

ORIGINAL ARTICLE

Preterm birth in women with asymptomatic bacteriuria.

Bhawna Mukesh¹, Falak Naz Baloch², Namia Nazir³, Atrooba Ismail⁴, Zakir Ali Punar⁵, Laraib Unar⁶

ABSTRACT... Objective: To determine the frequency of preterm birth in women with asymptomatic bacteriuria. **Study Design:** Descriptive Cross-sectional study. **Setting:** Department of Obstetrics and Gynaecology Liaquat University Hospital Hyderabad. **Period:** Six Months from June 2020 to November 2020. **Methods:** A total of 151 women fulfilling the inclusion criteria was enrolled in the study. All the pregnant ladies with asymptomatic bacteriuria were recruited. The data was collected on pre-designed proforma, and all such manoeuvres were performed. **Results:** The average age of the patients with asymptomatic bacteriuria was 27.95±5.66 years. Frequency of preterm birth in women with asymptomatic bacteriuria was 17.88% (27/151). **Conclusion:** We conclude that asymptomatic bacteriuria during pregnancy has a significant impact on pregnancy outcome, mainly premature labour. By early screening and treatment of asymptomatic bacteriuria the unwanted sufferings of the pregnant mothers and their offspring could easily be reduced and even prevented. In light of our results, we recommend that, health education sessions about personal hygiene should be emphasized by the healthcare provider during antenatal care to all pregnant females, specifically those of low socio-economic level.

Key words: Asymptomatic Bacteriuria, Preterm Birth, Urinary Tract Infections.

Article Citation: Mukesh B, Baloch FN, Nazir N, Ismail A, Punar ZA, Unar L. Preterm birth in women with asymptomatic bacteriuria. Professional Med J 2026; 33(03):518-524. <https://doi.org/10.29309/TPMJ/2026.33.03.8878>

INTRODUCTION

Urinary tract infections (UTIs) are more common in women than in men, primarily due to anatomical factors such as a shorter urethra, the proximity of the vagina, and the increased risk of pathogen entry through sexual activity.¹ Pregnant women, in particular, are more vulnerable to asymptomatic UTIs because of physiological changes and elevated hormone levels during pregnancy.² If left untreated, a significant number of women with asymptomatic bacteriuria may develop pyelonephritis, which can lead to preterm labour.³ Early screening for UTIs, particularly asymptomatic bacteriuria, during pregnancy is crucial in preventing significant complications. It serves as an effective method for identifying asymptomatic bacteriuria from urine specimens, which is essential for minimizing the risks.^{4,5}

Preterm labour refers to the onset of labour before 37 weeks of gestation and is a major contributor to neonatal morbidity and mortality globally.^{6,7} A urinary tract infection may signal an imbalance in vaginal flora, as the same pathogens present

in the urine may also colonize the vagina.⁸ Verma A et al. found that patients with bacteriuria had a significantly higher risk of low birth weight and were twice as likely to experience preterm delivery compared to those without bacteriuria. Furthermore, antibiotic treatment was shown to reduce the risk of preterm birth.⁹ Identifying and treating genitourinary infections before they become clinically apparent can help decrease the incidence of preterm labour, ultimately reducing neonatal morbidity and mortality among these infants.¹⁰ Lockwood CJ reported that approximately 50% of preterm births are linked to asymptomatic bacteriuria,¹¹ while Chhabra S, et al reported 14% preterm birth are due to bacteriuria¹², whereas the reported prevalence for preterm birth in asymptomatic bacteriuria by Sheiner E, et al and Verma A, et al is 13.3% and 11.1% respectively.^{13,14}

There is a limited local literature on the association between preterm birth and asymptomatic bacteriuria in our population, while international studies show varied results, influenced by the availability and accessibility of healthcare facilities in both developed and developing countries.

