The Social Sciences 11 (7): 1174-1178, 2016
ISSN: 1818-5800

Prevalence of Asymptomatic Bacteriuria among Pregnant Women Reffarred to Obstetric Clinic in Abadan Taleghani Hospital

[1]Nabi Jomehzadeh, [1]Mohammad Mahboubi, [2]Noorallah Taheri, [1]Sara Kooi,
[1]Maryam Drris, [3]Seyed Mokhtar Hosseini, [4]Mohammad Hossein Haghighizadeh,
[1]Khorshid Paidar and [1]Mahsan moosavi
[1]Abadan School of Medical Sciences, Abadan, Iran
[2]Department of Nursing, [3]Department of Urology, Golestan Hospital,
[4]Department of Bio Statistics, School of Public Health,
Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Abstract: A Symptomatic Bacteriuria (ASB) during pregnancy is amajor risk factor for development of pyelonephritis which is associated with potential obstetrical complications such as preterm labor and low birth weight if unrecognised and untreated. The aim of this study was to determine the prevalence of ASB, associated risk factors and antimicrobial susceptibility of isolated uropathogens among antenatal women. This cross-sectional study was conducted at Obstetric Clinic in Abadan Taleghani hospital between May 2014 and December 2014. Clean catch mid-stream urine specimen were collected from 200 antenatal women and then processed using standard bacteriological methods. We found the prevalence of asymptomatic bacteriuria was 9% among the pregnant women. *Escherichia coli* (55.5%), followed by *Enterobacter cloacae* (22.2%) were detected as the predominant microorganisms. Ciprofloxacin and Ceftriaxon were found to be the most effective antibacterial agent against the isolates in this study. Screening of asymptomatic bacteriuria in pregnancy and convenient treatment must be considered as an indispensable part of antenatal care.

Key words: Asymptomatic Bacteriuria (ASB), susceptibility, specimen, microorganisms, antibacterial

INTRODUCATION

Asymptomatic Bacteriuria (ASB) is defined as an urinary tract infection in which bacteria are present in the urine ($\geq 10^5$ CFU mL^{-1}) but the bacteria are not causing general or local symptoms of urinary infection (Jomezadeh *et al*., 2011; Ade-Ojo *et al*., 2013). In pregnancy, the urinary tract undergoes profound physiological and mechanical changes that provide conditions favourable for microbial growth in urine and facilitate the development of bacteriuria (Marahatta *et al*., 2011; Matuszkiewicz-Rowinska *et al*., 2015). The incidence of asymptomatic bacteriuria in pregnancy is about 2-11% although, there are certain variations in different countries and geographical areas (Nicolle *et al*., 2005; Tolosa, 2008). The most common complications of asymptomatic bacteriuria in pregnant women include intrauterine growth restrictions, prematurity and higher incidence of preterm labour and intrauterine fetal death (Awonuga *et al*., 2011; Thakur *et al*., 2013; Oli *et al*., 2010; Muharram *et al*., 2014). Furthermore, untreated ASB is a risk factor for acute cystitis (40% develop) and pyelonephritis (25-30% develop) in pregnancy (Marahatta *et al*., 2011). Screening for treatment of asymptomatic bacteriuria in pregnancy reduces both the risk acute pyelonephritis in mother and low weight infants, hence early detection is considerably important (Gayathree *et al*., 2010). *Escherichia coli* is the most common agent identified in screening tests which is responsible for 75-90% of asymptomatic bacteriuria during pregnancy (Stapleton, 2005). The easiest way to identify asymptomatic bacteriuria is urine analysis tests. However, quantitative urine culture is the gold standard screening method for diagnosis of ASB during pregnancy (Patterson and Andriole, 1987). Forasmuch as there is no local study on asymptomatic bacteriuria among pregnant women in this region this prospective study was carried out in order to determine the prevalenceof ASB isolate and identify the bacterial etiologic agents and antibacterial susceptibility patterns in pregnant women. In addition, this study can help us to know the prevalence of ASB in pregnant woman in our region for better infection control and treatment in Abadan hospitals.

