

Asymptomatic Bacteriuria in Ante-Natal Patients Attending State Hospital, Ado-Ekiti , Ekiti State, Nigeria

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Abstract: To evaluate the prevalence, predisposing factors and aetiological agents of asymptomatic bacteriuria in pregnant women attending antenatal clinic at State Hospital, Ado-Ekiti, Ekiti State, Nigeria. One hundred (100) pregnant women were screened. Clean catch midstream urine samples were collected, examined microscopically and cultured. Questionnaires were administered to determine the possible predisposing factors to asymptomatic bacteriuria. 52(52%) out of the 100 women screened were positive for asymptomatic bacteriuria. 6(11.5%) out of these had mixed bacterial growth while 46(88.5%) subjects had one type of bacteria. 36% had non-significant bacterial growth. 12(12%) yielded viable growth of *Candida albicans*. *Staphylococcus aureus* was the predominant bacteria followed by *Escherichia coli*. Pregnant women in their third trimester had the highest prevalence of asymptomatic bacteriuria (60.3%). The age group 30-40 years had the highest prevalence (62.5%). Women with parity range of 1-2 has the highest prevalence rate of 80% while the least 27.3% was found in parity range of 0 (no previous pregnancy) Full time housewives had highest prevalence while Christian pregnant women had higher prevalent rate (66.7%) than their Muslim counterparts (58.1%) Routine screening of the urine of pregnant women for asymptomatic bacteriuria and personal hygiene was emphasized so as to reduce maternal and foetal complications associated with pregnancy.

Key words: Antenatal, asymptomatic bacteriuria, pregnant women, predisposing factors, trimester

INTRODUCTION

Urinary Tract Infection (UTI) can be classified into three disease categories according to the site of infection: cystitis (the bladder), pyelonephritis (the kidney), and bacteriuria (urine). (Akinloye *et al.*, 2006) It is one of the most common medical problems that pregnant women face and can be attributed to the profound physiological and anatomical changes during pregnancy facilitating the development of bacteriuria both symptomatic and asymptomatic in women. (Ulla *et al.*, 2007) Asymptomatic bacteriuria is defined as true bacteriuria in the absence of specific symptoms of an acute UTI and it is the detection of more than 100,000 bacterial/mL in a single voided midstream urine sample (Smaill and Vazquez, 2007). (ASB) is a major risk factor for the development of Urinary Tract Infections (UTIs) during pregnancy accounting for 70% of all cases of symptomatic UTI among unscreened pregnant women (Jones *et al.*, 2009). 20-40% of pregnant patients with asymptomatic bacteriuria if left untreated, will eventually develop pyelonephritis later in their pregnancy (Hill *et al.*, 2005) Urinary tract infection can be caused by numerous bacteria such as *Escherichia coli* and *Staphylococcus aureus* Variation in occurrence and prevalence of ASB

may be attributed to several factors such the geographical, socioeconomic status, ethnicity of subjects and setting of the study among other factors (Al Sibiani, 2010). Screening of pregnant women for the presence of bacteria in their urine is necessary so as to commence prompt treatment and avoid complication, Knowledge of factors that can encourage bacteriuria is also necessary to reduce the prevalence of this disease. This study was therefore undertaken to evaluate the prevalence of asymptomatic bacteriuria in pregnant women, its causative agents and to ascertain factors that predispose these women to bacteriuria

MATERIALS AND METHODS

Study area: This study was carried out in Ado-Ekiti, in the state of Ekiti. Southwest Nigeria, Ekiti state covers 6,353 km². The State Hospital (upgraded to a University Teaching Hospital in 2008) is located in the state capital, Ado-Ekiti The study covered a period of 5 months from April to August, 2007.

Study population: One hundred (100) pregnant women attending the ante-natal clinic of State Hospital, Ado-Ekiti, Ekiti State, Nigeria were used for this study.

The women were informed about the study and its purpose and encouraged to participate voluntarily.

Specimen collection: Clean catch mid-stream urine was collected from each patient into a sterile universal bottle, well labeled for identification. Samples were brought to the laboratory not more than an hour after collection. All necessary information such as name, age, religion, occupation, parity and stages of pregnancy were collected through the administration of a standardized questionnaire to the patients. When not treated immediately samples were refrigerated between 4 and 8°C and treated within an hour. Refrigerated samples were allowed to attain room temperature before they were processed

Isolation and identification of isolates: Culturing was done on blood agar and MacConkey agar (oxid) by a semi-quantitative method using a wire loop designed to deliver 0.01 ml of urine. Plates were incubated aerobically at 37°C for 24 h. Colony counts of bacteria growth of 10⁵/mL or more of pure isolates were regarded as significant for asymptomatic bacteriuria.

