



Original Research Article

Associated Risk Factors of Asymptomatic Urinary Tract Infection among Pregnant Women Attending Antenatal Care in a Secondary Health Care Facility in a South – South Nigerian City

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A B S T R A C T

Urinary tract infection is a frequent cause of admissions in hospital during pregnancy. This is due to the several physiological, anatomical and personal factors in women especially during pregnancy, contributory to this problem. The infection is caused by the presence of micro-organisms in the urinary tract and pregnant women are at risk of infections beginning from 6 weeks of gestation and this may be associated with an increase in neonatal mortality. There are however universally known risk factors linked with the infection during pregnancy. There is therefore the need to find out how these may apply locally in our environment. The objective was to determine the prevalence and risk factors associated with urinary tract infection in pregnant women seen at the antenatal care clinic in a secondary health care facility in Uyo, a South – South Nigerian city. Three hundred urine specimens from pregnant women not on any antibiotics therapy and willing to participate were included in the study. All urine samples were cultured using the calibrated loop technique and incubated at 37°C for 24 hours. Colony counts yielding bacterial growth of 10⁵/ml of urine were regarded as significant for bacteriuria and further analysed biochemically using Microbact 24E (MB24E). A pre- tested questionnaire was used to obtain socio-demographic data from the pregnant women and data obtained was analysed statistically using chi square to determine the relationship between the variables and its significance. The total number of bacterial isolates from 300 cultured urine samples was 80 (26.7%) and the most prevalent bacterial isolate was *Escherichia coli* (40%). The pregnant women within the age group 25–34 had the highest number of isolates with 45(56.6%) while majority of the women 61 (76%) with primary education only, were affected. As regards occupation, gestational age and parity of women, the lowest rate of infection (10%) was gotten from women who were housewives with no intention of working. Pregnant women in their second trimester had more UTI (80%) and 57 out of the 100 multiparous women with parity of 2-3 had more infections. Nonetheless, there was no statistically significant between the women's age, occupation, gestational age, parity and frequency of urinary tract infections during pregnancy. Also the 281 pregnant women with history of UTI in their previous pregnancies were found to have 92% infection rate though no significant association between UTI and this risk factor also. This study however revealed significant association between sexual activity, poor personal hygiene, pains in the loins, previous use of contraceptive, catheterization and UTI during pregnancy. Pregnant women with previous history of catheterization, pains in the loins, poor personal hygiene, sexual activity and previous use of contraceptive are more likely to have UTI during pregnancy than others.

Keywords

Antenatal care,
Bacterial
isolates,
Risk factors,
Significant
bacteriuria,
Urinary tract
infection

Introduction

Urinary tract infection (UTI) is known to be the single most common bacterial infection of mankind (Theodor, 2007). Apart from other several factors peculiar to the female gender, the short urethra and its proximity to the anus in women, during pregnancy, vaginal secretion is much more increased and is a medium for bacterial growth. Also, due to increased progesterone activity, the glucose level of the vagina is increased which aids bacterial growth (Cunningham, and Lucas, 1993; Saidi *et al.*, 2005).

Pregnant women are at risk of infections beginning from 6 weeks of gestation and peaks at weeks 22 to 24 (John and Michael, 2000). The three clinical manifestations of UTIs in pregnancy are asymptomatic bacteriuria, acute cystitis and pyelonephritis (Loh and Silvalingam, 2007). Many different organisms can infect the urinary tract, but by far the most common agents are the gram-negative bacilli (Braunwald *et al.*, 2001; Wilson and Gaido, 2004). The gram negative bacilli are *Escherichia coli*, *Klebsiella spp*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Acinetobacter spp*, *Citrobacter spp*, *Enterobacter* and *Serratia spp* as the case may be.

The risk of asymptomatic bacteriuria, a form of UTI increases with increasing parity, lower socioeconomic status, increasing age, sexual activity, sickle cell trait or disease, diabetes and previous UTI. Others include gestational age and level of education, previous history of catheterization, pains in the loins, personal hygiene, use of contraceptive and previous use of third generation Cephalosporin (Glistrap and Ramin, 2001; Moges *et al.*, 2002; Vardi *et al.*, 2012; Alemu *et al.*, 2012).

