

ASYMPTOMATIC BACTERIURIA IN PREGNANCY CAUSES AND INCIDENCE

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ABSTRACT**OBJECTIVES**

This study aims to provide an understanding of asymptomatic bacteriuria in pregnancy by examining its frequency, causative agent, and potential strategies for detection and management.

METHODOLOGY

A cross-sectional study was conducted in the Department of Obstetrics and Gynecology, PGMI Hayatabad Medical Complex, Peshawar, from July to December 2022. The study included 117 antenatal patients with varying gestational periods attending the OPD. Patients with a history of antibiotic therapy, urinary frequency and dysuria, vaginal discharge, renal tract anomalies, and medical disorders were excluded. Demographic details were recorded, and urine samples were collected and cultured. Data was analyzed using SPSS version 22.

RESULTS

*The incidence of asymptomatic bacteriuria was 25.5%, among 117 women, with *E. coli* (53.3%) the most common pathogen responsible for the infection, followed by *Klebsiella* (36.7%) and *staphylococcus* (10%).*

CONCLUSION

Bacteriuria without causing any symptoms is quite common in pregnancy. Simple measures like screening early in pregnancy can timely detect positive cases and with targeted treatment, both maternal and neonatal morbidity can be curtailed.

KEYWORDS: Bacteriuria, Pregnancy, Urinary tract infections, Asymptomatic

INTRODUCTION

Asymptomatic bacteriuria (ASB) is one of the foremost complications during pregnancy. It is defined as the presence of significant bacteria i.e., $\geq 10^5$ colony-forming bacteria (CFU/ml) in the urine of an individual without causing any symptoms.¹ ASB is more common in pregnant women due to the structural, immunological and physiological changes in the urinary system during pregnancy.² The expanding uterus during pregnancy can lead to a reduced bladder capacity, resulting in incomplete bladder emptying and subsequent bacterial growth. Moreover, hormonal changes during pregnancy can lead to a relaxation of the ureters and bladder, which can also result in incomplete bladder emptying.³ Certain other factors such as low socioeconomic status, multi-parity, poor hygiene and diet have also been observed to contribute to an increased risk of urinary tract infections during pregnancy. The prevalence of ASB in pregnancy is highly variable amongst different populations, ranging from 2 % to 15% in developing and 2% to 7% in developed countries.⁵ Undiagnosed ASB is a constant threat to maternal and fetal wellbeing as it can lead to acute pyelonephritis in 30 to 40% of

cases, which carries morbidity for both mother and the baby. ASB can also lead to preterm labor putting the baby at risk of prematurity and its consequences.^{5,6} Enterobacteriaceae are the cause in up to 90% of the cases with *Escherichia coli* being the most common pathogen. Other microorganisms involved are *Klebsiella*, *Proteus*, *Staphylococcus aureus* and *Pseudomonas*.⁷ Given the risks associated with ASB the American College of Obstetrics and Gynecology (ACOG) and Infectious Diseases Society of America advise routine screening for bacteriuria, with a urine culture, at least once during early pregnancy and once in the third trimester, as early diagnosis and the detection of the causative organism followed by the administration of antibiotics significantly decreases related complications.^{7,8} The rationale of our study is to have an idea of the frequency of asymptomatic bacteriuria in pregnancy in our region as there is a paucity of data on the subject from the population of KPK province. Additionally, the spectrum of causative organisms causing asymptomatic bacteriuria is constantly evolving. Thus the findings of this study will not only help in identifying the exact frequency and causative agent of asymptomatic bacteriuria in

pregnancy but will also contribute to the early identification of patients and the timely initiation of suitable treatment.