Colonial appearances of organisms such as shape, colour, size and consistency were noted, biochemical identification and characterization of organisms isolated were carried out by using Gram Staining, catalase test, motility test, coagulase test, oxidase test, indole test, Voges Proskauer test, methyl red and fermentation tests as described by Cheesbrough (1985).

Microscopy: Ten milliliter (10 ml) of each patient's urine was transferred into sterile centrifuge tubes and centrifuged at 3000 rpm for 15 min. The supernatant was discarded and the deposit examined microscopically at high magnification for the cellular and non cellular components such as blood cells, epithelial cells, casts, crystals, yeast-like cells and *Trichomonas vaginalis*. Pus cells >5 per high power field were also considered significant for infection.

RESULTS

Out of the 100 pregnant women screened in this study 52 had asymptomatic bacteriuria giving a percentage of 52%. 6(11.5%) out of these 52 had mixed bacteria growth while 46(88.5%) subjects out of these 52 had one type of bacteria. 36% had non-significant bacterial growth. 12(12%) yielded viable growth of *Candida albicans*.

The predominant organisms isolated were *Staphylococcus aureus* (42.2%), followed by *Escherichia coli* (26.6%), *Candida albicans* (18.8%), *Pseudomonas* species (6.2%), *Klebsiella* species (3.1%) and *Proteus* species (3.1%) (Table 1).

Table 1: Prevalence of uropathogens in pregnant women at State Hospital, Ado-Ekiti

Isolates	Number of patients	Percentage (%)
<i>Staphylococcus aureus</i>	27	42.2
<i>Escherichia coli</i>	17	26.6
<i>Candida albicans</i>	12	18.8
<i>Pseudomonas</i> spp	4	6.2
<i>Klebsiella</i> spp	2	3.1
<i>Proteus</i> spp	2	3.1
Total	64	100

Table 2: Prevalence rate with respect to trimester in pregnant women at State Hospital, Ado-Ekiti

Pregnancy	Number examined	Number showing significant bacteriuria	Percentage (%)
1 st Trimester	20	10	50.0
2 nd Trimester	27	10	37.0
3 rd Trimester	53	32	60.3
Total	100	52	

Table 3: Summary of prevalence rate with respect to age, parity, occupation and family planning method

Demographic factors	Number examined	Number showing significant bacteriuria	Percentage (%)
Age range			
15-20	12	4	33.3
21-29	40	18	45.0
30-40	48	30	62.5
Occupation			
Full time housewives	7	7	100.0
Traders	21	15	71.4
Civil servants	45	22	48.8
Students	17	7	41.2
Self employed	10	1	10.0
Parity			
0	11	2	18.2
1-2	40	30	75.0
3-4	33	18	54.4
5 and above	16	2	12.5
Family planning method			
Condom	1	1	100
Oclusive cap	-	-	-
Diaphragm	1	0	0
Intra-uterine devices	-	-	-
Injection	2	2	100
Pills	-	-	-
Religion			
Christian	69	46	66.7
Muslim	31	18	58.1

Investigation of the effect of gestation age on the prevalence of bacteriuria in pregnant women in this study showed that women at the 3rd trimester had the highest prevalence of 60.3% followed by those at 1st trimester (50%) and least in those at the 2nd trimester (37%) (Table 2).

The summary of the percentage prevalence of asymptomatic bacteriuria with respect to age, parity, occupation, family planning method and religion practices is presented in Table 3. There was a significant difference in the prevalence of bacteriuria with respect to age group.

Age range 30-40 had the highest percentage of bacteriuria in pregnant women. Women with parity range of 1-2 had the highest prevalence rate of 80% followed by those with parity range 3-4 (63.6%), parity range of 5 and above 50.6% and parity range of 0 (no previous pregnancy) 27.3% respectively. Based on occupation and level of education, full time housewives with little or no education had the highest prevalence of 100% of asymptomatic bacteriuria followed by traders and hawkers (71.4%), civil servant (48.8%), students (41.2%) and self employed e.g. hairdressers, tailors (10.0%) respectively. It was discovered many of the pregnant women attending State Hospital Ado-Ekiti in Nigeria had not adopted any method of family planning. Out of the 100 women sampled, only four had adopted a method of family planning. The two women who had used condom as a source of contraceptive show a high prevalence rate of 100%. Religious practices was found to have effect on the prevalence of bacteriuria in pregnant women, Christian pregnant women had higher prevalence rate (66.7%) than Muslim counterparts (58.1%).

