colonised mothers-Fig 6.



**Fig-6: Relation between birth weight and maternal colonization (SGA: small for gestational age, AGA: appropriate for gestational age)**

## DISCUSSION

There is evidence that abnormal vaginal microflora may be involved in the causation of fetal growth restriction. Ascending genital infections can install low grade intrauterine infection and inflammation, selectively damage the invasive trophoblast cells, disturb placental invasion and result in later placental dysfunction, thereby affecting intrauterine fetal growth potential [8]. In the present study, out of 32 colonised mothers, the SGA babies were seen in 90% of cases in comparable to the study by Marijane A *et al.* Joachim A *et al.* McDonald *et al.* [9-11], Singaravelu V. *et al.* [6]. In our study, out of 35 organisms isolated, most common isolate was CONS (63%). This is comparable to Singaravelu V. *et al.* (20%) [6] And Hall *et al.* [12] (50%) who also isolated CONS as predominant colonizer in pregnant women. The next common colonizer isolated was *Candida* spp (11.4%) which is in comparable to Alex Farr *et al.* [13] showing 13.5% candidal colonization.

As per Marc Germain *et al.* [7] SGA was associated with younger, primigravida, which is comparable to our present study which shows 77.1% of primigravidae had SGA babies. In our study, women below 20yrs are (100%) colonised which correlates with studies by Singh M. *et al.* [14] and Singaravelu V.

*et al.* [6] showing younger age as one of the predisposing factor. Thus, this shows decrease in trend of colonization with increasing maternal age. The possible explanations could be either decreased local resistance due to thin vaginal epithelium or a relatively higher pH predisposing to colonization [6]. In the present study, low socioeconomic status is the risk factor for maternal colonization which is comparable to Singaravelu V. *et al.* [6] probably due to poor local hygiene which has been identified as a risk factor in the Singh M *et al.* [14] study. According to Karina *et al.* [15] socioeconomic status is related to rectovaginal colonization, low levels of hygiene make the growth of colonization easier in population with low socioeconomic and minimum level of education.

Studies show rectovaginal bacterial colonization of pregnant women and chorioamnionitis has a positive correlation with the incidence of early-onset neonatal sepsis [16]. This was however prevented in neonates in our study by treating empirically all the high risk colonised pregnant mothers. As per Marc Germain *et al.* [7] SGA was associated with younger, primigravida, which is comparable to our present study which shows 77.1% of primigravidae had SGA babies. SGA babies of these colonised mothers were followed up till discharge for signs of sepsis and discharged in healthy state.

Because of the known adverse prognosis for SGA infants, the consideration of antibiotic treatment trials in high-risk subgroups of pregnant women will be justified.

## CONCLUSION

To conclude maternal vaginal colonization during pregnancy has significant impact on baby's birth weight. SGA babies were more among colonised mothers. During the study, colonised mothers were treated with appropriate empirical antibiotics which prevented the neonatal infections in babies after birth. Hence identification of vaginal colonization in pregnant mothers and appropriate antimicrobial treatment is essential to decrease the incidence of infections in SGA babies who are prone for neonatal infections and complications. This decreases neonatal morbidity and mortality. Hence further studies of abnormal vaginal flora in pregnancy and empirical treatment of high risk colonised mothers can prevent neonatal sepsis and would resolve the impact on fetal growth.

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