1. MBBS, FCPS, Consultant Gynecologist, RHC.

2. MBBS, FCPS MRCOG, Senior Clinical Fellow, Bedford

3. MBBS, FCPS, Deputy Director, PPHI

4. MBBS, MCPS, Consultant Gynecologist,

5. MBBS, MSPH, Diploma in Project Management, Director Health Services, PPHI

6. BDS, Medical Student, JSMU.

Correspondence Address:

Dr. Falak Naz Baloch
Bedford.
drfalakn1@gmail.com

Article received on:

16/01/2025

Accepted for publication:

09/09/2025



This study will help generate local data for academic purposes and assist healthcare providers in assessing the prevalence of asymptomatic bacteriuria. Early detection and management can prevent preterm births, and the findings will support the development of targeted health strategies based on the study's observations. Moreover, the results will also share and presented in various health orientation seminars at national as well as international forum as the approach may helpful and results in reducing the complications due to asymptomatic bacteriuria.

OBJECTIVES

To determine the frequency of preterm birth in women with asymptomatic bacteriuria.

OPERATIONAL DEFINITIONS

Asymptomatic Bacteriuria (ASB)

is characterized by the presence of a pure culture containing at least 10^5 organisms/ml of urine in two consecutive urine samples (or from a catheterized urine specimen), without any accompanying symptoms, as determined through clinical examination and laboratory testing.

Preterm Birth

was considered when there was birth of a baby between 25-36 gestational weeks of pregnancy (on inquiring about the history of last menstrual period LMP).

EFFECT MODIFIERS:

Booked Mother

as a part of antenatal care in which a woman who attends at least one antenatal clinic session by consultant gynaecologist.

Un-Booked Mother

Not attending the antenatal clinical sessions.

Anemia

was considered when haemoglobin concentration of less than 11 g/dL (laboratory manoeuvre).

Diabetes Mellitus

is defined as a history of at least 1 year with a blood

glucose level of 200 mg/dl or higher at the time of presentation, with the individual already receiving treatment.

Fever

was labelled when the axillary temperature $\geq 100^\circ\text{F}$ on thermometer (clinical examination).

Obesity

As defined by the National Heart, Lung, and Blood Institute (NHLBI), obesity is determined using the body mass index (BMI) tool for the Asian population, with a BMI of 27.5 kg/m² or higher indicating obesity. BMI is calculated by dividing weight (in kilograms) by height squared (in meters), as measured on a weight-and-height scale.

Smoking

has ≥ 5 cigarette per day tobacco use for ≥ 01 years duration.

Hypertension

A history of at least 1 year with a blood pressure reading of 140/90 or higher at the time of presentation, with the individual already on treatment.

Low Birth Weight

Low birth weight refers to a newborn's body weight at birth, considered low if the baby weighs less than 2.5 kg, as determined through physical examination using a baby weighing scale.

METHODS

This descriptive cross sectional study was conducted at the Department of Obstetrics and Gynecology, Liaquat University Hospital, Hyderabad for Six months, from June 2020 to November 2020.

Based on the prevalence of 11.11% for preterm birth in women with asymptomatic bacteriuria¹⁴, with a margin of error of 5%, the sample size was calculated to be 151 women with asymptomatic bacteriuria was taken.

Non-probability consecutive sampling technique was used.

SAMPLE SELECTION

Inclusion Criteria

Pregnant women aged 20-45 years, with a gestational age of ≤ 36 weeks (determined through clinical history and the last menstrual period L.M.P), either primiparous or multiparous, diagnosed with asymptomatic bacteriuria.

Exclusion Criteria

Pregnant women with congenital kidney disease (horseshoe kidney, unilateral renal agenesis and cystic kidneys), women already on oral or parenteral antibiotic, women with disseminated intravascular coagulation (DIC), bleeding disorder, or those using anticoagulants, as well as women experiencing postpartum hemorrhage (PPH) due to other causes, such as retained product of conceptions (RPOCs) or trauma to the birth canal were excluded from the study.

The above conditions were assessed based on the patient's previous health records or diagnosis slips provided by the relevant consultant gynaecologists and obstetricians.