DISCUSSION

The prevalence of asymptomatic bacteriuria in pregnant women attending all antenatal clinic in State Hospital Ado-Ekiti as reported in this study (52%) is higher than that reported by some studies in Nigeria (Olusanya *et al.*, 1993; Akinloye *et al.*, 2006; Imade *et al.*, 2010) and 7.3% reported in Ghana (Turpin *et al.*, 2007). However, it is lower than the 78.7% reported in Abakaliki, Nigeria (Amadi *et al.*, 2007) and 86.6% reported in Benin City, Nigeria (Akerele *et al.*, 2001).

The predominance of *Staphylococcus aureus* as discovered in this study was corroborated by other researchers (Olusanya *et al.*, 1993; Akinloye *et al.*, 2006; Imade *et al.*, 2010). However other studies reported *E. coli* as the predominant organism causing bacteriuria in pregnant women (Okonko *et al.*, 2009; Daniyan *et al.*, 2010; Imade *et al.*, 2010). These findings vary between different countries and had changed from time to time (Shigemura *et al.*, 2006) and can also be attributed to factors such as geographical variation, socioeconomic status, ethnicity of subjects and setting of the study among other factors (Al Sibiani, 2010).

The prevalence of *Candida albicans* was lower than the 19.9% reported in Jeddah (Al Sibiani, 2010) but higher than the 7.9% reported by (Akinloye *et al.*, 2006) in Nigeria. While that of the mixed bacterial growth observed in this study was lower than that reported by other researchers (Al Sibiani, 2010; Amadi *et al.*, 2007) but is also an indication of increased risk for both pregnant women and fetuses.

The highest rate of bacteriuria at the 3rd trimester can be attributed to the frequency of micturation by the pregnant women at this period. This finding agreed with other works (Amadi *et al.*, 2007; Lindsay, 1998). According to Ciragil *et al.* (2005), increased in the lipid peroxidation level during pregnancy causes an increased in UTI at the 1st and 3rd trimester. This agreed with the findings reported by other authors (Amadi *et al.*, 2007; Imade *et al.*, 2010).

Advanced maternal age (>/35 years) has been reported as risk factors in asymptomatic bacteriuria in pregnancy (Akinloye *et al.*, 2006). The highest prevalence rate of 80% of women with parity range 1-2 followed by those with parity range 3-4 (63.6%), parity 5 and above (50.6%) is in agreement with a similar report, in which significant growth was observed in the multiparous (parity range 2-5) followed by the grand multiparous (>5) while the least growth was observed in the nulliparous group (0) (Al Sibiani, 2010).

There was a correlation between the result obtained in this parity group and that obtained in the different age groups. The result obtained in the parity group can be linked to that obtained in the age groups. Women in the age group 30-40 are likely to have had more than one child before the present pregnancy hence can fall into the parity group (1-4). It has also been reported that multiparity is a risk factor for acquiring asymptomatic bacteriuria in pregnancy (Akinloye *et al.*, 2006).

It has been reported that pregnant women with little or no education and low socioeconomic status have high prevalence of asymptomatic bacteriuria (Olusanya *et al.*, 1993; Amadi *et al.*, 2007). This could be attributed to the 100% prevalence found in fulltime housewives and the 71.4% in traders, the nature of the work those engaged in trading and hawking, may be a factor that place them in the category of women with multiple sexual partners and waiting too long to urinate thus increasing their chances of having urinary tract infection (Comforth, 2006).

It was discovered many of the pregnant women attending State Hospital Ado-Ekiti in Nigeria had not adopted any method of family planning. Out of the 100 women sampled, only four had adopted a method of family planning. The two women who had used condom as a source of contraceptive show a high prevalence rate of 100%. According to MCW Health link (1999), women whose partners use condom with spermicidal foam tend to have growth of *E. coli* on their vaginas.

Religious practices was found to have effect on the prevalence of bacteriuria in pregnant women and the lower level of bacteriuria in Muslim pregnant women may be linked to religious practices which lay emphasis on good body hygiene practices which involve washing and cleaning of private parts with water before prayers (carried out at least five times daily) and after each urination.

CONCLUSION

This study revealed 52% prevalence of asymptomatic bacteriuria among pregnant women and *Staphylococcus aureus* as the predominant causative organism. This prevalence is higher than that reported by some studies in Nigeria and other countries thus a major risk factor for the development of Urinary Tract Infections (UTIs) during pregnancy which may result to serious complications for mother and fetus. Trimester, age, parity, occupation, family planning method and religion practices were found to have effect on the prevalence of asymptomatic bacteriuria. Based on the findings of this study, there is a need for routine screening of urine of pregnant women for asymptomatic bacteriuria at antenatal clinics. Women attending these clinic should also be educated on factors that can predispose them to bacteriuria and UTIs and how and what to do to prevent these infections.

