International Journal of Current Pharmaceutical Research

ISSN- 0975-7066 Vol 15, Issue 3, 2023

Original Article

ASYMPTOMATIC URINARY TRACT INFECTION IN PREGNANT WOMEN WITH BACTERIAL VAGINOSIS ATTENDING TERTIARY CARE HOSPITAL, VISAKHAPATNAM

PRASAD RAO M.[1], M. VASANTHA MALINI[2], M. RADHIKA[3], RAJAMANICKAM VENKATA LAXMI[4*]

[1]Department of General Surgery, NRI Institute of Medical Sciences and Anil Neerukonda Hospital, Sangivalasa, Visakhapatnam, India. [2]Department of Obstetrics and Gynaecology, NRI Institute of Medical Sciences and Anil Neerukonda Hospital, Sangivalasa, Visakhapatnam, India. [3]Consultant Obstetrician and Gynaecologist, Visakhapatnam, India. [4*]Department of Microbiology, Government Medical College, Wanaparthy, Telangana, India

[*]Corresponding author: Rajamanickam Venkata Laxmi; Email: rajamanickamvenkatalaxmi123@gmail.com

Received: 13 Mar 2023, Revised and Accepted: 17 Apr 2023

ABSTRACT

Objective: Determining the prevalence of bacterial vaginosis and asymptomatic bacteriuria in pregnant women who were prenatal outpatients and inpatients at a tertiary care hospital was the goal of the current investigation.

Methods: During a one-year period, a total of 234 prenatal women from the OP and IP (GYN and OBG dept.) department representing various age and parity groups and gestational ages attended tertiary care teaching hospital. The samples were subjected to standard microbiological techniques for identification of microorganisms. Amsel's criteria and Nugent scoring system were applied for diagnosis of bacterial vaginosis.

Results: Out of 234 study subjects, Increased homogenous vaginal discharge was found in 132 patients (56.4%), whiff's test positive was seen in 59 patients (25.2%), clue cells were observed in 48 patients (20.5%) and pH greater than 4.5 was seen in 115 patient high vaginal swabs (49.1%). Maximum numbers of cases 109 were reported in the Nugent's score 7-10 (80.7%) out of 135 cases. Among 234 urine samples subjected to microbiological analysis, 82 urine samples showed microbial growth. The major isolate was *E. coli* 34 (41.4%) followed by Proteus species 18 (21.9%).

Conclusion: In order to avoid pregnancy difficulties, it is advised that antenatal health care institutions examine pregnant women for vaginitis. Moreover, women with BV should get a UTI screening. Antibiotic usage should be promoted responsibly, while misuse of antibiotics should be discouraged. Douching and having several sexual partners are risk factors for BV, hence precautions should be done.

Keywords: Antibiotic susceptibility pattern, Bacterial vaginosis, Pregnant women, Urinary tract infection

© 2023 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (https://creativecommons.org/licenses/by/4.0/)
DOI: https://dx.doi.org/10.22159/ijcpr.2023v15i3.3003. Journal homepage: https://innovareacademics.in/journals/index.php/ijcpr