Data Collection Procedure

All women who met the inclusion criteria were enrolled in the study after obtaining approval from the College of Physicians and Surgeons of Pakistan (CPSP) to conduct the research (CPSP/REU/OBG-2017-164-8073). Consent was sought from every relevant patient and all the pregnant ladies with asymptomatic bacteriuria as per operational definition was and enrolled in the study and was further evaluated for preterm birth according to the criteria mentioned in the operational definitions. Data was collected using a pre-designed proforma, and all procedures (history taking, clinical examinations, sampling and data collection) were carried out by the principal researcher under the supervision of senior obstetrician with at least 3 years of experience. The financial cost of the study were covered by the researcher. The variables which were explored are booked and un-booked mother, anaemia, diabetes mellitus, fever, smoking, obesity, parity, hypertension, residency (urban or rural) and low birth weight along with preterm birth as an outcome.

Data Analysis Procedure

The data for all patients were analysed using SPSS version 20.00. Frequency and percentage distributions were calculated for variables such as booked and un-booked status, anaemia, diabetes mellitus, fever, smoking, obesity, parity, hypertension, residency (urban or rural), low birth weight and preterm birth. The mean and standard deviation (SD) were calculated for weight, height, BMI, maternal age, gestational age and parity.

Stratification was performed based on booked or un-booked status, anaemia, diabetes mellitus, fever, smoking, obesity, parity, hypertension, residency (urban or rural) and low birth weight to assess their impact on the outcomes and control for potential effect modifiers. A post-stratification chi-square test was applied to categorical variables at a 95% confidence interval (CI), with a p-value of ≤ 0.05 considered statistically significant.

RESULTS

The average age of the 151 patients with asymptomatic bacteriuria was 27.95 ± 5.66 years. Others demographic statistics of the women and their baby birth weight are also reported in Table-I. There were 92(60.93%) primigravida women and 59(39.09%) multigravida women (Figure-1). Most of the cases were un-booked and living in urban residency as shown in Figure-2 and 3. Regarding associated disease, 19.9% were anaemic, 27.8% were diabetic, 16.6% were hypertensive, 17.9% were obese, 14.6% had fever and only 6% were smokers (Table-II). Out of 151 women, low birth baby was observed in 19.87% as presented in Figure-4.

Frequency of preterm birth in women with asymptomatic bacteriuria was 17.88% (27/151) as shown in Figure-5. The rate of preterm birth was not statistically significant across age groups, parity, booking status, residency status, obese or smoker status as shown in Table-III. However, rate of preterm was high in women with anaemia, hypertension, fever and low birth weight as shown in Table-IV.

TABLE-I

Descriptive characteristics of patients

Variables	Mean	Std. Deviation	95% Confidence Interval for Mean	
			Lower Bound	Upper Bound
Age (Years)	27.95	5.66	27.04	28.86
Gestational Age (Weeks)	37.32	1.42	37.09	37.55
Weight (kg)	60.26	7.10	59.12	61.41
Height (cm)	155.56	6.52	154.51	156.60
BMI (kg/m ²)	24.99	3.34	24.45	25.53
Birth Weight (kg)	2.75	.41	2.68	2.81

FIGURE-1

Parity status of the patients (n=151)

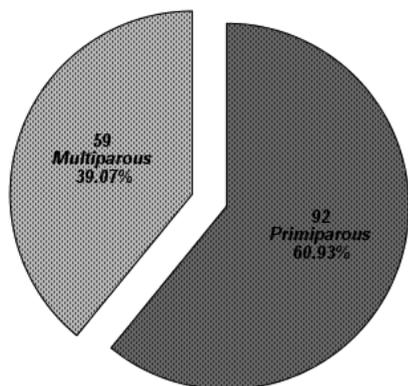


FIGURE-2

Booking status of the patients (n=151)