MATERIALS AND METHODS

Pregnant women not having any symptoms imputable to UTI were consecutively continuallyasked to participate in this research. A total of 200 antenatal women with

Corresponding Author: Mohammad Mahboubi, Abadan School of Medical Sciences, Abadan, Iran

asymptomatic bacteriuria admitted in Obstetric Clinic in Abadan Taleghani hospital in South West of Iran were taken for the study. The antenatal women were explained about the study and informed consent was taken. Clinical and demographic data related to the study such as age, gestational age, educational qualification and profession were obtained and recorded on prepared data collection forms. Exclusive criteria of the pregnant women were: history of urinary symptoms (such as dysuria, hesitancy, frequency and urgency, incontinence, incomplete voiding and suprapubic pain), fever, history of previous antibiotic therapy for any ailment with in past 2 weeks, any chronic illness history such as diabetes mellitus, hypertension, metabolic and liver diseases. Urine specimens were collected by the standard mid-stream urine method in sterile disposable bottles. One drop of well-mixed centrifuged urine was examined underwet preparation procedure to detect the presence of the pus cells, erythrocytes, bacteria and ova. Collected urine samples were cultured on blood agar (Merck, Germany) and Mac Conkey agar (Merck, Germany), using a calibrated loop delivering 0.002 mL of urine. After 24 h of inoculation at 37°C, colonycounts yielding bacterial growth of ≥105 CFU mL^{-1} of pure isolates were interpreted as bacteriuria. The bacteria were identified by colonial morphology, gram staining and biochemical reactions according to standard procedure (Farajzadeh Sheikh *et al*., 2011). Antibiotic sensitivity testing by disc diffusion method (Kirby Bauer's technique) was performed according to the Clinical and Laboratory Standards Institute Guidelines (CLSI, 2010).

RESULTS AND DISCUSSION

Of the total 200 pregnant women without any signs and symptoms of Urinary Tract Infection (UTI) included in the study, 18 (9%) had asymptomatic bacteriuria on urine culture.The dominant isolated organism being *Escherichia coli* (55.5%), followed by *Enterobacter cloacae* (22.2%), *Klebsiella pneumonia* (11.1%), *Proteus mirabilis* (5.5%) and *Citrobacter freundii* (5.5%) (Table1). The antimicrobial susceptibility pattern of organisms cultured from the cases of considerable bacteriuria wasdemonstrated in Table 2. Overall, isolates were sensitive to Ciprofloxacin and Ceftriaxon (100%). The least effective antimicrobial agents were Amoxycillin (5.5%), followed by Cephalothin (16.6%) and Cefalexin (22.2%). The percentage prevalence of ASB with respect to age, gestational age, literacy status and gravidity were also investigated. Two hundred pregnant women that participated in our study were at age 16 to over of 35 years. In the present study, prevalence of 38.9% was recorded in the age group of 21-25 years, 33.3% among 26-30 age groups, 22.2% among 31-35 age groups and 5.5% among >35 years. No relationship was found between prevalence of ASB and patient's age group (p = 0.25). Majority of the bacteriuric women belonged to age group of 21-25 (38.9%). In the study, most cases of asymptomatic bacteriuria were found during 2rd trimester (22.2%) of pregnancy. There was non significant difference in the prevalence of ASB with pregnancy trimester (p = 0.45). From 200 pregnant women only 9 women (50%) had educational level of secondary. majority of the asymptomatic bacteriuric women belonged to primary and secondary education (38.9%, 7/36) and (38.9%, 7/90), respectively. The ASB was no significantly associated among them (p = 0.13). The ASB was in primigravida 55.6%, secondigravida 27.8% and multigravida 16.6%. Majority of ASB was in primigravida, there was no significant difference between them (Table 3).

Pregnant women are predisposed to urinary infections due to profound changes in the urinary tract resulting in urinary stasis and an increased concentration

Table 1: Distribution of culture positive cases according to bacterial isolates.

Microorganism	Total no. of culture positive cases	%
Escherichia coli	10	55.5
Enterobacter cloacae	4	22.2
Klebsiella pneumoniae	2	11.1
Proteus mirabilis	1	5.5
Citrobacter freundii	1	5.5

Table 2: Antimicrobial susceptibility pattern of bacteria from asymptomatic bacteriuria in pregnancy

	Antibiotics (No. (%))									
Uropathogens	AMX	CRO	GM	CP	FM	CN	SXT	CF	AMC	Total
E. coli	0	10 (100)	9 (90)	10 (100)	6 (60)	4 (40)	6(60)	3 30)	8 (80)	10
Enterobacter cloacae	0	4 (100)	4 (100)	4 (100)	2 (50)	0	2 (50)	0	3 (75)	4
Klebsiella pneumoniae	1 (50)	2 (100)	2 (100)	2 (100)	1 (50)	0	0	0	1 (50)	2
Proteus mirabilis	0	1 (100)	1 (100)	1 (100)	0	0	0	0	1 (100)	1
Citrobacter freundii	0	1 (100)	0	1 (100)	0	0	1 (100)	0	1 (100)	1
Total (No. (%))	1 (5.5)	18 (100)	16 (88.8)	18 (100)	9 (50)	4 (22.2)	9 (50)	3 (16.6)	14 (77.7)	18

