Prevalence of Asymptomatic Bacteriuria among Pregnant Women Attending Antenatal Care at Semienawi Asmara Health Center

Kisanet Hagos[1], Adiam Tesfamariam[1], Berzelin Adugna[1], Hermon Amanuel[1], Epherm Ghebray[2], Dawit Eman[1], Nuredin Mohamed Kassm[1], and Faisal M. Fadlelmola[1,3*]

[1]*School of Allied Health Professions, Asmara College of Health Sciences, P.O. Box 8566, Asmara, Eritrea.*
[2]*Department of Basic and Behavioral Sciences, Asmara College of Health Sciences, P.O. Box 8566, Asmara, Eritrea.*
[3]*Centre for Bioinformatics, Faculty of Science, University of Khartoum, P.O. Box 321, Khartoum, Sudan.*

Authors' contributions

This work was carried out in collaboration between all authors. Authors KH, AT, BA, HA contributed equally to the study design, wrote the protocol, collected the samples, performed all laboratory analyses, and managed literature searches. Author EG performed the statistical analysis. Authors DE, NMK, FMF overlooked the study design, managed the literature review, supervised the analyses of the study and wrote the first draft of the manuscript. All authors read and approved the final manuscript.

Article Information

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ABSTRACT

Aim: This study was carried out to assess the prevalence of asymptomatic bacteriuria (ASB) among asymptomatic and symptomatic pregnant women attending antenatal care follow-up at Semienawi Asmara Health Center (SAHC).

Corresponding author: E-mail: faisal.mohamed@hotmail.com;

Study Design: This was a cross-sectional and quantitative study to assess the prevalence and risk factors associated with ASB among 200 pregnant women who were attending antenatal follow up in SAHC. A written consent form was obtained from the participants. A structured questionnaire was used to collect data from the study subjects on socio-demographics and possible risk factors.

Place and Duration of Study: The current study was carried out in SAHC, Eritrea, during the period of March to June, 2013.

Methodology: A total of 200 subjects were recruited for the study according to their sequence of arrival at the health center. Clean catch midstream urine was collected from each pregnant woman into a sterile container. The urine samples were examined using chemical, microscopical, and culture methods.

Results: A total of 19(9.5%) samples were positive for culture tests. 12 out of the 19 subjects were symptomatic and the rest 7 were asymptomatic. A patient who has no signs of infection on urinalysis, no symptoms of infection, but a positive urine culture, the patient by definition has asymptomatic bacteriuria. There was a significant difference in the prevalence of ASB among asymptomatic and symptomatic pregnant women. Generally there was a significant association between risk factors such as parity, inadequate washing of the genitalia, a blood relative with Urinary tract infection (UTI), signs and symptoms, previous UTI and gestational age, and the presence of the UTI (P-value of <0.05). However, age, treatment, pre-existing medical conditions, delay in urination, usage of contraceptives, and level of education were not significantly associated with the presence of the UTI (P>0.05). *Escherichia coli* was found to be the most predominant microorganism followed by microbes of streptococcus group D.

Conclusion: Asymptomatic bacteriuria is not uncommon among pregnant women attending antenatal care in the population studied. Routine urine culture tests should be carried out on all pregnant women in order to identify any infection.

1. INTRODUCTION

Asymptomatic bacteriuria is a common bacterial infection, affecting human beings throughout their life span especially in women in whom nearly 50% develop symptoms of urinary tract infections due to bacteriuria at some stage during their life [1]. A urinary tract infection (UTI) is caused by the growth of microorganisms anywhere in the urinary tract [2]. It is characterized as being either upper or lower based primarily on the anatomic location of the infection [3]. The lower urinary tract encompasses the bladder and urethra, and the upper urinary tract encompasses the ureters and kidneys. Urinary tract infections are the second most common type of infection in the body, accounting for about 8.1 million visits to health care providers each year.