Complications such as abortion, small birth

size, maternal anaemia, hypertension, preterm labour, phlebitis, thrombosis, and chronic pyelonephritis may complicate urinary tract infection during pregnancy (Akere *et al.*, 2002; Onuh *et al.*, 2006).

Materials and Methods

The study was carried out over a period of six months on urine samples from 300 pregnant women attending antenatal clinic at the only well attended Secondary Health care facility in Uyo, Akwa Ibom State, Nigeria following ethical approval by the institution. All pregnant women not on any antibiotics therapy and willing to participate were included in the study while those on any antibiotic therapy were excluded from the study.

Mid stream clean-catch urine samples were collected and inoculated on MacConkey and blood agars and incubated at 37°C for 24 hours. They were examined for growth and colony counts yielding bacterial growth of 10⁵/ml of urine were taken to be significant. Following Gram stain, the bacterial isolates were further identified biochemically using Microbact 24E (MB24E).

A well structured pretested questionnaire self administered or by the aid of an interviewer according the educational level of the participants was used to obtain their socio-demographic data. The data obtained was analysed statistically using chi square to determine the relationship between the variables and their significance.

Results and Discussion

The total number of bacterial isolates from cultured urine samples is 80 and the most prevalent bacterial isolate is *Escherichia coli*, as shown on figure 1. The distribution of the bacterial isolates according to the age,

marital status, educational and occupation levels of women is shown on figure 2, tables 1, 2 and 3 respectively. Pregnant women in their second trimester of pregnancy have the highest rate of bacterial isolates (80%) and therefore are more infected (Table 4). The parity of these women as regards infections reveals lowest and highest rates of infection at parity 0–1 and 2–3 respectively (Table 5). Higher percentages of bacterial isolates and UTI are recorded in sexually active pregnant women (26.7%), past history of UTI (92%), previous use of contraceptive (77%), history of catheterization (69%), reduced personal hygiene (37%) and presence of loin pain (67%) (Tables 6–9 and figures 3 and 4).

The prevalence of urinary tract infection from this study was 26.7% and of Gram negative bacterial origin. This is in conformity with similar studies carried out in Nigeria and some African countries as regards the bacterial isolates but differed in the prevalence as higher rates of urinary

gram negative bacterial isolates of 61.1%, 51.0%, 67.5% and 61.9% were reported in Bayelsa state, Rivers state, Ethiopia and Tanzania respectively (Sabrina *et al.*, 2010; Pondei *et al.*, 2012). The reason for this difference may not be unconnected with the increased health awareness created by government and nongovernmental organizations. The uropathogen *Escherichia coli* (40%) predominated over *Klebsiella* spp. (31%) in this study as in some other studies (Okonko *et al.*, 2009; Ebie *et al.*, 2001; Sabharwal, 2012). However this result is in contrary to the findings from some states in Nigeria which showed *Klebsiella* spp. to be more prevalent than *E. coli* (Omonigho *et al.*, 2001). The anatomical proximity of the genito-urinary system to the anal region (Obiogbolu *et al.*, 2009) and the increased concentration of amino acids and lactose during pregnancy which encourages the growth of *E. coli* (Weatheral *et al.*, 1988) may have also contributed.