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REFERENCES

- Akerele, J., P. Abbulimen and F. Okonofua, 2001. Prevalence of asymptomatic bacteriuria among pregnant women in Benin City. Nigeria J. Obstet. Gynaecol., 21: 141-144.
- Akinloye, O., D.O. Ogbolu, O.M. Akinloye and A.O. Terry, 2006. Asymptomatic bacteriuria of pregnancy in Ibadan, Nigeria: A re-assessment. Br. J. Biomed. Sci., 63(3): 109-112.
- Al Sibiani, S.A., 2010. Asymptomatic bacteriuria in pregnant women in Jeddah, Western Region of Saudi Arabia: Call for assessment. JKAU Med. Sci., 17(1): 29-42.
- Amadi, E.S., O.B. Enemu, C.J. Uneke, O.K. Nwosu, R.A. Onyeagba and O.C. Ugbogu, 2007. Asymptomatic bacteriuria among pregnant women in Abakaliki, Ebonyi State. Nigeri. J. Med. Sci., 7: 698-700.
- Cheesbrough, M., 1985. Collection, Transport and Examination of Specimen Medical Laboratory Manual for Tropical Countries Tropical Health Technology and Butter Worths. Great Britain at the University Press, Cambridge, pp: 148-149, 226-227, 394-395.
- Ciragil, P., E.B. Kurutas, M. Gul, M. Aral and A. Guven, 2005. The Effect of Oxidative Stress in Uti During Pregnancy. Retrieved from: <http://www.pubmed.gov>.
- Comforth, T., 2006. Urinary Tract Infection Retrieved from: <http://www.about.com/womenhealth>.
- Daniyan, S.Y., A. Dangana and M.E. Abalaka, 2010. Incidence of asymptomatic bacteriuria in ante-natal patients attending general hospital, Minna, Niger State. J. Int., Libyan Agriculture Research Centre. 1(2): 100-102.
- Hill, J.B., J.S. Sheffield, D.D. Mcintire and G.D. Wendel, 2005. Pyelonephritis. Obstet Gynaecol., 105: 18-23.
- Imade, P.E., P.E. Izekor, N.O. Eghafona, O.I. Enabulele and E. Ophori, 2010. Asymptomatic bacteriuria among pregnant women. North Am. J. Med. Sci., 2: 263-266.
- Jones, L.A., P.J. Woodman and H.E. Ruiz, 2009. Urinary Tract Infections in Pregnancy; Medicine 9. Retrieved from: <http://emedicine.medscape.com/article/452604-overview>.
- Lindsay, E.N., 1998. Screening for asymptomatic bacteriuria in pregnancy. Can. Guide Clin. Prevent. Health Care, 1: 100-106.
- MCW Health Link, 1999. Risk for Urinary Tract Infection (UTI). Retrieved from: <http://www.healthlink.mcw.edu/article/943045175.html>.
- Okonko, I.O., O.B. Donbraye-Emmanuel, L.A. Ijandipe, A.A. Ogun, A.O. Adedeji and A.O. Uteze, 2009. Antibiotics sensitivity and resistance patterns of uropathogens to nitfurantoin and nalidixic acid in pregnant women with urinary tract infectious in Ibadan, Nigeria. Middle-East J. Scient. Res., 4(2): 105-109.
- Olusanya, O., Ogunledun and T.A. Fakoya, 1993. Asymptomatic significant bacteriuria among pregnant and non pregnant women in Sagamu, Nigeria West Afr. J. Med., 12: 27-33.
- Smaill, F. and J.C. Vazquez, 2007. Antibiotics for asymptomatic bacteriuria in pregnancy Cochrane. Database Syst. Rev., 18(2): CDOO490.
- Turpin, C.A., B. Minkah, K.A. Danso and E.H. Frimpong, 2007. Asymptomatic bacteriuria in pregnant women attending antenatal clinic at Konifo Anokye Teaching Hospital, Kumasi, Ghana. Ghana Med. J., 41(1): 26-29.
- Ulla, M.A., A. Barman, M.A. Siddique and A.K.M.E. Haque, 2007. Prevalence of asymptomatic bacteriuria and its consequences in pregnancy in a rural community of Bangladesh. Bangladesh Med. Res. Counc. Bull., 33: 60-64.
- Shigemura, K., S. Arakawa, Y. Sakai, S. Kinashita, K. Tanaka and M. Fujisawa, 2006. Complicated urinary tract infection caused by *Pseudomonas aeruginosa*, in a single institution. Int. J. Urol., 13: 538-542.