About 95% of UTIs occur when bacteria ascend the urethra to the bladder and in the case of acute uncomplicated pyelonephritis ascend the ureter to the kidney. The remainder of UTIs are hematogenous. UTIs often develop in the first month of pregnancy and are frequently associated with a reduction in urine concentration, suggesting involvement of the kidney. As a result; bacteriuria during pregnancy has a greater propensity to progress to pyelonephritis [3].

Asymptomatic bacteriuria is characterised by isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen from an individual without symptoms or signs of urinary tract infection[4]. It is found in 2% of sexually active women and is more common (up to 70%) during pregnancy. It refers to persistent, actively multiplying bacteria within the urinary tract in asymptomatic women [5]. Its prevalence depends on parity, race, and socio-economic status. Since most women have recurrent or persistent bacteriuria, it is frequently discovered during prenatal care. Pregnancy predisposes asymptomatic patients to symptomatic UTIs; about 10% of those with asymptomatic bacteriuria develop symptomatic bacteriuria, which is easily diagnosed and treated due to its overt symptom [1]. Symptomatic urinary tract infection may involve only the lower urinary tract, in which case it is known as a bladder infection. Of patients with symptomatic bacteriuria, 40% would become symptomatic with a UTI and acute pyelonephritis which can cause fetal growth restriction, fetal death, and preterm birth.

2. MATERIALS AND METHODS

2.1 Study Design

This was a cross-sectional and quantitative study designed to assess the prevalence and risk factors associated with presence of UTIs among 200 pregnant women who were attending antenatal follow up in SAHC. The subjects were recruited to the study during their visit to the health center and their maternal age, gestational age, educational level, history of urinary tract infection, and other related conditions were assessed.

The participants were asked to give written consent to verify that they were participating in the research of their own free will. A structured questionnaire was used to collect data on socio-demographics and possible risk factors. Specific instructions for collection of mid-stream urine specimens was provided by the researchers. A urine specimen of at least 20 ml was collected from each individual and examined for all urine analytes. The subjects were screened for bacteriuria using a dipstick test for nitrite and microscopic analysis for bacteria and white blood cells. All the results were confirmed using culture methods and isolates were identified to the species level using standard protocols. A colony count of more than 100,000 per ml of urine was defined as significant bacteriuria [2].

2.2 Data and Sample Collection

2.2.1 Study population

The study was conducted on pregnant women at SAHC. The study was conducted from March to June, 2013. Each participant was given a study number that linked the questionnaire to the sample. Socio-demographic data was obtained by means of personal interview and a questionnaire. Subjects who had been prescribed antibiotic treatment two weeks prior to the study were excluded.

2.2.2 Data collection

Subjects were selected based on their sequence of arrival. After consent was obtained from the selected subjects, the researchers filled the structured questionnaire related to their personal information, medical history, clinical presentation and associated risk factors.

2.2.3 Sample collection and processing technique

Urine samples were collected into sterile universal containers at the collection site. Clean catch midstream urine samples were shipped to the laboratory for identification. Urine specimen was first centrifuged for five minutes at a relative centrifugal force (RCF) of 400. Then, a uniform amount of urine and sediment remained in the tube after decantation from which a drop or two (20 µl) were place on a microscope slide and examined under *bright field microscopic* technique (a light-compound microscope was used). A minimum of 10 fields were examined under both low (10x) and high (40x) power objectives. The average number of the urine analytes observed in all the ten fields was reported per the respective power used. The microscopic examination was done at three control levels. First three microscopists examined and reported their results. Then two other microscopists for whom the results were blinded, were allowed to examine the same specimen and reported their results. The two results were compared and samples with discrepancy were confirmed by a third controller. Bacterial strains were isolated using culture technique.

Samples were inoculated in Nutrient agar (BD, Daignostic Systems, USA), MacConkey's agar (BD, Daignostic Systems, USA) and bile esculin agar and were incubated for 24 hours at 37 C. Colony counts of 100,000/ml or more of pure isolates were regarded as significant for infection. Once grown, the colonies were isolated for gram staining. Gram positive organisms were assayed for catalase activity, and for gram negative organisms, a series of biochemical tests were performed, including carbohydrate fermentation, amino acid utilization, urea utilization, Triple Sugar Iron (TSI), citrate for specific identification of the organisms.