INTRODUCTION

A polymicrobial, superficial vaginal infection known as bacterial vaginosis (BV) is caused by an increase in the vaginal pH and milky discharge, which is frequently brought on by a decrease in the amount of Lactobacillus, a bacteria that produces hydrogen peroxide, and an overgrowth of anaerobic, Gram negative, or Gram variable bacteria. It is symptomatic if there is an offensive vaginal discharge and, in very rare cases, vaginal burning or itching [1]. Over 95% of the vaginal bacterial flora in normal circumstances is made up of lactobacilli, which also secrete a number of antibacterial substances such lactic acid and hydrogen peroxide (H_2O_2). Women who are continuously colonised with lactobacilli that produce hydrogen peroxide are less likely to develop BV. In addition, it is characterised by an excessive growth of a variety of aerobic, microaerophilic, and anaerobic microorganisms, including E. coli, Group B Streptococci, Enterococci spp., Staphylococcus aureus, Klebsiella spp., Gardnerella vaginalis, Ureaplasma urealyticum, Mycoplasma hominis, Mobiluncus spp. Low socioeconomic level, smoking, douching, using antibiotics for a different ailment, being young at the time of coitarche, acquiring a new sex partner, and having recently had several sex partners are some additional risk factors for BV. In fact, many researchers prefer to see BV as a complicated microbial imbalance with an important function for the naturally occurring vaginal lactobacilli rather than an infection [3, 4]. The majority of cases of BV is asymptomatic and remains unreported and untreated. BV has been related to many gynecologic conditions and complications of pregnancy including pelvic inflammatory disease, posthysterectomy vaginal cuff cellulitis, endometritis, amniotic fluid infection, preterm delivery, preterm labor, premature rupture of the membranes, and, possibly, spontaneous abortion. The most popular technique for detecting BV was the Amsel's criterion, although each of the various parameters had inherent problems [5]. The whiff test is conducted subjectively for each individual clinician and lacks sensitivity, the assessment of vaginal pH lacks specificity because an increase in vaginal pH may be a result of many other lower genital tract conditions, and the identification of clue cells may vary depending on the microscopist's skill and interpretation as well as the calibre of the sample collection. The presence of actively multiplying bacteria in the urinary system, except the distal urethra, in a patient who has no overt urinary symptoms is known as asymptomatic bacteriuria (AB) [6]. In order to diagnose asymptomatic bacteriuria, it is necessary to find 100,000 or more colony forming units of a single bacteria per millilitre in two consecutive clean catch urine specimens or a single catheter specimen in the absence of urinary symptoms and signs. Asymptomatic bacteriuria, which affects 2% to 10% of all pregnancies, is commonly characterised as genuine bacteriuria in the absence of clear acute urinary tract infection symptoms. Asymptomatic bacteriuria has been linked to preterm birth and low birth weight. Both pregnant and non-pregnant women have similar levels of infection prevalence, which is most closely associated to socioeconomic status [7-9]. A history of recurrent urinary tract infections, urinary tract blockages brought on by kidney stones, diabetes, and anatomical abnormalities of the urinary tract are all recognized as additional risk factors for bacteriuria. At least 80% of isolates with asymptomatic bacteriuria are E. coli, making it the most prevalent pathogen. Additional organisms include group B streptococci and other gram-negative bacteria. Numerous researchers have noted the connection between bacterial vaginosis and urinary tract infections in pregnant women [10]. Bacterial vaginosis and urinary tract infections must be promptly and properly treated in pregnant women. Both infections are associated with increased risk of premature rupture of the membranes (PROM), preterm birth (which can lead to brain damage and cerebral palsy), low birth weight, sepsis, meningitis and perinatal

death. Clinicians must employ a repeat urine culture to ensure that UTIs and bacterial vaginosis have been completely treated because these diseases can reoccur. Kidney infections can, in the worst-case scenarios, result in maternal sepsis, preterm labour, and early delivery [11, 12]. Determining the prevalence of bacterial vaginosis and asymptomatic bacteriuria in pregnant women who were prenatal outpatients and inpatients at a tertiary care hospital was the goal of the current investigation.

MATERIALS AND METHODS

Study sample

During a one-year period, a total of 234 prenatal women from the OP and IP (GYN and OBG dept.) department representing various age and parity groups and gestational ages attended tertiary care teaching hospital.

Inclusion and exclusion criteria

- The study included pregnant women of geatational age between 10 and 40 w.
- The study excluded non-pregnant women and pregnant women who had a symptoms of urinary tract infection.

