

# Prevalence of Group B Streptococcal Colonization Among Pregnant Women in Delhi, India

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## Abstract

**Background:** Low GBS rectovaginal colonization rates in pregnant women have been reported in India. Since 1% to 2% of infants born to women colonized with GBS at delivery develop invasive early-onset GBS disease, understating maternal colonization rates impacts global estimates of neonatal GBS disease. We hypothesized that colonization rates in India would be substantial using optimal methods and an adequate sample size.

**Methods:** Lower vaginal and rectal swabs were collected from third trimester pregnant women at Dr. Ram Manohar Lohia Hospital, a tertiary center serving a diverse population in the Central District of Delhi. Swabs were placed in Strep B Carrot Broth™ selective chromogenic media and subculture was performed on GBS Detect™ plates. GBS was confirmed using StrepPRO™ grouping reagent. Isolates were serotyped using Immulex™ Strep-B latex kits (Statens Serum Institute, Denmark) containing antisera to GBS capsular polysaccharides (CPS) Ia, Ib and II-IX. Demographic and clinical data were collected.

**Results:** From August 2015 to April 2016, 300 pregnant women (mean age 26.9 [range 19-39] years; mean gestation 34 [range 28-42] weeks) were enrolled. GBS colonization prevalence was 15%. Of these women, 15% had vaginal, 29% had rectal and 56% had colonization at both sites. CPS types were III (22.2%), V (20%), II (20%), Ia (13.3%), VII (6.7%) and Ib (4.4%); 13.3% were nontypable. Rural vs. urban dwelling, crowding, and educational level did not differ in colonized vs. non-colonized women. 20.7% had a history of spontaneous abortion; fetal loss at ≥20 weeks' gestation was significantly more common in GBS colonized than non-colonized women (15.6% vs. 3.5%; p=0.004). Employing Census of India 2011 data for the annual birth cohort (26.1 million) and estimating that 1% of neonates born to GBS colonized women will develop early-onset disease, at least 19,575 cases of early-onset GBS disease occur yearly in India.

**Conclusion:** Using optimal methods, 15% of third trimester pregnant women in India are GBS colonized. We provide the first contemporary data regarding GBS serotypes in an Indian population. A multivalent vaccine containing 6 CPS types (Ia, Ib, II, III, V and VII) would encompass ~87% of GBS carried by pregnant women in India.

## Introduction

- Low group B streptococcal (GBS) colonization rates have been reported among pregnant cohorts in India
- Since an estimated 1-2% of infants born to women colonized with GBS at delivery develop early-onset GBS disease, inaccurate assessment of maternal colonization impacts global estimates of neonatal GBS disease
- We proposed that colonization rates could be substantial if optimal body site sampling and culture methods are used

## Objectives

- To determine the prevalence of GBS colonization among pregnant women in Delhi, India
- To characterize the GBS capsular polysaccharide (CPS) distribution of colonizing GBS isolates
- To estimate the number of infants yearly with early-onset GBS disease in India

## Methods

- Lower vaginal and rectal swabs were collected from third trimester pregnant women at Dr. Ram Manohar Lohia Hospital, a tertiary center serving a diverse population in the Central District of Delhi
- Swabs were placed in Strep B Carrot Broth™ selective chromogenic media and subculture was performed on GBS Detect™ plates
- GBS was confirmed using StrepPRO™ grouping reagent
- Isolates were serotyped using Immulex™ Strep-B latex kits (Statens Serum Institut, Denmark) containing antisera to GBS CPS Ia, Ib and II-IX
- Demographic and clinical data were collected