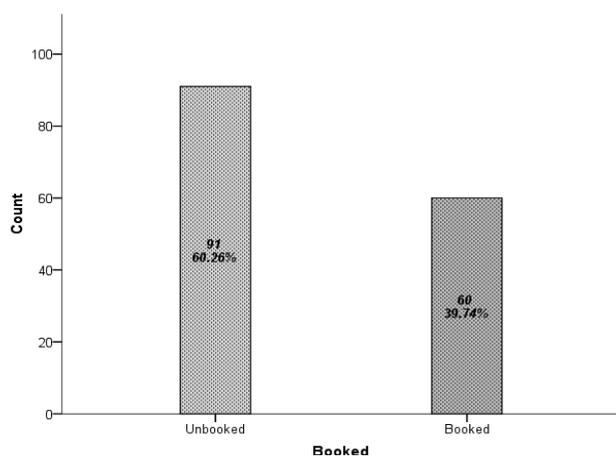


FIGURE-3

Residency status of the patients (n=151)

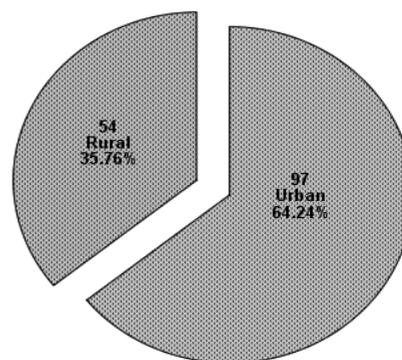


TABLE-II

Proportion of preterm birth by aetiology

Aetiology	Frequency (Percent)
Spontaneous preterm labor	30 to 50
PPROM	5 to 40
Multiple gestation	10 to 30
Preeclampsia/eclampsia	12
Antepartum bleeding	6 to 9
Fetal growth restriction	2 to 4
Other	8 to 9

PPROM: preterm premature rupture of membranes. Adapted from: Slattery MM, Morrison JJ. Lancet 2002; 360:1489.

Graphic 74561 Version 3.0

TABLE-III

Descriptive characteristics of patients

Variables	Mean	Std. Deviation	95% Confidence Interval for Mean	
			Lower Bound	Upper Bound
Age (Years)	27.95	5.66	27.04	28.86
Gestational Age (Weeks)	37.32	1.42	37.09	37.55
Weight (kg)	60.26	7.10	59.12	61.41
Height (cm)	155.56	6.52	154.51	156.60
BMI (kg/m ²)	24.99	3.34	24.45	25.53
Birth Weight (kg)	2.75	.41	2.68	2.81

TABLE-IV

Associated diseases with pregnant women		
Variables	Frequency	Percentage
Anaemia	30	19.9%
Diabetes mellitus	42	27.8%
Hypertension	25	16.6%
Fever	22	14.6%
Smoking	9	6%
Obese	27	17.9%

FIGURE-4

Low birth weight (n=151)

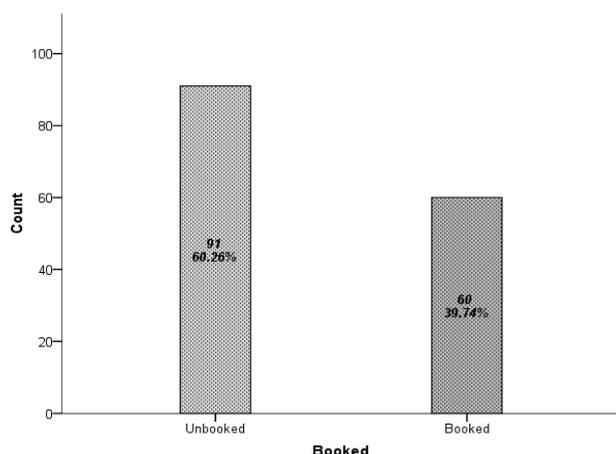
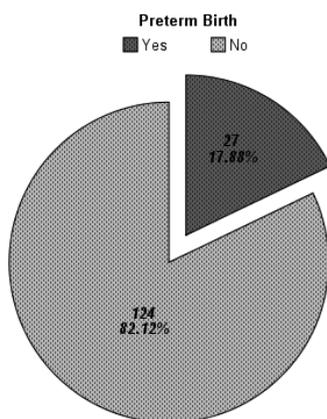


FIGURE-5

Frequency of preterm birth in women with asymptomatic bacteriuria (n=151)



