

**PREVALENCE OF BACTERIAL VAGINOSIS IN PREGNANCY AFTER 20 WEEKS OF GESTATION**Pranali Ghuge<sup>1</sup>, Dattatraya Gopalghare<sup>2</sup><sup>1</sup>Senior Resident, Department of Obstetrics and Gynaecology, MIMER Medical College, Talegaon Dabhade, Pune.<sup>2</sup>Associate Professor, Department of Obstetrics and Gynaecology, MIMER Medical College, Talegaon Dabhade, Pune.**ABSTRACT****BACKGROUND**

Bacterial vaginosis (BV) is an extremely prevalent vaginal condition and the number one cause of vaginitis among both pregnant and non-pregnant women.

**Aims and Objective-** To study the prevalence of bacterial vaginosis in pregnancy after 20 weeks of gestation; to study the microbiology of bacterial vaginosis and antibiotic sensitivity pattern.

**Study Setting-** The study is carried out in the Department of Obstetrics and Gynaecology of MIMER Medical College, Talegaon Dabhade, Pune.

**Study Design-** Hospital based observational study.

**MATERIALS AND METHODS**

The present study was conducted to study the prevalence of bacterial vaginosis in pregnancy after 20 weeks of gestation and to observe its microbiology and antibiotic sensitivity pattern.

**Data Analysis and Statistical Tests-** All the collected data was entered in Microsoft Excel sheet and then transferred to SPSS software version 17 for analysis. Appropriate statistical tests (t-tests/ chi-square test) were applied based on type and distribution of data. P-value < 0.05 was taken as level of significance.

**RESULTS**

The study included 540 cases and prevalence of bacterial vaginosis among pregnant women was (65.6%). The prevalence among asymptomatic cases was 64.6%. In 354 cases of BV, 86.7% were asymptomatic. Coagulase positive Staph. aureus was found in 43.9% of cases. High level of resistance against Fluoroquinolones, Cephalosporins and Penicillins and good sensitivity towards Aminoglycosides was noted.

**CONCLUSION**

The overall prevalence of bacterial vaginosis among pregnant women is very high in our study (65.6%). The prevalence of BV among asymptomatic pregnant women was 64.6%. In 354 cases of BV 307 were asymptomatic, i.e. 86.7%. We also found high level of resistance against Fluoroquinolones, Cephalosporins and Penicillins and good sensitivity towards Aminoglycosides.

**KEYWORDS**

Bacterial Vaginosis in Pregnancy and Antibiotic Sensitivity.

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**BACKGROUND**

Bacterial vaginosis (BV) is an extremely prevalent vaginal condition and the number one cause of vaginitis among both pregnant and non-pregnant women.<sup>1</sup> Many studies have found the prevalence of BV in pregnancy ranges from 6% - 32% in general population.<sup>2,3,4,5</sup> However, majority of cases are asymptomatic and go unreported and untreated.<sup>2,5</sup> Previously considered as benign condition, BV has been related to many gynaecological conditions and complications of pregnancy including pelvic inflammatory disease, post-hysterectomy vaginal cuff cellulitis, endometritis, amniotic fluid infection, preterm labour, premature rupture of membranes and possibly spontaneous abortion.<sup>6,7,8,9,10,11</sup> In

laboratory and clinical studies, BV has been shown to ascend to the endometrium and invade the placenta, but the complete impact of this migration in terms of initial and sustained placental development and early foetal development is unclear.<sup>12</sup> Microbes associated with BV are part of the endogenous flora of the vagina and the acquisition of BV results when there are changes of the normal flora of the vagina causing an increased prevalence of Gardnerella vaginalis, Mycoplasma hominis and anaerobic organisms and a decreased prevalence of the dominant Lactobacillus species.<sup>13</sup>

**Aims and Objectives**

1. To study the prevalence of bacterial vaginosis in pregnancy after 20 weeks of gestation.
2. To study the microbiology of bacterial vaginosis and antibiotic sensitivity pattern.

**MATERIALS AND METHODS**

The present study was conducted to study the prevalence of bacterial vaginosis in pregnancy after 20 weeks of gestation and to observe its microbiology and antibiotic sensitivity pattern.

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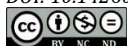
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**Study Design**

Hospital based observational study.