Table.1 Distribution of bacterial isolates in relation to marital status

Marital Status	No. of samples (%)	No. of isolates (%)
Single	0 (0)	0 (0)
Married	300 (100)	80 (100)
Separated	0 (0)	0 (0)
Divorced	0 (0)	0 (0)
Total	300(100)	80 (100)

Table.2 Distribution of bacterial isolates in relation to educational levels of women

Educational status	No. of samples (%)	No. of isolates (%)
No formal education	0 (0)	0 (0)
Primary	150 (50.0)	61 (76)
Secondary	100 (33.3)	19 (24)
Higher learning	50 (16.7)	0 (0)
Total	300(100)	80 (100)

Table.3 Bacterial isolates in relation to occupation

Occupation	No. of samples (%)	No. of isolates (%)
No employment	15 (5)	10 (12.5)
Housewife	10 (3.3)	8 (10)
Employed	50 (16.7)	45 (56.2)
Business	225 (75)	17 (21.3)
Total	300 (100)	80 (100)

Table.4 Distribution of bacterial isolates in relation to gestational age

Gestational age	No. of samples (%)	No. of isolates (%)
1 st Trimester	80 (26.7)	6 (7.5)
2 nd Trimester	120 (40)	64 (80)
3 rd Trimester	100 (33.3)	10 (12.5)
Total	300(100)	80 (100)

P<0.005.

Table.5 Distribution of bacterial isolates in relation to parity

Parity	No. of samples (%)	No. of isolates (%)
0-1	50 (16.7)	10 (12)
2-3	100 (33.3)	57 (73)
>4	150 (50)	13 (16)
Total	300 (100)	80 (100)

p>0.005

Table.6 Distribution of bacterial isolates in relation to sexual activity

Sexual activity	No. of samples (%)	No. of isolates (%)
Active	300 (100)	80 (26.7)
Non-active	0(0)	0 (0)
Total	300(100)	80 (26.7)

p<0.005

Table.7 Distribution of bacterial isolates in relation to past history of UTI

Past history of UTI	No. of samples (%)	No. of isolates (%)
Present	281 (93.7)	73 (92)
Absent	19 (6.3)	7 (8)
Total	300(100)	80 (100)

p>0.005

Table.8 Distribution of bacterial isolates in relation to previous use of contraceptive

Previous use of contraceptive	No. of samples (%)	No. of isolates (%)
Yes	195 (65)	61 (77.0)
No	105 (35)	19 (23.0)
Total	300(100)	80 (100)

p< 0.005

Table.9 Distribution of bacterial isolates according to history of catheterization

History of catheterization	No. of samples (%)	No. of isolates (%)
Yes	47 (15.7)	55 (69)
No	253 (84.3)	25 (31)
Total	300(100)	80 (100)