METHODOLOGY

This was a Descriptive Cross-sectional Study, carried out in the Department of Obstetrics and Gynecology, PGMI Hayatabad Medical Complex, Peshawar, from July to December 2022, after obtaining approval from the hospital ethical committee. A sample size of 117 was calculated using the prevalence in the previous studies keeping CI at 95% Non-probability consecutive sampling was adopted in all the antenatal patients with varying periods of gestations attending the OPD. No restriction was made for age, parity or gestational age of the patients. Patients having a history of antibiotic therapy in the past two weeks, those with complaints of urinary frequency and dysuria, patients having vaginal discharge, those having any renal tract anomalies, and with medical disorders like diabetes or anaemia were excluded from the study. A written informed consent was taken from patients included in the study. Demographic details of all patients including age, gestational age, parity, education level and socioeconomic status were noted and recorded. All patients were instructed to collect the mid-stream clean catch urine sample in a sterile bottle. Samples were then immediately transported to the hospital laboratory for assessment within 2 hours of collection. Urine samples having more than 10 pus cells per high power field were labelled as positive for bacteriuria. Once the sample was positive, it was cultured to find the causative organism. The urine was cultured on MacConkey agar and colistin nalidixic acid agar, as studies have shown that using these mediums for culture has significantly increased the detection of enterococci and lactobacillus.⁸ A loopful of well-mixed urine at 3000 rpm for 10 minutes was streaked onto the surface plates. Incubation was done aerobically at 35°C for 18-24 hours. Pure growth of 2×10^5 CFU/ml of one organism was considered to be suggestive of significant bacteriuria. Mixed growths of two or more organisms were considered as contamination. The samples were reported by a consultant pathologist. All the data was recorded on a predesigned proforma. The exclusion criteria were strictly followed to control confounders and bias in the study. Data was analyzed using SPSS version 22. Mean and standard deviation were determined for quantitative variables like age, gestational age, and parity. Frequencies and percentages were calculated for qualitative variables like education level, socioeconomic status, and causative organisms. A chi-square test was used and a p-value of < 0.05 was considered statistically significant. The Ethical Approval No.1489, dated:01-07-2022.

RESULTS

A total of 117 patients were included in the study 30 (25.6 %) patients had asymptomatic bacteriuria. The mean age of the participants was 29.3 ± 4.9 years, 65(55.5%) patients were from the age group 20 to 30 years, and out of these 13 (20.0%) women showed positive cultures. 52 (44.4%) women in the age group 30 to 40 years, of whom 17 (32.7%) had positive cultures for ASB, showing that ASB is more common in the women of higher age groups however, no statistical significance (p-value) was found between the age and the incidence of infection. Forty-eight (41.0%) women presented in their first trimester with 12 (25.0%) showing infection. Fifty-two (44.4%) women presented in their second trimester and among those only 12 (23.1%) had positive cultures. Seven teens (14.5%) women were in their third trimester with only 06 (06%) having the infection, upon data analysis no statistical significance (p-value) was shown of the infection with the period of gestation. Incidence of asymptomatic bacteriuria was seen more in patients with, low socioeconomic status and among the illiterate group of women (Table 1). The most common pathogen isolated from the culture was Escherichia Coli 53.3% followed by Klebsiella pneumonia 36.7% and Staphylococcus aureus 10.0% (Table 2).

Table 1: Demographic Details

Variables	Frequency	Positive cases f (%)	Negative cases f (%)	P-Value
Age	20 - 30 yrs	65	13 (20.0)	0.119
	30 - 40 yrs	52	17 (32.7)	
Parity	Primigravida	43	09 (20.9)	0.2
	Multigravida	74	21 (28.4)	
Socioeconomic Status	Poor	52	16 (30.8)	0.267
	Middle class	42	11 (26.2)	
	Upper class	23	03 (13.0)	
Educational Status	Illiterate	36	09 (25.0)	0.144
	Primary	47	12 (25.5)	
	Secondary	22	03 (13.6)	
	Intermediate and above	12	06 (50.0)	
Gestational Age	1 st Trimester	48 (41.0)	12 (25.0)	0.600
	2 nd Trimester	52 (44.4)	12 (23.1)	
	3 rd Trimester	17 (14.0)	06 (35.3)	

Table 2: Distribution of Bacterial Isolates among Culture-Positive Cases (n=30)

Uropathogenic	Frequency	%age
E.Coli	16	53.3
Klebsiella	11	36.7
Staph.Aureus	03	10.0

DISCUSSION

Asymptomatic bacteriuria in pregnancy is a serious cause of maternal morbidity and perinatal morbidity

