



# Comparison of the Frequency Asymptomatic Bacteriuria in Patients with Preterm Labor and Term

Farahnaz Farzaneh<sup>1,\*</sup>, Mozhgan Mokhtari<sup>2</sup> and Elnaz Kalemati<sup>3</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Infectious Diseases and Tropical Medicine Research Center, School of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran

<sup>2</sup>Department of Obstetrics and Gynecology, School of Medicine, Iran University of Medical Sciences, Tehran, Iran

<sup>3</sup>School of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran

\*Corresponding author: Department of Obstetrics and Gynecology, Infectious Diseases and Tropical Medicine Research Center, School of Medicine, Zahedan University of Medical Sciences, Zahedan, Iran. Tel: +98-9144263014, Email: farahnazi826@yahoo.com

Received 2018 February 25; Revised 2018 April 04; Accepted 2018 April 22.

## Abstract

**Background:** Asymptomatic bacteriuria is prevalent in pregnancy and has unpleasant side effects such as hypertension, preeclampsia, Intra uterine growth restriction, preterm labor, low birth weight, postpartum endometritis, pyelonephritis, septicemia, and maternal death. Urinary tract infections are a common health problem among women as compared to men due to a short urethra in women, the proximity of the anus to the vagina, and the easier access of pathogens to sexual activity. Asymptomatic bacteriuria in pregnancy is a risk factor for early delivery.

**Methods:** In this study, the frequency asymptomatic bacteriuria was compared in women with preterm labor and women with term delivery who referred to the maternity ward of Ali Ebn Abitaleb Hospital in 2015 to 2016. In this case-control study, 112 patients with preterm labor and 112 patients in the control group were term. The participants were selected through inclusion and exclusion criteria. The urine specimen was sent to the lab for bacteriuria examination and was analyzed. Finally, the results of the two case and control groups were analyzed.

**Results:** The frequency of asymptomatic bacteriuria was 33 in the preterm labor group and 6 in the term of delivery. There was a statistically significant relationship between asymptomatic bacteriuria and preterm labor (P-value < 0.05).

**Conclusions:** Asymptomatic bacteriuria is a common infection in pregnancy that can lead to an increased risk of adverse maternal and fetal complications. Therefore, pregnant women should be screened for bacteriuria and treated appropriate antibiotics. It is suggested that pregnant mothers are screened at the beginning of their pregnancy owing to treatment for positive bacteriuria can lead to reduce maternal and fetal complications.

**Keywords:** Asymptomatic Bacteriuria, Preterm Labor, Term Labor

## 1. Background

Urinary tract infections are a common health problem among women compared with men due to a short urethra, vaginal proximity, and facilitated entry of pathogens by sexual activity (1-4). Pregnant women are more susceptible to symptomatic and asymptomatic urinary tract infection due to their anatomical and physiological status and increased sex hormones during pregnancy.

Asymptomatic bacteriuria refers to the presence of more than 100,000 colony-forming units (CFU) of a type of pathogen per mL of urine in two successive samples from the middle of the urine flow or a catheterized specimen (5-7).

About 30% of untreated women with asymptomatic

bacteriuria are prone to pyelonephritis during pregnancy (7), where the systemic febrile infections of the mother, including pyelonephritis, are associated with preterm labor and low birth weight (8, 9). Asymptomatic bacteriuria in pregnancy may lead to hypertension, preeclampsia, intra uterine growth restriction, low birth weight, postpartum endometritis, septicemia, and maternal death (8, 10, 11). With early screening during pregnancy, a relatively high prevalence of urinary tract infection, especially asymptomatic bacteriuria, can be prevented due to its significant complications (8).

A golden standard for screening asymptomatic bacteriuria from urine specimens is during 12-16 weeks of gestation age of pregnancy (12). The results of several studies have shown that preterm labor in pregnant women with

asymptomatic bacteriuria is higher than other pregnant women.