AMX = Amoxicillin, CP = Ciprofloxacin, SXT = Co-trimoxazole, CRO = Ceftriaxon, CN = Cefalexin, AMC = Amoxicillin clavulinic acid, CF = Cephalothin, FM = Nitrofurantoin, GM = Gentamycin

Table 3: Prevalence of ASB with respect to age, gestational age, literacy status and gravidity

Parameters	Levels	ASB positive (%) N = 18	Total number (%) N = 200	p-values	Odds ratio (95% CI)
Age	16-20	0.0	5 (2.5)		
	21-25	7 (38.9)	48 (24.0)	0.70	0.65 (0.07-5.93)
	26-30	6 (33.3)	86 (43.0)	0.39	2.76 (0.26-29.19)
	30-35	4 (22.2)	50 (25.0)	0.90	1.15 (0.11-11.41)
	>35	1 (5.5)	11 (5.5)	0.25	1
Pregnancy trimester	First	5 (27.8)	34 (17.0)	0.30	0.48 (0.12-1.94)
	Second	9 (50.0)	114 (57.0)	0.96	0.97 (0.28-3.31)
	Third	4 (22.2)	52 (26.0)	0.45	1
Educational status	Unlettered	3 (16.6)	48 (24.0)	0.66	0.6 (0.05-6.07)
	Primary school	7 (38.9)	36 (18.0)	0.10	0.16 (0.01-1.44)
	Secondary education	7 (38.9)	90 (45.0)	0.49	0.47 (0.05-4.04)
	High school diploma	1 (5.6)	22 (11.0)	0.13	1
	University	0.0	4 (2.0)		
Gravidity	Primigravida	10 (55.6)	86 (43.0)	0.53	1
	Secondigravida	5 (27.8)	74 (37.0)	0.29	1.81 (0.59-5.57)
	Multigravida	3 (16.6)	40 (20.0)	0.48	1.62 (0.42-6.25)

of glucose and amino acids in urine. The majority of the urinary infections in pregnancy are caused by normal perineal flora (Cunningham *et al*., 2010). Many of the primary studies on the prevalence of asymptomatic bacteriuria in pregnancy were conducted >20 years ago but some are more recent (Meads, 2010). In this study, significant bacteriuria was found in 9% cases which was similar to other studies (Enayat *et al*., 2008; Imad *et al*., 2010; Kerure *et al*., 2013). Inconsistently, it is lower than that reported by other studies in Adama, Ethiopia (16.1%), Benin City, Nigeria (45.3%) and Uganda (13.1%) (Nisha *et al*., 2015; Andabati and Byamugisha, 2010). This variation of prevalence rates between studies may be explained by the fact that differences in the socioeconomic status such as educational levels, social habits of the community and personal hygiene. *Escherichia coli* was the most predominant uropathogen isolated from antenatal mothers with overall rates of 55.5%. This correlates with findings had been previously reported in Uganda 51.2%, India 54.5%, Nigeria 56.8% and Iran 58.96% (Andabati and Byamugisha, 2010; Dash *et al*., 2013; Chukwu *et al*., 2014; Enayat *et al*., 2008). This reason could be due to urinary stasis because of anatomical and functional changes and poor genital hygiene practices during pregnancy, thus promoting increase the risk of acquiring bacteriuria from *E. coli*. In this present study most of the uropathogens isolated from urine culturs were most susceptible to Ciprofloxacin and Ceftriaxon (100%). Similar susceptiblity pattern was reported from studies conducted by Imade *et al*. (2010) in Benin City, Nigeria. On the other hand, Amoxycillin was found to be least sensitivein our study. This finding is in accordance with previous studies by Ade-Ojo *et al*. (2013) and Dash *et al*. (2013). In the study, most cases of asymptomatic bacteriuria were found during 2nd trimester (22.2%) of pregnancy. These results correlates with other studies such as in one study by Girishbabu *et al*. (2011), most cases of asymptomatic bacteriuria were found during 3rd trimester (40%) of pregnancy. In another study in india in 2013, majority of ASB presented in 2nd and 3rd trimester of pregnancy (61%) and there was no significant difference in the prevalence of ASB with pregnancy trimester in their study (p = 0.09). This agrees with earlier studies (Dash *et al*., 2013). In one study in India, the occurrence of ASB was in dependent of trimester in this study (Oli *et al*., 2010). The results showed, majority of the asymptomatic bacteriuric women belonged to primary and secondary education 38.9 and 38.9%, respectively. In contrast of the study in a study in india in 2013, majority of ASB women belonged to primary level and the ASB was significantly associated among them ($p<0.05$) (Dash *et al*., 2013). In this study all of alternatives that we have checked became non-significant according to Table 3. There was no association between maternal age, gravidity, pregnancy trimester and educational status with bacteriuria in this study. This was in agreement with studies in Tanzania, Sudan and Ethiopia (Emiru *et al*., 2013; Masinde *et al*., 2009; Hamdan *et al*., 2011). In another study in India in 2013, similar to our study showed no significant difference in the prevalence of asymptomatic bacteriuric in pregnant woman (Dash *et al*., 2013). It has been reported that maternal age was risk factor for ASB among pregnant women (Dash *et al*., 2013). In the study, from total 200 pregnant women checked for ASB, 18 were positive for asymptomatic bacteriuria, thus showed a prevalence of 9% (18/200). And prevalence in different studies varied between 8.4-18.2% (Oli *et al*., 2010; Lavanya and Jogalakshni, 2002).