and mortality in terms of causing pyelonephritis in the mother and complications of prematurity in babies. Timely diagnosis and appropriate treatment however can reduce the serious consequences.^{5,6,9} In our study, 25.6% of the patients were positive for ASB which is a high figure in comparison to certain other local studies carried out in other regions of Pakistan e-g the incidence of ASB was 19.9% in Nawab Shah, and 17% in Karachi.^{10,11} However, even higher figures were quoted from Saudi Arabia (32.1%) Iraq (42.9%) and Nigeria (37.1%).^{12,13,14} Frequency as low as 3.3% has been quoted from India.¹⁵ Our study results showed that ASB was higher in the age group of 30 to 40 years (32.7%) in comparison with patients in the age group of 20 to 30 years (20%) which is similar to the trends of infection quoted by Turpin et al. and Chandel et al. Multigravida in our study has shown a higher rate of infection as compared to Primigravida which is 28.4% vs 20.9 %, which is per the results reported by Akpan NG et al from Nigeria and Al-Mamory from Iraq.^{16,17,18,19} Another study has shown an upward trend of ASB among multiparous women of advanced age.²⁰ The common bacteria, obtained from the cultures of positive cases in our study, was E.Coli (53.3%) followed by Klebsiella (36.7%) and Staph. Aureus (10.0%). Similar results were observed in a study conducted in Ethiopia where gram-negative isolates were the predominant (60.7%). E. coli (44.6%) was the most common followed by Klebsiella spp. (8.9%). Among Gram-positive bacteria, Coagulate-negative staphylococci were the more frequently isolated (28.6%) followed by S. Aureus (10.7%).²¹ Bizuwork K et al. in their study has reported that 30.4% of cases were E. coli positive, followed by Proteus spp. in 23.2%, Klebsiella spp. in 14.3%, and Citrobacter spp. in 12.5% of the cases.²² E Cotton et al., in his study has also confirmed E. coli as the most common isolated pathogen (79.6%).²³ E. coli has an acquired ability to produce several virulent factors facilitating its colonization and invasion of urinary epithelium resulting in its predominance when it comes to infecting the host.²⁵

LIMITATIONS

This was a small-scale study encompassing a single hospital; larger-scale multicenter studies are needed to find the true frequency of the condition along with the antimicrobial susceptibility and resistance.

CONCLUSIONS

Asymptomatic bacteriuria is a prevalent condition with significant implications for maternal and fetal health. Early detection and prompt treatment are essential in preventing adverse outcomes, including pyelonephritis

and preterm birth. With increased awareness, implementation of universal screening protocols, and proper management, the incidence of asymptomatic bacteriuria in pregnancy can be reduced, leading to improved maternal and neonatal outcomes.

CONFLICT OF INTEREST: None

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REFERENCES

1. Politis PA, File TM. Highlights of Clinical Practice Guideline for the Management of Asymptomatic Bacteriuria. *Infectious Diseases in Clinical Practice*. 2019 Nov;27(6):308-9.
2. Azami M, Jaafari Z, Masoumi M, Shohani M, Badfar G, Mahmudi L, et al. The etiology and prevalence of urinary tract infection and asymptomatic bacteriuria in pregnant women in Iran: a systematic review and Meta-analysis. *BMC urology*. 2019 May 30;19(1):43-43.
3. Glaser AP, Schaeffer AJ. Urinary Tract Infection and Bacteriuria in Pregnancy. *Urologic Clinics of North America*. 2015 Nov;42(4):547-60.
4. Farazi A, Jabbariasl M. Asymptomatic bacteriuria in pregnancy in the central region of Iran: Frequency, risk factors, and causative organisms. *Clinical Epidemiology and Global Health*. 2019 Sep;7(3):309-12.
5. Nteziyaremye J, Iramiot SJ, Nekaka R, Musaba MW, Wandabwa J, Kisegerwa E, et al. Asymptomatic bacteriuria among pregnant women attending antenatal care at Mbale Hospital, Eastern Uganda. *PloS one*. 2020 Mar 19;15(3):e0230523-e0230523.
6. Smaill FM, Vazquez JC. Antibiotics for asymptomatic bacteriuria in pregnancy. *The Cochrane database of systematic reviews*. 2019 Nov 25;2019(11):CD000490.
7. Abu D, Abula T, Zewdu T, Berhanu M, Sahilu T. Asymptomatic Bacteriuria, antimicrobial susceptibility pattern and associated risk factors among pregnant women attending antenatal care in Assosa General Hospital, Western Ethiopia. *BMC microbiology*. 2021 Dec 16;21(1):348-348.
8. Karah N, Rafei R, Elamin W, Ghazy A, Abbara A, Hamze M, et al. Guideline for Urine Culture and Biochemical Identification of Bacterial Urinary Pathogens in Low-Resource Settings. *Diagnostics (Basel, Switzerland)*. 2020 Oct 16;10(10):832.
9. Khapre M, Sharma D, Mehta A, Sinha S. Prevalence of Asymptomatic Bacteriuria (ASB) in Pregnant Women in India: A Systematic Review and Meta-Analysis. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine*. 2023;Nov-Dec;48(6):879-87.
10. Amala SE, Karibi-Botoye R, Nwokah EG, Pius MT. Prevalence of Asymptomatic Bacteriuria in Pregnancy and Urinary Tract Infection in Non-pregnant Symptomatic Womem. *American Journal of Biomedical Sciences*. 2021 Oct;172-83.
11. Sial SA, Mal Tanwani B, Detho AB, Parveen K, Rasool Memon F, Bukhari S, et al. Asymptomatic Bacteriuria, Prevalence Report during Antenatal Period at Pumhsw Nawabshah, Pakistan. *Journal of Pharmaceutical Research International*. 2021 Apr 29;18-23.
12. Qazi TN, Naseer S, Ainuddin JA. Prevalence and Causative Organisms of Asymptomatic Bacteriuria among Pregnant Women in Karachi, Pakistan. *Journal of the College of Community Physicians of Sri Lanka*. 2021 Sep 14;27(2):360.
13. Samje M, Yongwa O, Enekegbe AM, Njoya S. Prevalence and antibiotic susceptibility pattern of bacteriuria among HIV-seropositive patients attending the Bamenda Regional Hospital, Cameroon. *African health sciences*. 2020 Sep;20(3):1045-52.