## 2. Methods

This descriptive-analytic study was conducted to compare the asymptomatic bacteriuria of pregnant women with preterm labor and term in the first and second trimesters of pregnancy. All women who referred to the maternity clinic of Ali Ebn Abitaleb Hospital of Zahedan, urine samples were collected for bacteriuria examination in 2015 to 2016. In order to reduce the risk of contamination during collection, sampling was performed after hand washing and washing the genital area with normal saline impregnated cotton. In addition, about 20 mL urine samples from the median urinary flow of patients in a sterile container were collected. Samples were taken to the lab after collection and processed immediately after. Samples that had not been processed until this time were kept in the refrigerator at 4°C. For urine culture, 0.01 mL of urine sample was taken by calibrated loop and inoculated with culture media and methylene blue eosin. The environments were placed in a 37°C incubator for 24 hours. In the case of growth of more than or equal to 100,000 colonies per mL of urine in the culture medium, the sample was considered as an asymptomatic bacteriuria. In the analysis of information, descriptive statistics tables and chi-square test will be used. In the presentation of the results, the confidence interval will be 95% and there is a significant statistical difference less than 5%.

## 3. Results

In this study, the prevalence of asymptomatic bacteriuria was 33 (84.6%) in preterm labor and 6 (15.4%) in preterm labor. The prevalence of asymptomatic bacteriuria in women with preterm labor was significant. It was more than the group of women with preterm delivery and statistically significant difference was observed between the groups (P-value = 0.0001) (odds ratio = 7.38) (Table 1).

Parity in preterm pregnancy was not significantly different between two groups with asymptomatic bacteriuria and no asymptomatic bacteriuria (Table 2). In addition, in our study, there was no significant difference in the level of education between the two groups (P-value = 0.262) (Table 3). Parity in preterm delivery was not significantly different between two groups with asymptomatic bacteriuria and no asymptomatic bacteriuria (Table 4).

## 4. Discussion

Asymptomatic bacteriuria is more common in pregnant women than non-pregnant women. Although recurrent bacteriuria is more prevalent in pregnancy, the prevalence of pyelonephritis in pregnant women is higher than in the general population, which is probably due to physiological changes in the urethra in pregnancy (10, 13-15). Urinary tract infections begin in most pregnant women with presence of bacteria in the urine without any specific symptoms (16). It is estimated that 7 million cases of bladder infection are diagnosed in young women in the United States each year, which cost 1 billion dollars (6, 7).

Asymptomatic bacteriuria occurs in 2% to 7% of pregnant women depending on factors such as race and socioeconomic status. The highest prevalence was in African-American women with sickle cell anemia and the lowest in white wealthy women (17, 18). It occurs precisely at the beginning of pregnancy, and almost one quarter of cases are detected in the second and third months, risk factors associated with most bacterial infections is the positive history of the previous urinary tract infection, pre-existing diabetes mellitus, parity, and low socioeconomic status (10, 13-15).

Without treatment, 30% - 40% of pregnant women with asymptomatic bacteriuria will have symptomatic urinary tract infections (including pyelonephritis) (17). If bacteriuria is eradicated, this risk is reduced by 70% to 80% (11, 19, 20), many studies have shown the association between urinary tract infection, especially asymptomatic bacteriuria, and poor outcome of pregnancy. Untreated bacteriuria is associated with an increased risk of preterm delivery, low birth weight, and prenatal mortality (16).

Urinary tract infection is a common clinical problem that includes urethra, bladder, and kidney infection, and it is the second common medical condition after anemia in pregnancy. In addition, asymptomatic bacteriuria is the most common condition where lack of diagnosis and treatment can have dangerous consequences for the mother and fetus (1-3). Among urinary tract infections, asymptomatic bacteriuria is important due to the lack of clinical symptoms. In pregnant women, physiological and anatomical changes in the urinary system and changes in the immune system during pregnancy increase the risk of an asymptomatic bacteriuria and in some cases, it leads to an infection of the urinary tract, which has a serious risk for the mother and the fetus (18).