DISCUSSION

Bacteriuria is the second most common bacterial infection seen during pregnancy.¹⁵ Although the prevalence is the same in pregnant and non-pregnant female¹⁶, changes in maternal physiology may alter

the natural course of infection and make pregnant women, more susceptible to grave consequences of UTI.¹⁷ The micro-organisms responsible for urinary tract infections (UTIs) during pregnancy are similar to those in non-pregnant individuals, with *E. coli*, *Klebsiella* and *Enterobacteriaceae* accounting for 90% of UTIs.^{18,19} While first trimester screening and treatment for ASB during pregnancy are considered standard care in developed countries, and the role of specific antimicrobial therapy is well-established²⁰, there is insufficient data from developing countries to assess the impact of antimicrobial treatment for ASB during pregnancy. However, there is substantial evidence indicating that bacteriuria is prevalent in the developing regions of south Asia.^{21,22} To determine the frequency of preterm birth in women with asymptomatic bacteriuria, 151 pregnant ladies of 20-45 years of age, either primipara or multiparous with asymptomatic bacteriuria were enrolled in this research study. The average age of the 151 patients with asymptomatic bacteriuria was 27.95 ± 5.66 years, which is consistent with the study by Bachman²³, which reported a mean age of 28.2 ± 4.5 years for pregnant women. Age and Gravity are strongly correlated, as older women are generally more likely to have had multiple pregnancies compared to younger women. However, In our study out of 151 women 92(60.93%) women were Primiparous and 59(39.09%) were multiparous. Savage et al.²⁴ observed that the prevalence of UTI increases by 1% to 1.5% per decade with age, and that the frequency of UTI is directly related to gravidity. In the study by Savage et al., 10% of the bacteriuric population were grand multigravidas and 20% were primigravida. In our study, 60.2% cases were un-booked. Multiple factors contributor to these pregnant women not accessing available resources, including familial taboos, lack of education, poverty, long distances to health care facility, lack of transportation and attitudes of healthcare providers toward delivering services. According to a demographic survey in Pakistan, 70% of births occurred at home without any antenatal care.²⁵ The incidence of hypertension (HYN) was 16.6, and diabetes was 27.8% in this study. Abayad et al²⁶ reported that asymptomatic bacteriuria is linked to both hypertension & diabetes.

Infection is a significant and common cause of

preterm births. Microbial studies indicate that infections are responsible for approximately 25–40% of all preterm births.²⁷ A strong association exists between asymptomatic bacteriuria (ASB) and preterm birth.²⁸ In our study, the prevalence of preterm birth among women with asymptomatic bacteriuria was 17.88% (27 out of 151). Some studies have reported an association between ASB and preterm labour, as well as fetal and maternal morbidities ($p = 0.02$).^{15,16} However, the study by Verma et al. found no significant association between asymptomatic bacteriuria and preterm delivery (OR=3.231 CI: 1.108, 9.418, $p > 0.05$).²⁹ Tahir et al. also reported no significant adverse perinatal outcomes, including premature delivery associated with ASB ($p > 0.05$).³⁰ John and Michael³¹, reported an odds ratio of 1.6 for the occurrence of premature labour among pregnant women with asymptomatic bacteriuria. Laura et al. (1994)³², also documented that woman with antepartum asymptomatic bacteriuria were at a higher risk of experiencing premature labour (OR= 1.8). Several theories support the scientific plausibility of this association; for example, uterine contractions may be triggered by cytokines and prostaglandins released by microorganisms.³³ Urinary tract infections can directly influence preterm labor through the development of amnionitis.³² Bacterial enzymes, such as collagenase, may compromise the integrity of fetal membranes.³⁴ It has also been suggested that bacterial products, such as phospholipase A and C or endotoxins, may stimulate prostaglandin biosynthesis in the foetal membranes, thereby initiating labour.³⁵

CONCLUSION

We conclude that asymptomatic bacteriuria during pregnancy significantly affects pregnancy outcomes, particularly leading to premature labour. With effective early screening techniques and appropriate treatment of asymptomatic bacteriuria the unnecessary suffering of the pregnant women and their newborns could be effectively reduced and prevented. Based on our findings, we recommend that antenatal care providers emphasize health education on personal hygiene for all pregnant women, particularly those from low socio-economic level. During the first antenatal visit, urine cultures should be performed for high-risk patients, with follow-up cultures conducted as needed. Based

on culture results, pregnant women should receive appropriate antibiotic therapy to prevent maternal-foetal complications.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SOURCE OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Copyright© 09 Sep, 2025.