Collection of urine sample and microbiological processing

A 10 ml sample of urine was collected into sterile test tubes. The deposit was examined under a microscope at a high magnification for yeast-like cells (Candida spp.), red blood cells, epithelial cells, casts, crystals, pus cells, and more. Pus cells more than five in a high power field were also seen as important for infection. The Gram's staining method and biochemical reactions were used to identify the isolated organisms from culture plates. Each patient's clean-catch midstream urine was collected and placed into a sterile universal container. On dried plates of blood agar and cysteine lactose electrolyte deficient agar, samples were cultured (CLED). For 24 h, plates were incubated aerobically at 37 °C. Pure isolate bacterial growth of 10^5 cfu/ml or more was considered to be substantial for infection. The biochemical tests include tests for the fermentation of carbohydrates using sugars like glucose, lactose, sucrose, xylose, mannitol, and maltose, as well as tests for the production of the enzymes catalase, coagulase, urease, and coagulase as well as the methyl red test, voges-proskauer test, citrate utilisation, and nitrate reduction.

Collection of vaginal sample and microbiological processing

When three of the four Amsel criteria include homogeneous white adherent vaginal discharge, vaginal pH>4.5, fishy amine odour from vaginal fluid when mixed with 10% potassium hydroxide, and the appearance of clue cells in at least 20% of epithelial cells on a saline solution wet mount—were met, the diagnosis of bacterial vaginosis was made. Clue cell detection suggests bacterial vaginosis. The most popular diagnostic techniques are those based on Amsel's criteria. The Nugent scoring system, created by Nugent *et al.* [12], is based on Gram staining and counting lactobacilli and other morphotypes (various Gardenerella vaginalis shapes, Prevotella species, and Mobiluncus species) that are scored between 0 and 10, where values 7–10 indicate bacterial vagonosis. Its high sensitivity has led to its recognition as the gold standard of BV.

RESULTS

In the present study 234 pregnant women attended OP and OP GYN and OBG dept. Highest number of cases were reported in the age group 20-29 (81%) followed by 30-39 (13.7%),<20 (4.4%) and 40 and above (0.9%) (fig. 1). The majority of the patients were reported with 3rd trimester 145 (61.5%) of pregnancy followed by 2nd trimester 74 (32%) followed by 3rd trimester 15 (6.5%) (fig. 2). In Amsel's criteria, if any three factors were positive indicates bacterial vaginosis. Out of 234 study subjects, Increased homogenous vaginal discharge was found in 132 patients (56.4%), whiff's test positive was seen in 59 patients (25.2%), clue cells (fig. 3) were observed in 48 patients (20.5%) and pH greater than 4.5 was seen in 115 patient high vaginal swabs (49.1%) (table 1). Table 2 showed the results of BV cases based on Nugent's scoring system ranging from 0-10. Maximum numbers of cases 109 were reported in the score 7-10 (80.7%) out of 135 cases. Score 4-6 was reported in 11 cases (8.1%). From the table 3 it was observed that, 87 cases (37.1%) were reported to have vaginitis out of 234 samples according to Amsel's criteria and 95 cases with score>7 were reported to have vaginitis out of 234 samples according to Nugent's criteria. Among 234 urine samples subjected to microbiological analysis, 82 urine samples showed microbial growth. The major isolate was *E. coli* 34(41.4%) followed by Proteus species 18 (21.9%), *S. aureus* 15(18.3%), Pseudomonas aeruginosa 10(12.2%) and Enterococci spp 5(6.2%). Out of 234 patients, the mixed infection bacterial vaginosis and asymptomatic urinary tract infection was found in 51 patients (21.7%).