CONCLUSION

In conclusion, the study confirmed the prevalence of ASB pregnant women in Abadan, Iran. Such ASB with different bacteria were isolated from pregnancy women at

Abadanteaching hospital (Taleghani hospital). The most prevalence of ASB in pregnant women was among second trimester of pregnancy and low prevalence of ASB was among third trimester. In addition, the most prevalence of ASB was among primary and secondary educational grades and low prevalence was among high school grades.

ACKNOWLEDGEMENTS

Researchers are sincerely grateful dear colleague, Ms. Atefe Zahedi from Medical University of Abadan, who were responsible for the statistical work of this study.

REFERENCES

Ade-Ojo, I.P., O.A. Oluyege, P.T. Adegun, A.A. Akintayo, O.P. Aduloju and B.A. Olofinbiyi, 2013. Prevalence and antimicrobial suseptibility of asymptomatic significant bacteriuria among new antenatal enrollees in Southwest Nigeria. Int. Res. J. Microbiol., 4: 197-203.

Andabati, G. and J. Byamugisha, 2010. Microbial aetiology and sensitivity of asymptomatic bacteriuria among ante-natal mothers in Mulago hospital, Uganda. Afr. Health Sci., 10: 349-352.

Awonuga, D.O., H.O. Dada-Adegbola, A.O. Fawole, F.A. Olola, O.M. Awonuga and H.O. Onimisi-Smith, 2011. Asymptomatic bacteriuria among an obstetric population in Ibadan. West Afr. J. Med., 30: 89-93.

CLSI., 2010. Performance standards for antimicrobial susceptibility testing; Twentieth informational supplement. Document M100-S20, Clinical and Laboratory Standards Institute, Wayne, PA. USA.

Chukwu, O.S., I.M. Ezeonu, V.M. Agah, M.N. Alo, U. Ugah, J.O. Owolabi and O.O. Olaosebikan, 2014. Incidence, aetiology and antibiotic susceptibility profile of asymptomatic bacteriuria in pregnant women in Nsukka urban, Enugu State, Nigeria. World J. Life Sci. Med. Res., 3: 94-99.

Cunningham, F.G., K.J. Leveno, S.L. Bloom, J.C. Hauth, D. Rouse and C.Y. Spong, 2010. Williams Obstetrics. 23rd Edn., McGraw-Hill, New York, USA., ISBN-13: 9780071497015, Pages: 1404.

Dash, M., S. Sahu, I. Mohanty, M.V. Narasimham, J. Turuk and R. Sahu, 2013. Prevalence, risk factors and antimicrobial resistance of asymptomatic bacteriuria among antenatal women. J. Basic Clin. Reprod. Sci., 2: 92-96.

Emiru, T., G. Beyene, W. Tsegaye and S. Melaku, 2013. Associated risk factors of urinary tract infection among pregnant women at Felege Hiwot Referral hospital, Bahir Dar, North West Ethiopia. BMC Res. Notes, Vol. 6. 10.1186/1756-0500-6-292.

Enayat, K., F. Fariba and N. Bahram, 2008. Asymptomatic bacteriuria among pregnant women referred to outpatient clinics in Sanandaj, Iran. Int. Braz. J. Urol., 34: 699-707.

Farajzadeh Sheikh, A., N. Jomehzadeh, M. Amin and A. Asadi Rad, 2011. Prevalence of asymptomatic bacteriuria in elderly referred to outpatient clinics in Talegani hospital, Abadan, Iran. Jundishapur J. Microbiol., 4: 147-152.