Overall asymptomatic bacteriuria is a common infection. Pregnant women with asymptomatic bacteriuria are at an increased risk for harmful, maternal, and fetal com-

**Table 1.** Frequency of Asymptomatic Bacteriuria in Preterm and Term Pregnant

Group/Variable	Term, Prevalence (%)	Preterm, Prevalence (%)	Total, Prevalence (%)	P-Value
<b>Asymptomatic bacteriuria</b>				0.0001
Positive	6 (5.4)	33 (29.5)	39 (17.4)	
Negative	106 (94.6)	79 (70.5)	185 (82.6)	
<b>Total</b>	112 (100)	112 (100)	224 (100)	0.0001

**Table 2.** Frequency of Parity in Term Pregnant Based on Bacteriuria

Group/Variable	Patient with ASB, Prevalence (%)	Patient Without ASB, Prevalence (%)	Total, Prevalence (%)
<b>Parity</b>			
PG	2 (33.3)	53 (50)	55 (49.1)
1	2 (33.3)	30 (28.3)	32 (28.6)
2	1 (16.7)	9 (8.5)	10 (8.9)
3	1 (16.7)	7 (6.6)	8 (7.1)
4	0 (0)	4 (3.8)	4 (3.6)
5	0 (0)	2 (1.9)	2 (1.8)
6	0 (0)	1 (0.9)	1 (0.9)
<b>Total</b>	6 (100)	106 (100)	112 (100)

**Table 3.** Frequency of Education Among Two Groups (Term and Preterm)

Group/Variable	Term, Prevalence (%)	Preterm, Prevalence (%)	Total, Prevalence (%)	P-Value
<b>Study</b>				0.262
Elementary (primary)	41 (36.6)	29 (25.9)	70 (31.3)	
Guidance (secondary)	32 (28.6)	31 (27.7)	63 (28.1)	
Graduate	25 (22.3)	32 (28.6)	57 (25.4)	
Postgraduate	14 (12.5)	20 (17.9)	34 (15.2)	
<b>Total</b>	112 (100)	112 (100)	224 (100)	0.262

**Table 4.** Frequency of Parity in Preterm Pregnant Based on Bacteriuria

Group/Variable	Women with Bacteriuria, Prevalence (%)	Women Without Bacteriuria, Prevalence (%)	Total, Prevalence (%)
<b>Parity</b>			
PG	17 (51.2)	42 (53.2)	59 (52.7)
1	9 (27.3)	9 (11.4)	18 (16.1)
2	4 (12.1)	16 (10.3)	20 (17.9)
3	2 (6.1)	8 (10.1)	10 (8.9)
4	0 (0)	3 (3.8)	3 (7.2)
5	1 (3)	1 (1.3)	2 (8.1)
<b>Total</b>	33 (100)	79 (100)	112 (100)

plications that can be prevented by antibiotic therapy. In this study, the isolated organism was dominant E.coli. The present study showed that asymptomatic bacteriuria is a risk factor for preterm labor. It is suggested that urine culture should be performed as a routine assessment in all pregnant women during pregnancy and prevent from complications with antibiotic therapy (Dipstick leukocyte esterase and nitrite, as an evaluation method, is with positive and negative false positives).