**Time Period**

October 2013 to September 2015.

**Study Population**

The study group comprised of pregnant females (> 20 weeks of gestation) from the OPD and wards of this hospital.

**Inclusion Criteria**

All the patients coming to OPD and wards with more than 20 weeks of gestation.

**Exclusion Criteria**

Less than 20 weeks of gestation and active bleeding per vaginum.

**Methodology**

Following information was collected and examination was carried out for every patient included in this study: Age, Parity, LMP, EDD, Gestational age in weeks, Menstrual history in detail, Obstetric History, Past History and Clinical Findings like PS Examination and PV Examination were noted.

**Method of Collection of Specimen**

Patient in lithotomy position, Cusco’s speculum is introduced and high vaginal swab is taken before PV examination. Swab is taken under all aseptic precautions. Swab is sent to Bacteriology Laboratory as early as possible or within 2 - 3 hrs. Inoculation is done on Blood Agar or MacConkey’s agar or nutrient agar or Sabouraud’s agar. Growth occurs after 24 - 48 hrs. Identification of the organisms is done by biochemical testing. Antimicrobial susceptibility testing takes 24 - 48 hrs. or more.

**Statistical Analysis**

All the collected data was entered in Microsoft Excel sheet and then transferred to SPSS software version 17 for analysis. Appropriate statistical tests (t-tests/ chi-square test) were applied based on type and distribution of data. P-value < 0.05 was taken as level of significance.

**RESULTS**

The study was done with 540 subjects.

Age Group (Yrs.)	Number	Percentage
<= 20	081	15.0%
21 - 25	262	48.5%
26 - 30	119	22.0%
31 - 35	070	13.0%
> 35	008	01.5%
<b>Total</b>	<b>540</b>	<b>100.0%</b>

**Table 1. Distribution based on Maternal Age**

Presenting Symptom	Number	Percentage
None	475	88.0%
White Discharge	065	12.0%
<b>Total</b>	<b>540</b>	<b>100.0%</b>

**Table 2. Presenting Symptom**

Parity	Number	Percentage
Multigravida	230	42.6%
Primigravida	310	57.4%
<b>Total</b>	<b>540</b>	<b>100.0%</b>

**Table 3. Distribution based on Parity**

Gestational Age	Number	Percentage
21 - 25	033	06.1%
26 - 30	108	20.0%
31 - 35	194	35.9%
> 35	205	38.0%
<b>Total</b>	<b>540</b>	<b>100.0%</b>

**Table 4. Distribution as per Gestational Age**

Per Speculum Examination	Number	Percentage
Normal Cervix/Vagina	384	71.1%
Cervicitis	033	06.1%
Cervical Discharge	088	16.3%
Vaginitis	033	06.1%
UV Prolapse	002	00.4%
<b>Total</b>	<b>540</b>	<b>100.0%</b>

**Table 5. Per Speculum Examination**

PV Examination	Number	Percentage
Internal Os Closed	327	60.6%
Internal Os Open	213	39.4%
<b>Total</b>	<b>540</b>	<b>100.0%</b>

**Table 6. Per Vaginum Examination**

Culture Report	Number	Percentage
Positive	354	65.6%
Negative	186	34.4%
<b>Total</b>	<b>540</b>	<b>100.0%</b>

**Table 7. Distribution based on Culture Report**

Organism	Number (n= 354)	Percentage
Coagulase positive Staph. Aureus	237	43.9%
Candida albicans	060	11.1%
E. coli	043	08.0%
Gram negative bacilli	028	05.2%
Candida non-albicans	019	03.5%
Pseudomonas	011	02.0%
Coagulase Negative Staph. aureus	003	00.6%
Citrobacter	003	00.6%
Klebsiella	003	00.6%
Proteus	002	00.4%
Streptococci	001	00.2%
No organism	186	34.4%

**Table 8. Distribution based on Type of Organism Found**

Age Group (Yrs.)	Bacterial Vaginosis		Total
	No	Yes	
<= 20	29	052	081
21 - 25	90	172	262
26 - 30	44	075	119
31 - 35	21	049	070
> 35	02	006	008
<b>Total</b>	186	354	540
	34.40%	65.6%	100.0%