Gayathree, L., S. Shetty, S.R. Deshpande and D.T. Venkatesha, 2010. Screening for asymptomatic bacteriuria in pregnancy: An evaluation of various screening tests in Hassan district hospital, India. J. Clin. Diagn. Res., 4: 2702-2706.

Girishbabu, R.J., R. Srikrishna and S.T. Ramesh, 2011. Asymptomatic bacteriuria in pregnancy. Int. J. Biol. Med. Res., 2: 740-742.

Hamdan, H.Z., A.H.M. Ziad, S.K. Ali and I. Adam, 2011. Epidemiology of urinary tract infections and antibiotics sensitivity among pregnant women at Khartoum North hospital. Ann. Clin. Microbiol. Antimicrob., Vol. 10. 10.1186/1476-0711-10-2

Imade, P.E., P.E. Izekor, N.O. Eghafona, O.I. Enabulele and E. Ophori, 2010. Asymptomatic bacteriuria among pregnant women. N. Am. J. Med. Sci., 2: 263-266.

Jomezadeh, N., A. Farajzadeh, H. Javaherizadeh and M. Torabizadeh, 2011. The prevalence of asymptomatic bacteriuria in infants and children. Pak. Paediatr. J., 35: 13-16.

Kerure, S.B., R. Surpur, S.S. Sagarad and S. Hegadi, 2013. Asymptomatic bacteriuria among pregnant women. Int. J. Reprod. Contracept. Obstetr. Gynecol., 2: 213-216.

Lavanya, S.V. and D. Jogalakshmi, 2002. Asymptomatic bacteriuria in antenatal women. Indian J. Med. Microbiol., 20: 105-106.

Marahatta, R., B.A. Dhungel, P. Pradhan, S.K. Rai and D.R. Choudhury, 2011. Asymptomatic bacteriurea among pregnant women visiting Nepal medical college teaching hospital, Kathmandu, Nepal. Nepal Med. Coll. J., 13: 107-110.

Masinde, A., B. Gumodoka, A. Kilonzo and S.E. Mshana, 2009. Prevalence of urinary tract infection among pregnant women at Bugando Medical Centre, Mwanza, Tanzania. Tanzan. J. Health Res., 11: 154-159.

Matuszkiewicz-Rowinska, J., J. Malyszko and M. Wieliczko, 2015. Urinary tract infections in pregnancy: Old and new unresolved diagnostic and therapeutic problems. Arch. Med. Sci., 11: 67-77.

Meads, C., 2010. Screening for asymptomatic bacteriuria in pregnancy. UK National Screening Committee, UK., pp: 1-15.

Muharram, S.H., S.N.B. Ghazali, H.R. Yaakub and O. Abiola, 2014. A preliminary assessment of asymptomatic bacteriuria of pregnancy in Brunei Darussalam. Malaysian J. Med. Sci., 21: 34-39.

Nicolle, L.E., S. Bradley, R. Colgan, J.C. Rice, A. Schaeffer and T.M. Hooton, 2005. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. Clin. Infect. Dis., 40: 643-654.

Nisha, A.K., A.E. Etana and H. Tesso, 2015. Prevalence of asymptomatic bacteriuria during pregnancy in Adama city, Ethiopia. Int. J. Microbiol. Immunol. Res., 3: 58-63.

Oli, A.N., C.I. Okafor, E.C. Ibezim, C.N. Akujiobi and M.C. Onwunzo, 2010. The prevalence and bacteriology of a symptomatic bacteriuria among antenatal patients in Nnamdi Azikiwe university teaching hospital Nnewi; South Eastern Nigeria. Niger. J. Clin. Pract., 13: 409-412.

Patterson, T.F. and V.T. Andriole, 1987. Bacteriuria in pregnancy. Infect. Dis. Clin. North Am., 1: 807-822.

Stapleton, A., 2005. Novel mechanism of P-fimbriated *Escherichia coli* virulence in pyelonephritis. J. Am. Soc. Nephrol., 16: 3458-3460.

Thakur, A., R. Baral, P. Basnet, R. Rai, A. Agrawal, M.C. Regmi and D.K. Uprety, 2013. Asymptomatic bacteriuria in pregnant women. J. Nepal Med. Assoc., 52: 567-570.

Tolosa, J., 2008. Antibiotics for asymptomatic bacteriuria in pregnancy: RHL commentary (last revised: 14 January 2008). The WHO Reproductive Health Library, WHO, Geneva, Switzerland. http://apps.who.int/rhl/archives/jtcom/en/index.html.