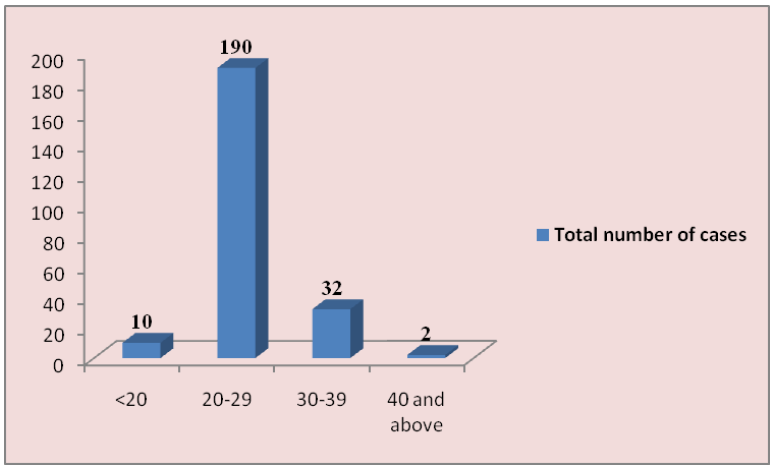

Fig. 1: Age-wise distribution of cases

Table 1: Prevalence of bacterial vaginosis based on Amsel's criteria

S. No.	Variables	Percentage
1.	Vaginal discharge	132 (56.4%)
2.	pH	115 (49.1%)
3.	Whiff test	59 (25.2%)
4.	Clue cells	48 (20.5%)

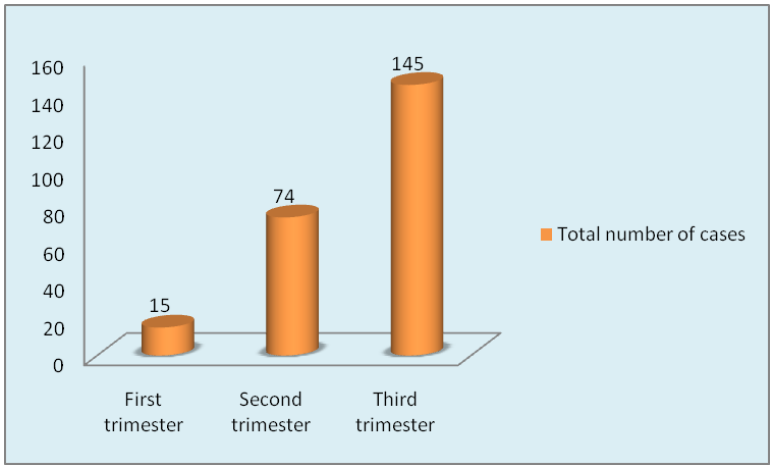

Fig. 2: Gestational age-wise distribution of cases

Table 2: Prevalence of bacterial vaginosis based on Nugent's scoring system

S. No.	Variables	Total number of cases and percentage
1.	0-3	15 (13.7%)
2.	4-6	11 (8.1%)
3.	7-10	109 (80.7%)
4.	Total	135 (n=234)

Table 3: Diagnosis of BV based on Amsel's criteria and Nugent's scoring system

	Total number of cases (n=234)			
Diagnosis of BV	**Amsel's criteria**		**Nugent's scoring**	
	Positive for BV	**Negative for BV**	**Positive>7 score**	**Negative 0-6 score**
Total number of cases	87	147	95	139
Percentage	37.1%	62.9%	40.5%	59.5%