**P-value - 0.856**  
**Table 9. Association of Bacterial Vaginosis and Maternal Age**

Presenting Symptom	Bacterial Vaginosis		Total
	No	Yes	
None	168	307	475
White Discharge	018	047	065
<b>Total</b>	186	354	540
	34.40%	65.6%	100.0%
<b>P-value - 0.266</b>			
<b>Table 10. Association of Culture Positivity and Presenting Symptom</b>			

Parity	Bacterial Vaginosis		Total
	No	Yes	
Primigravida	093	217	310
Multigravida	093	137	230
<b>Total</b>	186	354	540
	34.40%	65.6%	100.0%
<b>P-value &lt; 0.05</b>			
<b>Table 11. Association of Parity with Positive Culture</b>			

Gestational Age (Weeks)	Bacterial Vaginosis		Total
	No	Yes	
21 - 25	014	019	033
26 - 30	042	066	108
31 - 35	064	130	194
> 35	066	139	205
<b>Total</b>	186	354	540
	34.40%	65.6%	100.0%
<b>P-value - 0.472</b>			
<b>Table 12. Association of Positive Culture and Gestational Age</b>			

Antibiotic Sensitivity (n= 237)	Number	Percentage
Gentamicin	195	82.3%
Vancomycin	096	40.5%
Ampiclox	004	01.7%
Ciprofloxacin	093	39.2%
Cefotaxime	060	25.3%
Cefuroxime	126	53.2%
Cefoxitin	036	15.2%
Cefepime	005	02.1%
Linezolid	038	16.0%
Amikacin	143	60.3%
Clarithromycin	029	12.2%
Oxacillin	053	22.4%
Tobramycin	004	01.7%
Lomefloxacin	000	00.0%
<b>Table 13. Antibiotic Sensitivity of Coagulase Positive Staph aureus</b>		

Antibiotic Sensitivity (n= 43)	Number	Percentage
Gentamicin	24	55.8%
Vancomycin	02	04.7%
Ciprofloxacin	15	34.9%
Cefotaxime	02	04.7%
Cefuroxime	16	37.2%
Cefepime	08	18.6%
Amikacin	39	90.7%
Oxacillin	14	32.6%
Lomeflox, Ampiclox, Clarithro, Tobra, Cefoxitin, Linezolid	00	00.0%
<b>Table 14. Antibiotic Sensitivity of E. coli</b>		

Antibiotic Sensitivity (n= 11)	Number	Percentage
Gentamicin	10	90.9%
Ciprofloxacin	1	09.1%
Cefotaxime	2	18.2%
Cefepime	10	90.9%
Amikacin	10	90.9%
Lomefloxacin	1	09.1%
Tobramycin	2	18.2%
Oxacillin, Vanco, Ampiclox, Cefurox, Cefoxitin, Linezol, Clarith	0	00.0%
<b>Table 15. Antibiotic Sensitivity of Pseudomonas</b>		

Antibiotic Sensitivity (n= 28)	Number	Percentage
Gentamicin	1	3.6%
Ciprofloxacin	1	3.6%
Cefotaxime	3	10.7%
Cefepime	1	3.6%
Amikacin	2	7.1%
Oxacillin	1	3.6%
Tobra, Vanco, Ampiclox, Cefurox, Cefoxitin, Linez, Clarith, Lomeflox	0	0.0%
<b>Table 16. Antibiotic Sensitivity of Other Gram Negative Bacteria</b>		

**DISCUSSION**

An observational study was carried out to find the prevalence of bacterial vaginosis in pregnancy after 20 weeks of gestation and to study the microbiology of BV and antibiotic sensitivity pattern. BV is a shift in the vaginal ecosystem characterised by an overgrowth of anaerobes, and a decrease in Lactobacillus resulting in degradation of the natural flora that helps to keep the vaginal tissue healthy.<sup>14</sup> BV is an important gynaecological problem of childbearing age group of women worldwide. The presence of BV has consistently been shown to be a risk factor for adverse obstetric outcomes such as preterm labour and delivery, preterm premature rupture of membranes, spontaneous abortion and postpartum infections such as endometritis and caesarean section wound infections.<sup>15,16,17</sup> The prevalence rates of BV among pregnant women vary from 6.4% to 38%.<sup>18,19</sup> The overall prevalence of BV by Gram stains Nugent scoring criteria in a study by Mengistie et al was 19.4%.<sup>20</sup> The studies done in India and Denmark showed the prevalence as 20.5% and 17%.<sup>21,22</sup> Lower prevalence of BV was reported in Burkina Faso (6.4%), India (8.6%), Sweden (9.3%), Boston (11%) and Washington (12%).<sup>18, 23,24,25,26</sup>