REFERENCES

1. Kalinderi K, Delkos D, Kalinderis M, Athanasiadis A, Kalogiannidis I. **Urinary tract infection during pregnancy: Current concepts on a common multifaceted problem.** J Obstet Gynaecol. 2018; 38(4):448-53.
2. Elzayat MA, Barnett-Vanes A, Dabour MFF, Cheng F. **Prevalence of undiagnosed asymptomatic bacteriuria and associated risk factors during pregnancy: A cross-sectional study at two tertiary centers in Cairo, Egypt.** BMJ Open. 2017; 7(3):e013198.
3. Ailes EC, Summers AD, Tran EL, Gilboa SM, Arnold KE, Meaney-Delman D. **Antibiotics dispensed to privately insured pregnant women with urinary tract infections - United States, 2014.** MMWR Morb Mortal Wkly Rep. 2018; 67(1):18-22.
4. Emiru T, Beyene G, Tsegaye W, Melaku S. **Associated risk factors of urinary tract infection among pregnant women at Felege Hiwot referral hospital, Bahir Dar, North West Ethiopia.** BMC Res Notes. 2013; 6:292.
5. 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):23-5.
6. Dars S, Malik S, Samreen I, Kazi RA. **Maternal morbidity and perinatal outcome in preterm premature rupture of membranes before 37 weeks gestation.** Pak J Med Sci. 2014; 30(3):626-29.
7. Ryan JG, Dogbey E. **Preterm births: A global health problem.** MCN Am J Matern Child Nurs. 2015; 40(5):278-83.
8. Baig SA, Khan N, Baqai T, Fatima A, Karim SA, Aziz S. **Preterm birth and its associated risk factors. A study at tertiary care hospitals of Karachi, Pakistan.** J Pak Med Assoc. 2013; 63(3):414-8.
9. Verma I, Avasthi K, Berry V. **Urogenital infections as a risk factor for preterm labour: a hospital-based case-control study.** J Obstet Gynaecol India. 2014; 64(4):274-78.
10. Farzaneh F, Mokhtari M, Kalematis E. **Comparison of the frequency asymptomatic bacteriuria in patients with preterm labour and term.** Zahedan J Res Med Sci. 2018; 20(6):e67975.
11. Lockwood CJ. **Predicting premature delivery- no easy task.** N Eng J Med. 2002; 346:282-84.