2.3 Data Processing and Analysis

All the data derived from the questionnaires, urinalysis, and microbiological surveys was analysed using the SPSS software package (PASW, SPSS version 18) to facilitate data entry and analysis. Tables, graphs and other summary measures like proportions and means were used to describe the obtained data. Chi-square was applied to determine associations. A *P*-value less than 0.05 was taken as significant.

3. RESULTS AND DISCUSSION

3.1 General Description of Study

The study obtained ethical clearance from the Asmara College of Health Sciences (ACHS) ethical committee for research. In addition, a research permission was obtained from the Ministry of Health of the State of Eritrea, and Semienawi Asmara Health Center (SAHC). After taking the general information about the patient, they were asked if they ever had a UTI; whether they were treated or not if they had some; if they have any of the signs and symptoms of UTI such as*, frequency, dysuria, bloody urine, turbid urine, or nausea;* whether they delay in voiding; whether they wash their genitals and anus after voiding and defecating; regarding parity, gestational age, and their level of education. The level of education refers to the education background of the study participants being: either low for elementary (Grades 1-5); middle for junior (Grades 6-8); higher for both secondary school (Grades 9-12) and higher education or not educated.

The data collected from the questionnaire and the laboratory test results were entered into SPSS software version 18. Anonymity was maintained by using a questionnaire which had no name and was only linked with the sample by the study number. The results of the tests and questionnaire were analysed and the most significant findings were presented in tables and figures. Of the 200 subjects involved in the study 68 (34%) were symptomatic and 132(66 %) were asymptomatic.

The mean age of the subjects was 26.6±5.4, the youngest was 16 years and of the oldest 45 years of age. Of the pregnant women (n=200), 100(50%), 83(41.5%) and 17(8.5%) were in the age range of 16-25, 26-35 and 36-45 respectively (Table 1). All the pregnant women were from Zoba Maekel (Central zone). The gestational age of the pregnant women was such that, 25(12.5) were in their first trimester, 89(44.5%) were in their second trimester and 86(43%) were in their third trimester. Regarding the parity of the pregnant women 51(25.5%) were having child for the first time and 149(74.5%) were multiparous. From the total 200 subjects who had taken no antibiotics within the last two weeks 68(34%) had signs and symptoms of a UTI while the remaining 132(66%) had no signs and symptoms. The signs and symptoms of UTI diagnosed are: urge to urinate, burning sensation when urinating, painful or difficult urination (dysuria), bloody urine, cloudy urine, foul-smelling urine, and pelvic pain.

Table 1. Gross description of the study subjects attending SAHC

Characteristics	Pregnant women N=200
Age group	
16-25	100(50%)
26-35	83(41.5%)
36-45	17(8.5%)
Gestational age	
1st trimester	25(12.5%)
2nd trimester	89(44.5%)
3rd trimester	86(43%)
Parity	
Nulliparous	51(25.5%)
Multiparous	149(74.5%)
Clinical information	
Symptomatic	68(34%)
Asymptomatic	132(66%)

3.2 Laboratory Analysis

The final phase of the study was the analysis of the urine from pregnant women. After filling the informed consent and structured questionnaire, the pregnant women were instructed to collect clean catch midstream urine samples. Samples were linked to the questionnaires and to the study subjects by study numbers. Urine sample analysis was performed within one hour of collection. Initially chemical tests (dipstick) were carried out for nitrite reductase and leukocyte esterase, and then microscopic examination of the sample was performed. The results were then confirmed using culture tests.