In the present study, Bacterial vaginosis was seen in two-third of subjects 65.6%, which was higher than reports from different sub-Saharan countries like Kenya (37%), Botswana (38%) and Zimbabwe (32.5%).<sup>20,27,28</sup> The higher prevalence of BV in our study can be explained as most of the subjects were from lower socio-economic strata. It has been shown in various studies that lower the socioeconomic status of the population, higher the incidences of BV, which may indicate health and hygiene factors play a bigger role than anticipated.<sup>29</sup>

BV is mostly present without signs and symptoms. The most common clinical sign and symptoms of BV is thin white or gray, homogeneous vaginal discharge with or without unpleasant smell. The smell of the discharge is mostly noticed after sexual intercourse.<sup>15,30,6</sup> In the current study out of total 354 cases of BV 86.7% were asymptomatic, while only 13.3%

complained of white discharge. This result is consistent with other studies done in different countries.<sup>20,6,31</sup> The study results also showed that the vaginal discharge complaints by women has less value as diagnostic algorithm, because only few females reported abnormal discharge. The findings are consistent with other studies.<sup>27</sup> Incidence of BV was 70% in multigravida as compared to 59.6% in primigravida ( $p < 0.05$ ). In a similar study by Gupta et al sixty-six (67.3%) women with BV were nulliparous, 20 (20.4%) were primipara, 7 (7.1%) were second para and the remaining 5 (5.1%) were para 3 and above.<sup>32</sup> This shows that BV is significantly seen among nulliparous women ( $p < 0.001$ ). Similar association between bacterial vaginosis and nulliparity was also shown in studies by Lata et al<sup>21</sup> and Cristiano et al.<sup>33</sup> Most common organism in our study was *S. aureus* (43.9%) followed by candida (14.6%), *E. coli* (8%), gram negative bacilli (5.2%) and pseudomonas (2%). This is in contrast to a study from India by Swamy et al, where *E. coli* was the most common.<sup>34</sup> Similarly, *E. coli* was the most common organism in a study by Dutta S et al from Dhaka.<sup>35</sup> In study by Rosenstein J et al, vaginal swabs from 174 pregnant women whose vaginal flora had been evaluated by Gram's stain. Coagulase-negative Staphylococcus species were isolated from a greater number of swabs.<sup>36</sup>

Antibiotic sensitivity pattern of Staph. aureus showed that maximum sensitivity was towards Gentamicin and Amikacin, cefuroxime and vancomycin, while poor sensitivity towards penicillin group, fluoroquinolones and cephalosporins other than cefuroxime. In study by Mulu W et al maximum sensitivity of *S. aureus* was toward Gentamicin and Clindamycin, while maximum resistance towards penicillin group.<sup>37</sup> Similar results were also observed by Swamy et al,<sup>34</sup> *E. coli* maximum sensitivity towards Amikacin and Gentamicin. Similarly, most of the other micro-organisms showed good sensitivity towards Amikacin and Gentamicin. In study by Mulu W et al, maximum sensitivity of *E. coli* was toward Gentamicin and Norfloxacin, while max resistance was towards Ampicillin and Amoxicillin.<sup>37</sup> Swamy et al observed maximum sensitivity of *E. coli* towards Imipenems and Amikacin, while lowest towards Ampicillin and Amoxicillin.<sup>34</sup>

## CONCLUSION

The overall prevalence of bacterial vaginosis among pregnant women is very high in present study (65.6%). The prevalence of BV among asymptomatic pregnant women was 64.6%. In 354 cases of BV, 307 were asymptomatic i.e. 86.7%. The above results suggest that screening for BV should start in early pregnancy, which is vital for good pregnancy outcome. We also encountered high level of resistance against Fluoroquinolones, Cephalosporins and Penicillins and good sensitivity towards Aminoglycosides. We also recommend further large scale studies to find association of adverse maternal and foetal outcomes in bacterial vaginosis.

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