p< 0.005

Figure.1 Frequency of bacterial isolates

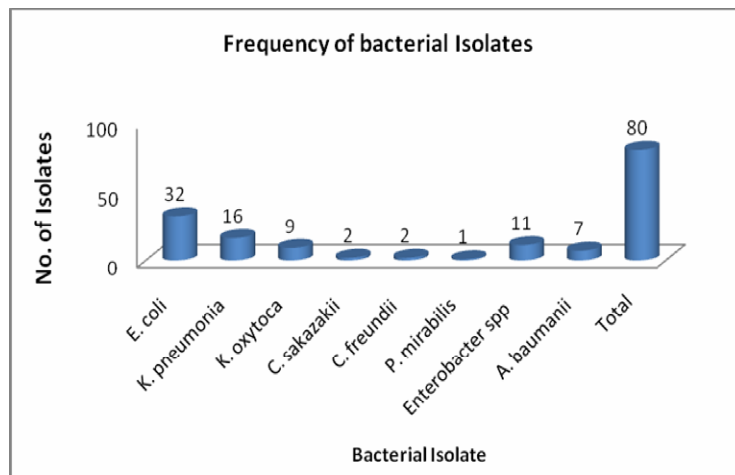


Figure.2 Bacterial isolates in relation to age of pregnant women

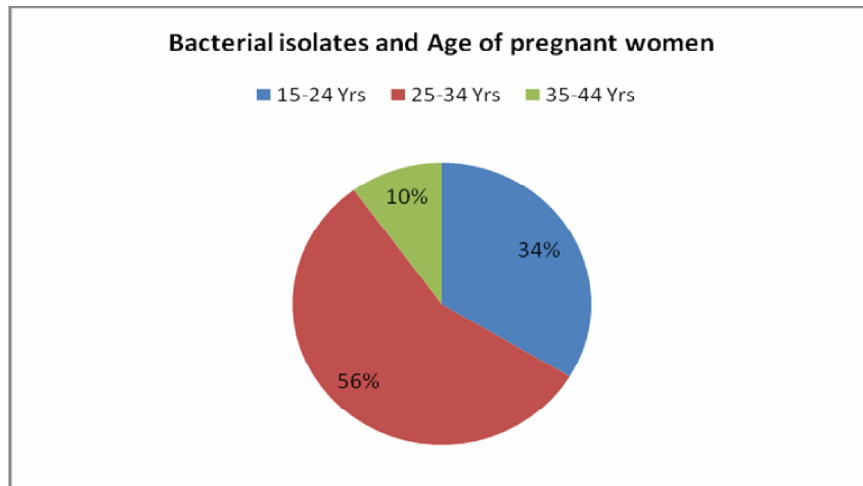
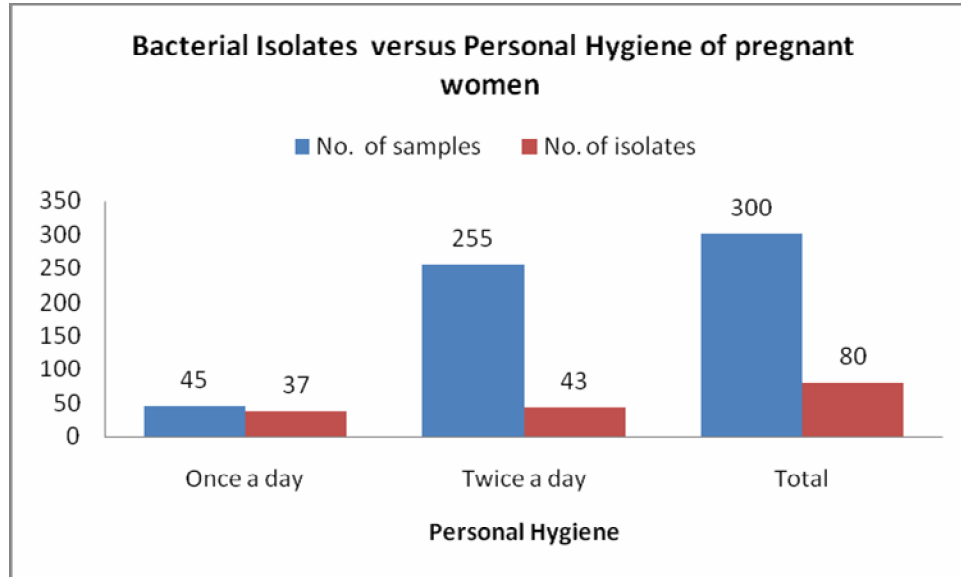
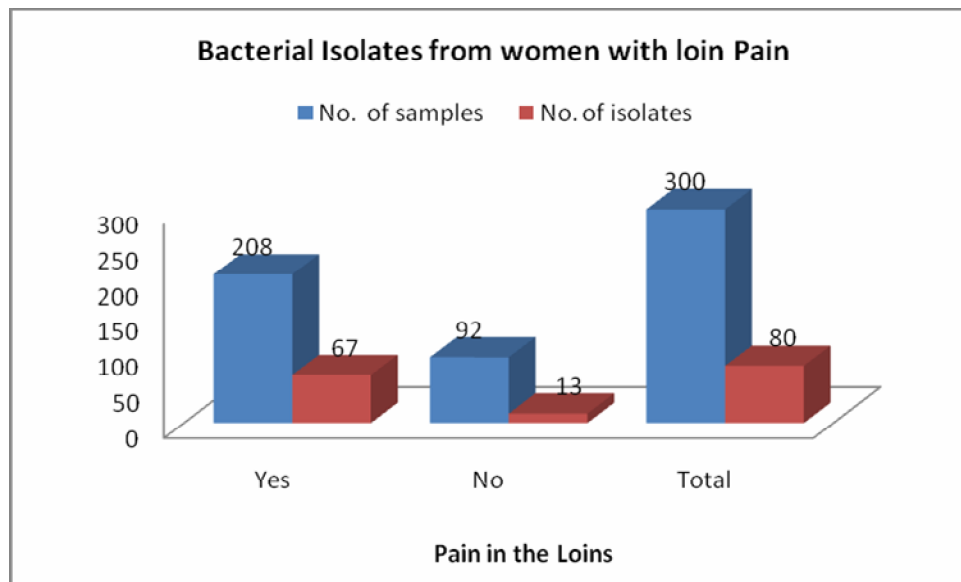