3.2.1 Urine physicochemical analysis

Physicochemical analysis was carried out on all of the 200 urine samples collected and the results indicated that 53(26.5%) were positive for leukocytes, whereas the remaining 147(73.5%) were leukocyte negative. Out of the leukocyte positive results (n=53), 10(18.9%), 30(56.6%) and 13(24.5%) were +1, +2 and +3 for leukocyte respectively. The leukocyte positivity +1 is defined when 5-10 leukocytes per high power field (HPF) of microscope are seen; +2 is defined when 10-20 leukocytes per HPF of microscope are seen; +3 is defined when 20-30 leukocytes per HPF of microscope are seen. Nitrate analysis of urine specimens (n=200) showed that 6(3%) were positive and 194(97%) were negative.

3.2.2 Microscopic analysis

Urine microscopic test was carried out on the samples collected from the pregnant women (n=200). The results showed that all of the 200 samples of the pregnant women had microscopic WBC graded as few, moderate and too many with a count of 149(74.5), 31(15.5%) and 20(10%) respectively. For microscopic RBC, 17(8.5%) were positive of which 2(1%), 4(2%) and 11(5.5%) had few, moderate or too many RBC respectively, while 183(91.5%) were negative for microscopic RBC.

3.2.3 Urine culture

The study was carried out in 200 pregnant women whose urine samples were inoculated into different culture media. The outcome of the culture result indicates that 53(26.5%)' out of which 19(35.85%) were pathogenic organisms and the remaining 34(64.15%) were Coagulase-negative staphylococci (CoNS).

A total of 5 bacterial species were found in the pathogenic isolates (n=19) of which 1(20%) was found overlapping along with the previous isolate, while 4(80%) were not overlapping. *Escherichia coli* was found to account for 13(68.4%) of infection with *Streptococcus* group D 3(15.7%) being the second most commonly encountered organism. Two species *Entrobacteriacae* and *K. pneumoniae* account for the remaining 15.8% (5.3% and 10.5% respectively as shown in Table 2.

Table 2. Frequency of organisms isolated from urine specimen in the study (N=19)

Species name	N (%)
Escherichia coli	13(68.4%)
Streptococcus group D	3(15.8%)
K. pneumoniaozanae	2(10.5%)
Enterococcus	1(5.3%)

3.3 Comparison of Laboratory Results

The 200 samples were tested for different types of diagnostic parameters that included microscopic detection of RBCs, WBCs, chemical tests for leukocyte and nitrite as well as culture. Out of the 200 samples which were studied for growth of microorganisms, 19(9.5%) showed a significant positive culture result (a culture that showed more than 105 CFU/mL, CFU = Colony Forming Units, after an incubation of 18-24 hours) and the rest 181(90.5%) samples showed

no growth., A comparison of all the tests was done for culture positive urine specimens as shown in Table 3, taking culture as a gold standard. The results indicated that all the culture positive samples were also leukocyte positive. Regarding the nitrite test, out of the 19 culture positive samples, 5(26.3%) were nitrite positive while the remaining 14(73.7%) were nitrite negative. The microscopic test results indicated that all the culture positive samples (n=19) were also positive for WBCs, 10(52.6%) of the culture positive samples were positive for RBCs, while the remaining 9(47.4%) culture positive samples were negative for RBCs.

Table 3. Comparison of laboratory results (n=19)

	+	-
Leukocyte. Esterase	19	0
Nitrite Reductase	5	14
WBC	19	0
RBC	10	9

3.4 Risk Factors for UTI

The presence of possible underlying risk factors among participants was assessed by analysis of the completed structured questionnaire, related to the basic demographics, previous UTI, treatment, medical condition, family history of UTI, signs and symptoms of UTI, delay in urination, contraceptive usage, level of education, parity, and gestational age. Out of the 200 subjects, 100(50%) were in the age range of (16-25), 83(42%) were in the age range of (26-35) and 17(9%) were in the age range of (36-45). Thirty seven (18.5%) reported that they had not washed their genitals. Fifty one individuals (25.5%) reported a previous UTI and eight (4%) had received treatment. Six (3%) had a blood relative with a UTI and six (3%) had an existing medical condition.