## References

1. American College of Obstetricians and Gynecologists. ACOG Committee Opinion No 579: Definition of term pregnancy. *Obstet Gynecol.* 2013;**122**(5):1139–40. doi: [10.1097/01.AOG.0000437385.88715.4a](https://doi.org/10.1097/01.AOG.0000437385.88715.4a). [PubMed: [24150030](https://pubmed.ncbi.nlm.nih.gov/24150030/)].
2. Cloherty JP, Eichenwald EC, Hansen AR, Stark AR, editors. *Manual of neonatal care.* 7th ed. Philadelphia: Wolters Kluwer Health/Lippincott Williams & Wilkins; 2012. 146 p.
3. Tadesse E, Teshome M, Merid Y, Kibret B, Shimelis T. Asymptomatic urinary tract infection among pregnant women attending the antenatal clinic of Hawassa Referral Hospital, Southern Ethiopia. *BMC Res Notes.* 2014;**7**:155. doi: [10.1186/1756-0500-7-155](https://doi.org/10.1186/1756-0500-7-155). [PubMed: [24636218](https://pubmed.ncbi.nlm.nih.gov/24636218/)]. [PubMed Central: [PMC3995498](https://pubmed.ncbi.nlm.nih.gov/PMC3995498/)].

4. Matuszkiewicz-Rowinska J, Malyszko J, Wieliczko M. Urinary tract infections in pregnancy: old and new unresolved diagnostic and therapeutic problems. *Arch Med Sci.* 2015;**11**(1):67-77. doi: [10.5114/aoms.2013.39202](https://doi.org/10.5114/aoms.2013.39202). [PubMed: [25861291](https://pubmed.ncbi.nlm.nih.gov/25861291/)]. [PubMed Central: [PMC4379362](https://pubmed.ncbi.nlm.nih.gov/PMC4379362/)].
5. Acosta-Terriquez JE, Ramos-Martinez MA, Zamora-Aguilar LM, Murillo-Llanes J. [Prevalence of urinary tract infection in hospitalized patients with preterm labor]. *Ginecol Obstet Mex.* 2014;**82**(11):737-43. Spanish. [PubMed: [25826955](https://pubmed.ncbi.nlm.nih.gov/25826955/)].
6. Rajaratnam A, Baby NM, Kuruvilla TS, Machado S. Diagnosis of asymptomatic bacteriuria and associated risk factors among pregnant women in mangalore, karnataka, India. *J Clin Diagn Res.* 2014;**8**(9):OC23-5. doi: [10.7860/JCDR/2014/8537.4842](https://doi.org/10.7860/JCDR/2014/8537.4842). [PubMed: [25386490](https://pubmed.ncbi.nlm.nih.gov/25386490/)]. [PubMed Central: [PMC4225942](https://pubmed.ncbi.nlm.nih.gov/PMC4225942/)].
7. Muharram SH, Ghazali SN, Yaakub HR, Abiola O. A preliminary assessment of asymptomatic bacteriuria of pregnancy in brunei darussalam. *Malays J Med Sci.* 2014;**21**(2):34-9. [PubMed: [24876805](https://pubmed.ncbi.nlm.nih.gov/24876805/)]. [PubMed Central: [PMC4028569](https://pubmed.ncbi.nlm.nih.gov/PMC4028569/)].
8. Demilie T, Beyene G, Melaku S, Tsegaye W. Diagnostic accuracy of rapid urine dipstick test to predict urinary tract infection among pregnant women in Felege Hiwot Referral Hospital, Bahir Dar, North West Ethiopia. *BMC Res Notes.* 2014;**7**:481. doi: [10.1186/1756-0500-7-481](https://doi.org/10.1186/1756-0500-7-481). [PubMed: [25073620](https://pubmed.ncbi.nlm.nih.gov/25073620/)]. [PubMed Central: [PMC4118157](https://pubmed.ncbi.nlm.nih.gov/PMC4118157/)].
9. Cram LF, Zapata MI, Toy EC, Baker B. Genitourinary infections and their association with preterm labor. *Am Fam Physician.* 2002;**65**(2):241-8.