Figure.3 Bacterial isolates in relation to personal hygiene of pregnant women



p < 0.005

Figure.4 Bacterial isolates in relation to history of pain in the loin



p < 0.005

Risk factors such as maternal age, gestational age and level of education are known to contribute to UTI in pregnant women (Glistrap and Ramin, 2001; Moges *et al.*, 2002; Haider *et al.*, 2010). There was however no significant association between

these factors and bacteriuria from this study as reported elsewhere (Masinde *et al.*, 2009). Occupation and parity of pregnant women have been reported as significant risk factors of UTI by some studies (Masinde *et al.*, 2009; Hamdan *et al.*, 2011).

However, this was not revealed by this study as the higher bacterial isolates observed in pregnant women who are on paid employment (56.2%) and those who had 2–3 deliveries (73%) has no statistical significant relationship with UTI.

The prevalence of Urinary tract infection in pregnant women with previous history of catheterization was significantly higher than those without previous history of catheterization ($p= 0.001$) this findings agrees with some study report (Vardi *et al.*, 2012; Akere *et al.*, 2002). This could be so because catheterization is an invasive procedure and can lead to the introduction of bacterial organism to the bladder. There were also significant associations between pains in the loins, poor personal hygiene as ascertained by number of baths taken per day, previous use of contraceptive and UTI. Similar findings have been reported elsewhere (Alemu *et al.*, 2012; Akere *et al.*, 2002).

Pregnant women with previous history of catheterization, pains in the loins, poor personal hygiene, sexual activity and previous use of contraceptive are more likely to have UTI during pregnancy than others. It is there important for Obstetricians and Health educators to educate these women on these risk factors to prevent the health implications of UTI.

References

- Akere, J., Abhlimen, P., Okonofua, F. 2002. Prevalence of asymptomatic bacteriuria among pregnant women in Benin City. *Niger. Br. J. Obstet. Gynaecol.*, 221(2): 141–144.
- Alemu, A.T., Moges, S.W., Shiferaw, S.T., Tafess, S.T., Kassu, T.S., Anagaw, S.V., Agegn, G.S. 2012. Recent development in the diagnosis and treatment of urinary tract infections. *Niger. Br. J. Obstet. Gynaecol.*, 11(12): 23–30.
- Braunwald, E., Fauci, A.S., Kasper, D.L., Hauser, S.L., Longo, D.L., Jameson, J.L. 2001. Principles of internal medicine, 15th edn, Mc Graw-Hill, New York. Pp. 1620–25.
- Cunningham, F.G., Lucas, M.J. 1993. Urinary tract infection in pregnancy. *Clin. Obset. Gynaecol.*, 36: 555–568.
- Ebie, M.Y., Kandakal-Olu Y.T., Ayanbadejo, A., Tanyigna, K.B. 2001. Urinary tract infections in a Nigerian Military Hospital. *Nig. J. Microbiol.*, 115(1): 31–37.
- Glistrap, L.C., Ramin, S.M. 2001. Urinary tract infections in pregnancy. *Obstet. Gynecol. Clin. North Am.*, 28(3): 581–589.
- Haider, G., Zehra, N., Munir, A.A., Aaidar, A. 2010. Risk factors for urinary tract infection in pregnancy. *J. Pak. Med. Assoc.*, 60: 213–216.
- Hamdan, Z., Haliem, A.Z., Ali Salah, K., Adam, I. 2011. Epidemiology of urinary tract infections and antibiotic sensitivity among pregnant women at Khartoum North Hospital. *Ann. Clin. Microbiol. Antimicrob.*, 10: 2–5.
- John, E.D., Michael, L.L. 2000. Urinary tract infections during pregnancy. *Am. Family Phys.*, 61(3): 713–21.
- Loh, K.Y., Silvalingam, N. 2007. Urinary tract infections in pregnancy. *Malaysian Family Phys.*, 2(2): 54–57.
- Masinde, A., Gumodoka, B., Kilon, B., Kilonzo, A., Mshana, S.E. 2009. Prevalence of urinary infection among pregnant women at Bugando Medical Centre, Mwanza. *Tanzan J. Health Res.*, 11: 154–159.
- Moges, F., Mengistus, G., Genetu, A. 2002. Multiple drug resistance in urinary