Amongst the participants, 68 (34%) had signs and symptoms of a UTI and 39 (20%) reported problems with urinating. Forty eight (24%) of the respondents used contraceptives. The respondents level of education was reported as: 98(49%) low, 91(45.5%) middle and 11(5.5%) in higher education. With regard to parity 51(25.5%) were uniparous and 149(74.5%) were multiparous. Among the pregnant women 25(12.5%) were in their first trimester, 89(44.5%) were in their second trimester and 86(43%) were in their third trimester as shown in Table 4.

Table 4. Risk factors of the study participants

Risk factors	Response	No. of women (n=200)
Age group	16-25	100(50%)
	26-35	83(41.5%)
	36-45	17(8.5%)
Not washing genital area	YES	37(18.5%)
	No	153(81.5%)
Previous UTI	Yes	51(25.5%)
	No	149(74.5%)
Treatment to previous UTI	Yes	8(4%)
	No	192(96%)
Blood relative with UTI	Yes	6(3%)
	No	194(97%)
Past med. condition	Yes	6(3%)
	No	194(97%)
Signs and Symptoms	Yes	68(34%)
	No	132(66%)
Urinating immediately	Yes	161(81%)
	No	39(20%)
Usage of contraceptive	Yes	48(24%)
	No	152(76%)
Level of education	Low	98(49%)
	Middle	91(45.5%)
	higher	11(5.5%)
Parity	Nulliparous	51(25.5%)
	multiparous	149(74.5)
Gestational age	1sttrimester	25(12.5%)
	2ndtrimester	89(44.5%)
	3rdtrimester	86(43%)

3.5 Association of Risk Factors with Asymptomatic Bacteriuria

In this study, out of those pregnant women who were positive for UTI(n=19), 9(47.4%) were in the age range of (16-25), 8(42.1%) were in the age range of (26-35) and 2(10.5%) were in the age range of (36-45). Eleven (57.9%) had washed their genitals. Nine (47.4%) of the repsondants had previous UTIs and 3(15.8%) had a blood relative with a UTI. Only one (5.3%) of the respondents had a pre-existing medical condition. Twelve (63.2%) of the participants had signs and symptoms of a UTI and four (21.1%) had problems with urination. Six (31.6%) of the respondents used contraceptives and the level of education was 7(36.8%) low, 12(63.2%) middle and none in higher education. With regard to parity 1(5.3%) were uniparous and 18(94.7%) were multiparous. Among the pregnant women 5(26.3%) were in their first trimester, 4(21.1%) were in their second trimester and 10(52.6%) were in their third trimester. The responses of the pregnant women who are positive for UTI is shown in Table 5.

Six out of the 12 risk factors and practices in relation to UTI were found to be statistically significant with the exception of age. These were having treatment for a previous UTI, preexisting medical condition, not being able to urinate immediately, usage of contraceptive and level of education. In order to see the strength of the association of the risk factors and practices between the pregnant women who were found to be positive for UTI and those which were, a negative odds ratio was calculated as shown in Table 5.

Asymptomatic bacteriuria is a major health problem that has been reported among 20% of the pregnant women and it is the most common cause of admission in obstetrical wards [2,6]. Symptomatic and asymptomatic bacteriuria has been reported among 17.9% and 13.0% pregnant women, respectively at Khartoum North Hospital, Sudan [7]. UTIs are infections caused by the presence and growth of microorganisms anywhere in the urinary tract [8]. They are perhaps the most common bacterial infections of humans. A UTI is evident when there are bacteria in midstream urine samples [9]. Asymptomatic bacteriuria is the presence of actively multiplying bacteria at the time when the patient has no urinary symptoms so that the diagnosis relies upon microbiologic findings [1,6,8].