12. Chhabra S, Patil N. **Study of factors causing and arresting preterm labour.** J Obstet Gynecol India. 2001; 51:99-103.
13. Sheiner E, Mazor-Drey E, Levy A. **Asymptomatic bacteriuria during pregnancy.** J Matern Fetal Neonatal Med. 2009; 22(5):423-7.
14. Verma A, Baheti S, Sharma M. Int J Reprod Contracept Obstet Gynecol. 2016; 5(12):4390-96.
15. Sampson JE, Gravett MG, Other infectious conditions in pregnancy: James DK, Steer PJ, Weiner CP, Govik B eds. **High Risk pregnancy, management options 2nd Edition.** London WB Saunders. 1999; 559-98.
16. Kutlay S, Kutlay B, Karaahmetoglu O, AKC, Erkayas; **Prevalence, detection and treatment of asymptomatic bacteriuria in a Turkish obstetric population:** J Reprod Med. 2003; 48(8):627-30.
17. Bachman JW, Heise RH, Naessens JM, Timmerman MG. **A study of various tests to detect asymptomatic urinary infections in an obstetric population.** JAMA. 1993; 270:1971-4.
18. Perdue BE, Plaisance KI. **Treatment of community acquired urinary tract infections,** Am. Pharm. 1995; 35-7.
19. Gilstrap LC, Faro S. **Urinary tract infections in pregnancy.** In: Infections in pregnancy, 2 ed. New York Wiley-Liss, 1997; 21. 6. Lucas MJ, Cunningham FG. Urinary tract infections during pregnancy. Clin Obstet Gynecol. 1993; 36:855.
20. Colgan R, Nicolle LE, McGlone A, Hooton TM. **Asymptomatic bacteriuria in adults.** American Family Physician. 2006; 74(6):985-90.
21. Khattak MA, Khattak S, Khan H, Ashiq B, Mohammed D, Rafiq M. **Prevalence of asymptomatic bacteriuria in pregnant women.** Pak J Med Sci. 2006; 22:162-6.
22. Ullah AM, Barman A, Siddique MA, Haque AKME. **Prevalence of asymptomatic bacteriuria and its consequences in pregnancy in a rural community of Bangladesh.** Bangladesh Med Res Counc Bull. 2007; 33:60-4.
23. Bachman JW, Heise RH, Naessens JM, Timmerman MG. **A study of various tests to detect asymptomatic urinary tract infections in an obstetric population.** JAMA. 1993; 270(16):1971-4.
24. Savage WE, Hajj SN, Kass EH. **Demographic and prognostic characteristics of bacteriuria in pregnancy.** Medicine (Baltimore) 1967; 46:385-407.
25. Human development report. **United Nations Human Development Program Pakistan.** Human Development Profile. 1991; 86-7.
26. Abyad A. **Screening for asymptomatic bacteriuria in pregnancy urinalysis versus urine culture.** J Fam Pract. 1991; 33(5):471-4.
27. Nageotte MP, Casal D, Senyei AE. **Fetal fibronectin in patients at increased risk for premature birth.** Am J Obstet Gynecol. 1994; 170(1):20-5.
28. Bandyopadhyay S, Thakur JS, Ray P, Kumar R. **High prevalence of bacteriuria in pregnancy and its screening methods in north India.** J Indian Med Assoc. 2005; 103:259-62.
29. Verma A, Baheti S, Sharma M. **Asymptomatic bacteriuria in pregnancy and its relation to perinatal outcome.** Int J Reprod Contracept Obstet Gynecol. 2016; 5(12):4390-6.
30. Tahir S, Tayyab M, Rasul S, Jabeen S, Gul A. **Prevalence of asymptomatic bacteriuria, associated risk factors and adverse fetomaternal outcome among antenatal women attending a tertiary care hospital.** Pak J Med Health Sci. 2015; 9(4):1399-402.
31. John, ED, Michael LL. **Urinary tract infections during pregnancy.** American Family Physician. 2000; 61(3):713-21.
32. Laura AS, Arden H, Ronald H, Victoria P, Faith D. **Urinary tract infection during pregnancy: Its association with maternal morbidity and perinatal outcome.** Am J P H. 1994; 84(3):405-10.
33. Cram LF, Zapata MI, Toy EC, Baker B. **Genito urinary infections and their association with preterm labor.** Am Fam Physicaian. 2002; 65(2):241-8.
34. Cox SM. **Infection induced preterm labor.** In: Gilstrap LC, Faro S, editors. **Infections in pregnancy.** New York: Ny: Alan R liss Inc; 1990; 247-53. J Egypt Public Health Assoc Vol. 2007:82(3-4):218.
35. Romero R, Mazor M. **Infection and preterm labor.** Clin Obstet Gynecol. 1988; 31:553-84.

AUTHORSHIP AND CONTRIBUTION DECLARATION

1	Bhawna Mukesh: Data collection.
2	Falak Naz Baloch: Manuscript writing.
3	Namia Nazir: Data collection.
4	Atrooba Ismail: Data entry.
5	Zakir Ali Punar: Data analysis.
6	Laraib Unar: Final editing.