10. Hazhir S. Asymptomatic bacteriuria in pregnant women. *Urol J.* 2007;**4**(1):24-7. [PubMed: [17514607](https://pubmed.ncbi.nlm.nih.gov/17514607/)].
11. Goldenberg RL, Culhane JF, Iams JD, Romero R. Epidemiology and causes of preterm birth. *Lancet.* 2008;**371**(9606):75-84. doi: [10.1016/S0140-6736\(08\)60074-4](https://doi.org/10.1016/S0140-6736(08)60074-4).
12. Blencowe H, Cousens S, Oestergaard MZ, Chou D, Moller AB, Narwal R, et al. National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: a systematic analysis and implications. *Lancet.* 2012;**379**(9832):2162-72. doi: [10.1016/S0140-6736\(12\)60820-4](https://doi.org/10.1016/S0140-6736(12)60820-4). [PubMed: [22682464](https://pubmed.ncbi.nlm.nih.gov/22682464/)].
13. Molina JP, Meza JG, Reyes JCL, Baron GP, Hernandez JFC. [Preterm delivery and asymptomatic bacteriuria]. *Ginecol Obstet Mex.* 2008;**76**(8):454-60. Spanish.
14. Aigere EO, Okusanya BO, Eigbefoh JO, Okome GB. Enhanced urinalysis in the detection of asymptomatic bacteriuria in pregnancy. *Nig Q J Hosp Med.* 2013;**23**(2):105-9. [PubMed: [24579505](https://pubmed.ncbi.nlm.nih.gov/24579505/)].
15. Pararas MV, Skevaki CL, Kafetzis DA. Preterm birth due to maternal infection: Causative pathogens and modes of prevention. *Eur J Clin Microbiol Infect Dis.* 2006;**25**(9):562-9. doi: [10.1007/s10096-006-0190-3](https://doi.org/10.1007/s10096-006-0190-3). [PubMed: [16953371](https://pubmed.ncbi.nlm.nih.gov/16953371/)].
16. Chandel LR, Kanga A, Thakur K, Mokta KK, Sood A, Chauhan S. Prevalance of pregnancy associated asymptomatic bacteriuria: a study done in a tertiary care hospital. *J Obstet Gynaecol India.* 2012;**62**(5):511-4. doi: [10.1007/s13224-011-0071-2](https://doi.org/10.1007/s13224-011-0071-2). [PubMed: [24082549](https://pubmed.ncbi.nlm.nih.gov/24082549/)]. [PubMed Central: [PMC3526708](https://pubmed.ncbi.nlm.nih.gov/PMC3526708/)].
17. Romero R, Oyarzun E, Mazor M, Sirtori M, Hobbins JC, Bracken M. Meta-analysis of the relationship between asymptomatic bacteriuria and preterm delivery/low birth weight. *Obstet Gynecol.* 1989;**73**(4):576-82. [PubMed: [2927852](https://pubmed.ncbi.nlm.nih.gov/2927852/)].
18. Omani-Samani R, Sepidarkish M, Safiri S, Esmailzadeh A, Vesali S, Farzaneh F, et al. Impact of gestational weight gain on cesarean delivery risk, perinatal birth weight and gestational Age in women with normal pre-pregnancy BMI. *J Obstet Gynaecol India.* 2018;**68**(4):258-63. doi: [10.1007/s13224-017-1023-2](https://doi.org/10.1007/s13224-017-1023-2). [PubMed: [30065539](https://pubmed.ncbi.nlm.nih.gov/30065539/)]. [PubMed Central: [PMC6046671](https://pubmed.ncbi.nlm.nih.gov/PMC6046671/)].
19. Goldenberg RL, Hauth JC, Andrews WW. Intrauterine infection and preterm delivery. *N Engl J Med.* 2000;**342**(20):1500-7. doi: [10.1056/NEJM200005183422007](https://doi.org/10.1056/NEJM200005183422007). [PubMed: [10816189](https://pubmed.ncbi.nlm.nih.gov/10816189/)].
20. Bloom SL, Corton MM, Spong CY, Dashe JS, Leveno KJ. *Williams Obstetrics.* 24th ed. McGraw-Hill Education; 2014.