14. Wabe YA, Reda DY, Abreham ET, Gobene DB, Ali MM. Prevalence of Asymptomatic Bacteriuria, Associated Factors and Antimicrobial Susceptibility Profile of Bacteria Among Pregnant Women Attending Saint Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia. *Therapeutics and clinical risk management*. 2020 Sep 29;16:923–32.
15. Okwu M, Imade O, Akpoka OA, Olley M, Ashi-ingwu B. Prevalence of Asymptomatic Bacteriuria among Pregnant Women Attending Antenatal Clinics in Ovia North East Local Government Area, Edo State, Nigeria. *Iranian Journal of Medical Microbiology*. 2021 Mar 1;15(2):227-31.
16. Thomas DFM. *Urinary tract infection in children*. Oxford Medicine Online. Oxford University Press; 2017.
17. Dzifa KA, Jude JA, Linda AO, Benedict A, Alex O-O, Michael O, et al. Microbiological profile of asymptomatic bacteriuria in pregnant women in Volta Region, Ghana. *Journal of Microbiology and Antimicrobials*. 2021 Sep 30;13(2):27-36.
18. Agarwal A, Pandey S, Maheshwari U, Singh MP, Srivastava J, Bose S. Prevalence of Asymptomatic Bacteriuria and Antimicrobial Resistance Profile among Pregnant Females in a Tertiary Care Hospital. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine*. 2021/Jul-Sep;46(3):469-73.
19. Akpan N, Onwuezobe I, Antia U. Asymptomatic Bacteriuria among Pregnant Women at University Hospital in Uyo, Nigeria: Prevalence, Risk Factors and Characteristics. *Asian Journal of Medicine and Health*. 2017 Jan 10;3(3):1-9.
20. Al-Mamoryi N, Al-Salman A. Prevalence of symptomatic urinary tract infections and asymptomatic bacteriuria in Iraqi pregnant women of Babylon Governorate. *Medical Journal of Babylon*. 2019;16(1):5.
21. Nicolle LE. Management of asymptomatic bacteriuria in pregnant women. *The Lancet Infectious Diseases*. 2015 Nov;15(11):1252-4.
22. Bizuwork K, Alemayehu H, Medhin G, Amogne W, Eguale T. Asymptomatic Bacteriuria among Pregnant women in Addis Ababa, Ethiopia: Prevalence, Causal agents, and their Antimicrobial Susceptibility [Internet]. Research Square Platform LLC; 2020.
23. Edae M, Teklemariam Z, Weldegebreal F, Abate D. Asymptomatic Bacteriuria among Pregnant Women Attending Antenatal Care at Hiwot Fana Specialized University Hospital, Harar, Eastern Ethiopia: Magnitude, Associated Factors, and Antimicrobial Susceptibility Pattern. *International journal of microbiology*. 2020 Jul 20;2020:1763931-1763931.
24. Cotton E, Geraghty R, Umraniar S, Saeed K, Somani B. Prevalence of asymptomatic bacteriuria among pregnant women and changes in antibiotic resistance: a 6-year retrospective study. *Journal of Clinical Urology*. 2022 May 16;17(1):9-15.
25. Mohebi S, Hashemizade Z, Hadadi M, Kholdi S, Javadi K, Motamedifar M. Pathogenic features of urinary Escherichia coli strains causing Asymptomatic Bacteriuria during Pregnancy [Internet]. Research Square Platform LLC; 2020.

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