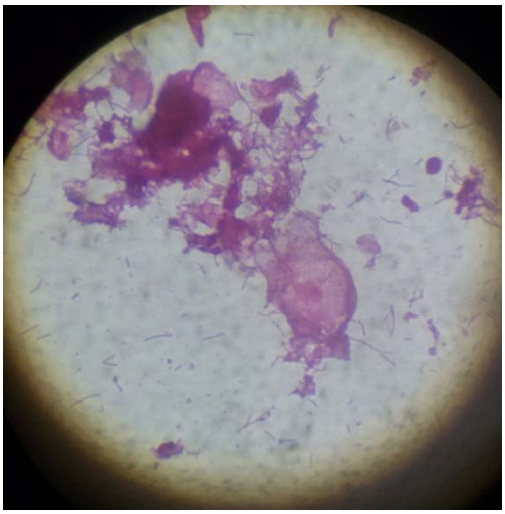

Fig. 3: Clue cells

DISCUSSION

From the findings of the current study it was revealed that, 37.1% cases were reported to have vaginitis out of 234 samples according to Amsel's criteria and 95 cases with score>7 were reported to have vaginitis out of 234 samples according to Nugent's criteria. These findings were similar to the results of previous studies [13, 14]. This age group has a greater infection rate than others, which may be related to the fact that it is also the most sexually active. The study found that more cases were reported in the third trimester of gestational age (61.5%) than in any other trimester, which is consistent with research by Afrakhteh *et al.* [15]. Increased levels of oestrogen and corticosteroids, which disrupt vaginal acid balance and weaken the vaginal defence mechanisms against opportunistic infections brought on by organisms like Candida, may be the cause of the higher infection rate in the third trimester of pregnancy. The most frequent cause of UTI during pregnancy is the involvement of the lower urinary tract, which results in silent bacteriuria. Among 234 urine samples subjected to microbiological analysis, 82 urine samples showed microbial growth. All the patients were fell in the category of asymptomatic UTI. The major isolate was *E. coli* 34(41.4%) followed by Proteus species 18 (21.9%), *S. aureus* 15(18.3%), *Pseudomonas aeruginosa* 10(12.2%) and Enterococci species 5(6.2%). Out of 234 patients, the mixed infection bacterial vaginosis and asymptomatic urinary tract infection was found in 51 patients (21.7%). The majority of research showed that acute pyelonephritis, the most frequent reason for pre-delivery hospitalisation, will eventually occur in 25% to 40% of untreated pregnant women with asymptomatic bacteriuria. The involvement of UTIs and bacterial vaginosis appears to be significantly complicated by sexual activity [16-19]. When uropathogens from the faecal flora colonise the vagina, ascend into the bladder, and occasionally the kidney in women, UTI will result. Women who lose their vaginal lactobacilli may be more susceptible to developing genitourinary infections. Host behavioural factors like the use of spermicides, sexual activity, and moreover an increase in vaginal pH as a result of a decrease in or alteration of the normal flora of the vagina, i.e. lactobacilli to the vagina as a result of BV, which ultimately results in UTI, favour the colonisation of various pathogenic microorganisms. Antibiotic usage should be promoted responsibly, while misuse of antibiotics should be discouraged. Douching and having several sexual partners are risk factors for BV, hence precautions should be done.

CONCLUSION

In order to avoid pregnancy difficulties, it is advised that antenatal health care institutions examine pregnant women for vaginitis. Moreover, women with BV should get a UTI screening. Antibiotic usage should be promoted responsibly, while misuse of antibiotics should be discouraged. Douching and having several sexual partners are risk factors for BV, hence precautions should be done.

FUNDING

Nil

AUTHORS CONTRIBUTIONS

All the authors have contributed equally.