- pathogens at Gondar College of Medical Science, Ethiopia. *East Afr. Med. J.*, 79: 415–419.
- Obiogbolu, C.H., Okonko, I.O., Anyamere, C.O., Adedeji, A.O. Akanbi, A.O., Ogun, A.A., Ejembi, J., Faley, T.O.C. 2009. Incidence of Urinary Tract Infections (UTIs) among pregnant women in Akwa metropolis, South Eastern Nigeria. *Sci. Res. Essay*, 4(8): 820–824.
- Okonko, I.O., Ijandipe, L.A., Illusanya, A.O., Udeze, A.O. 2009. Incidence of urinary tract infection among pregnant women in Ibadan, South Western Nigeria. *Afr. J. Biotechnol.*, 8: 6649–57.
- Omonigho, S.E., Obasi, E.E., Akokolia, R.N. 2001. Invitro resistance of urinary tract isolates of *E. coli* and *Klebsiella* species to nalidixic acid. *Niger. J. Microbiol.*, 15(1): 25–29.
- Onuh, S.O., Umeora, O.U.J., Igberase, G., Azikem, M.E., Okpere, E.E. 2006. Microbiological isolates and sensitivity pattern of urinary tract infection in pregnancy in Benin City, Nigeria. *Ebonyi Med. J.*, 5(2): 48–52.
- Pondei, K., Langley, O., Pondei, J. 2012. Current microbial and culture sensitivity pattern of urinary tract infection in a private setting in Bayelsa State, Nigeria. *Int. Res. J. Microbiol.*, 3(12): 393–398.
- Sabharwal, E.R. 2012. Antibiotic susceptibility pattern of uropathogens in Obstetric patients. *N. Am. J. Med. Sci.*, 4(7): 316–319.
- Sabrina, J., Said, A., Mabula, K., Samuel, Y. 2010. Bacterial isolates and drug susceptibility pattern of urinary tract infections among pregnant women at Muhimbili National hospital in Tanzania. *J. Health Res.*, 12: 4–14.
- Saidi, A., Delaporte, V., Lechevdier, E. 2005. Urological problems encountered during pregnancy. *Prog. Urol.*, 15: 1–5.
- Theodor, M. 2007. Prevalence and Bntibiogram of Urinary Tract Infections among prison Inmates in Nigeria. *Internet J. Microbiol.*, 3(2): 12–13.
- Vardi, M., Kochivi, T., Denekamp, Y., Bitterman, H. 2012. Risk factors for urinary tract infection caused by extended-spectrum beta-lactamase resistance in patients admitted to internal medicine department. *IMAJ*, Pp. 115–117.
- Weatheral, D.J., Ledindham, J.G.G., Warrel, D.H. 1988. Oxford textbook of medicine, 4th edn., Heinemann, London. Pp. 45–46.
- Wilson, M.L., Gaido, L. 2004. Laboratory diagnosis of urinary tract infections in adult patients. *Clin. Infect. Dis.*, 38: 1150–8.