## GBS Colonization Prevalence in Pregnant Women in India

Author (Year)	Women	Timing	Body Sites Sampled		Culture Method (SBM)*	% Positive
			Vaginal	Rectal		
Chaudhary (1981)	100	Labor	+	-	+	16
Mani (1984)	325	Labor	+	-	+	5.8
Kishore (1986)	212	Labor	+	-	+/-§	0.47
Lakshmi (1988)	207	Pregnancy or labor	+	-	NS#	5.13
Dalal (1998)	507	Pregnancy or labor	+	-	+	12
Kulkarni (2001)	317	Labor	+	+	+	2.52
Das (2003)	200	Pregnancy	+	-	+	7.5
Goyal (2004)	304	Pregnancy	+	-	+	1.3
Dechen (2010)	524	Labor	+	-	-	4.77
Sharmila (2011)	300	Pregnancy	+	+	-	2.3
Rajaratnam (2013)	349	Pregnancy	+	-	-	8.3
Patil (2013)	905	Pregnancy	+	+	+	12.15
Konikkara (2014)	50	Pregnancy	+	+	+	16

\* SBM = Selective broth media

§ Employed for samples from only 41 (19%) of 212 women

# NS, not specified

## Results

- 300 third trimester pregnant women were enrolled
- Colonization prevalence was 15% (95% CI [confidence interval] 11.2-19.5%)
- Site(s) of colonization were vaginal (15%), rectal (29%) or both sites (56%)
- Using Census of India 2011 data for the birth cohort (26.1 million) and estimating that 1% of neonates born to GBS colonized women develop early-onset disease, an estimated 19,575 cases of early-onset GBS disease may occur yearly in India

## Characteristics of the Study Population

Characteristic	GBS-Positive Women (n = 45)	GBS-Negative Women (n = 255)
Mean years of age (range)	26.6 (20-35)	27 (19-39)
Mean weeks of gestation (range)	34.5 (28-42)	34 (28-41)
Highest level of education		
None or primary	1 (2)*	20 (8)
Secondary	9 (20)	32 (12.5)
Higher secondary	8 (18)	42 (16.5)
Degree program	22 (49)	132 (52)
Postgraduate degree	5 (11)	29 (11)
Residence in cities (%)	40 (91)	232 (91)
Mean household rooms (median; range)	2.5 (2; 1-6)	3 (3; 1-10)
Mean household size (median; range)	4.5 (4; 1-13)	4.6 (4; 2-20)

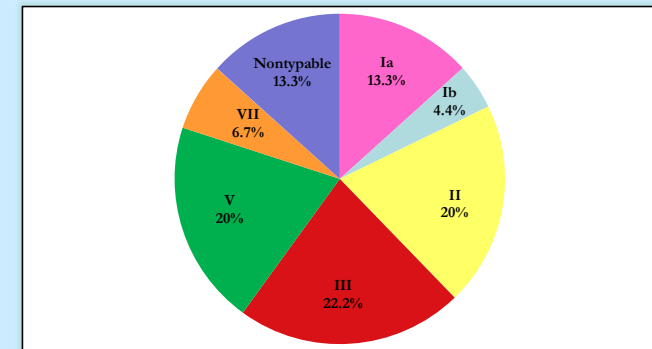
\*Number of cases (%)

## Pregnancy-Related Information

Characteristic	GBS-Positive Women (n = 45)	GBS-Negative Women (n = 255)	P Value
Previous pregnancy	20 (44.4)*	131 (51.3)	0.422
Preterm delivery	1 (2.2)	9 (3.5)	1.000
Spontaneous abortion < 20 weeks	6 (13.3)	46 (18)	0.527
Spontaneous abortion ≥ 20 weeks	7 (15.6)	9 (3.5)	0.004
Induced abortion < 20 weeks	3 (6.7)	18 (7.1)	1.000
Early infant death (≤ 3months)	1 (2.2)	7 (2.7)	1.000

\*Number of cases (%)

## Serotype Distribution of GBS Isolates



## Conclusions

- Using optimal body sites and culture methods, 15% of pregnant women in Delhi, India have rectovaginal colonization with GBS
- The GBS serotypes of colonizing isolates in this Indian cohort includes those common in the USA and, in addition, type VII GBS
- A multivalent vaccine containing the 6 CPS types Ia, Ib, II, III, V and VII would encompass 87% of GBS carried by pregnant women in India

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