CONFLICT OF INTERESTS

Declared none

REFERENCES

1. Hay PE. Chapter 7. Bacterial vaginosis as a mixed infection. In: Brogden KA, Guthmiller JM, editors. Polymicrobial diseases. Washington DC: ASM Press; 2002. Available from: https://www.ncbi.nlm.nih.gov/books/NBK2495/.
2. Mitchell C, Fredricks D, Agnew K, Hitti J. Hydrogen peroxide-producing lactobacilli are associated with lower levels of vaginal interleukin-1β, independent of bacterial vaginosis. Sex Transm Dis. 2015 Jul;42(7):358-63. doi: 10.1097/OLQ.0000000000000298, PMID 26222747.
3. Merchant JS, Oh K, Klerman LV. Douching: a problem for adolescent girls and young women. Arch Pediatr Adolesc Med. 1999;153(8):834-7. doi: 10.1001/archpedi.153.8.834, PMID 10437756.
4. Cribby S, Taylor M, Reid G. Vaginal microbiota and the use of probiotics. Interdiscip Perspect Infect Dis. 2008;2008:256490. doi: 10.1155/2008/256490, PMID 19343185.
5. Ravel J, Moreno I, Simon C. Bacterial vaginosis and its association with infertility, endometritis, and pelvic inflammatory disease. Am J Obstet Gynecol. 2021 Mar;224(3):251-7. doi: 10.1016/j.ajog.2020.10.019, PMID 33091407.
6. Givler DN, Givler A. Asymptomatic bacteriuria. StatPearls; 2022. Available from: https://www.ncbi.nlm.nih.gov/books/NBK441848/. [Last accessed on 24 Aug 2022].
7. Smaill FM, Vazquez JC. Antibiotics for asymptomatic bacteriuria in pregnancy. Cochrane Database Syst Rev. 2019 Nov 25;2019(11):CD000490.
8. Williams JD, Reeves DS, Condie AP, Franklin ISN, Leigh DA, Brumfitt W. The treatment of bacteriuria in pregnancy. In: O'Grady F, Brumfitt W. editor(s). Urinary tract infection. Proceedings of the first national symposium. London. Oxford University Press; 1968. p. 160-9.
9. Widmer TA, Theron G, Grove D. Prevalence and risks of asymptomatic bacteriuria among HIV-positive pregnant women. South Afr J Epidemiol Infect. 2010;25(1):28-32. doi: 10.1080/10158782.2010.11441374.
10. Ivler DN, Givler A. Asymptomatic bacteriuria. StatPearls; 2022. Available from: https://www.ncbi.nlm.nih.gov/books/NBK441848/. [Last accessed on 24 Aug 2022]
11. Dahiya A, Goldman RD. Management of asymptomatic bacteriuria in children. Can Fam Physician. 2018 Nov;64(11):821-4. PMID 30429177.
12. Albu S, Voidazan S, Bilca D, Badiu M, Truta A, Ciorea M. Bacteriuria and asymptomatic infection in chronic patients with indwelling urinary catheter: the incidence of ESBL bacteria. Med (Baltim). 2018 Aug;97(33):e11796. doi: 10.1097/MD.0000000000011796, PMID 30113467.
13. Nithyalakshmi J, Vijayalakshmi. Bacterial profile and anti-biogram pattern of UTI in pregnant women at tertiary care Teaching Hospital'. Int J Pharm Biol Sci. 2014;5(4):201-7.
14. Sujatha R, Nawani M. Prevalence of asymptomatic bacteriuria and its antibacterial susceptibility pattern among pregnant women attending the antenatal clinic at Kanpur, India. J Clin Diagn Res. 2014;8(4):DC01-3. doi: 10.7860/JCDR/2014/6599.4205, PMID 24959438.
15. Sharami SH, Afrakhteh M, Shakiba M. Urinary tract infections in pregnant women with bacterial vaginosis. J Obstet Gynaecol. 2007;27(3):252-4. doi: 10.1080/01443610701194846, PMID 17464804.
16. Gonzalez Pedraza A, Ortiz C, Mota R, Davila R, Dickinson E. Role of bacteria associated with sexually transmitted infections in the etiology of lower urinary tract infection in primary care. Enferm Infecc Microbiol Clin. 2003;21(2):89-92. doi: 10.1016/s0213-005x(03)72889-4, PMID 12586032.
17. Schnarr J, Smaill F. Asymptomatic bacteriuria and symptomatic urinary tract infections in pregnancy. Eur J Clin Invest. 2008;38 Suppl 2:50-7. doi: 10.1111/j.1365-2362.2008.02009.x, PMID 18826482.
18. Golan A, Wexler S, Amit A, Gordon D, David MP. Asymptomatic bacteriuria in normal and high-risk pregnancy. Eur J Obstet Gynecol Reprod Biol. 1989;33(2):101-8. doi: 10.1016/0028-2243(89)90202-5, PMID 2583335.
19. Moore A, Doull M, Grad R, Groulx S, Pottie K, Tonelli M. Recommendations on screening for asymptomatic bacteriuria in pregnancy. CMAJ. 2018;190(27):E823-30. doi: 10.1503/cmaj.171325, PMID 29986858.