Pregnant women are at increased risk for UTIs with incidence rates being as high as 8% in the United States [10]. Asymptomatic bacteriuria in pregnancy has been attributed to an increase in urinary stasis, ureteric relaxation and other anatomical changes. These conditions begin in week 6 and peak during weeks 22 to 24 [10]. Women with asymptomatic bacteriuria during pregnancy are more likely to deliver premature or low-birth-weight infants; fetal loss has also been noted. A review of birth certificate data for the state of Washington U.S.A. reported that women with urinary infections (UTI) during pregnancy had a fetal mortality rate 2.4 times greater, 2.04 times lower weight, and 2.4 times greater chance of prematurity than those without urinary infection. These pregnant women also have a 20 to 30-fold increased risk of developing pyelonephritis [11-13] compared with women without bacteriuria.

Table 5. Associated risk factors with asymptomatic bacteriuria (ASB)

Risk	Response	Positive for UTI(n=19)	Negative for UTI (n=181)	*P* value	Odds ratio
Age	16-25	9(47.4%)	91(50.2%)		
	26-35	8(42.1%)	75(42.3%)	0.936	
	36-45	2(10.5%)	15(8.3%)		
Not washing genitals	Yes	8(42.1%)	29(16.02%)		
	No	11(57.9%)	152(83.9%)	0.005	3.812 (1.411-0.295)
Previous UTI	Yes	9(47.4%)	42(23.2%)		
	No	10(52.6%)	139(76.8%)	0.022	0.34 (0.128-0.881)
Treatment to previous UTI	Yes	0	8(4.4%)		
	No	19(100%)	173(95.6%)	0.35	
Blood relative with UTI	Yes	3(15.8%)	3(1.7%)		
	No	16(84.2%)	168(98.3%)	0.001	0.090 (0.017-0.482)
Pre-existing med.condition	Yes	1(5.3%)	5(2.8%)		
	No	18(94.7%)	176(97.2%)	0.543	
Signs and symptoms	Yes	12(63.2%)	56(30.9%)		
	No	7(36.8%)	125(69.1%)	0.05	0.261 (0.098-0.699)
Not urinating immediately	Yes	4(21.1%)	35(19.34%)		
	No	15(78.9%)	146(80.66%)	.857	
Usage of Contraceptive	Yes	6(46.1%)	42(23.2%)	0.416	
	No	13(53.9%)	139(76.8%)		
Level of education	Low	7(36.84%)	92(50.83%)		
	Middle	12(63.16%)	79(43.65%)	0.199	
	Higher	0(0%)	11(5.52%)		
Parity	Uni	1(5.3%)	50(27.63%)	0.033	6.87 (0.893-2.829)
	Mul	18(94.7)	131(72.37%)		
Gestational age	1-T	5(26.3%)	20(11.1%)		
	2-T	4(21.1%)	85(46.9%)	0.044	
	3-T	10(52.7%)	76(41.92%)		

Pregnant women with asymptomatic bacteriuria are at high risk of a number of complications for both mother and the unborn fetus [14-16]. Maternal complications include overt urinary tract infection for 30 to 40% of patients especially as pregnancy advances. Whether or not symptomatic urinary tract infection ensues, the fetus is still at risk for prematurity, low birth weight and even fetal wastage [11-13]. Thus, in the obstetric patients, there is little doubt, regarding the need for early screening for asymptomatic bacteriuria. A cost-analysis study found that screening is cost-effective when the prevalence of bacteriuria is >2%. The exact prevalence rate of UTIs in symptomatic and asymptomatic pregnant women in the general population of Eritrea is unknown, and the only data available is the monthly case report from the health centers. Thus, the study herein reported, being a cross-sectional study with the objectives of assessing the prevalence of UTI among pregnant women and its related risk factors, could be described as the first study of its kind in Eritrea.

The current study identified the common organisms causing symptomatic and asymptomatic UTIs by assessing urinalysis (chemical, microscopic, culture and sensitivity test) and identified the possible risk factors associated with UTIs in symptomatic and asymptomatic pregnant women attending antenatal visits at SAHC. Comparisons of the risk factors were made between pregnant women with signs and symptoms for UTI and with those asymptomatic. Evaluation of risk factors between those two groups was made based on detailed questionnaires related to personal information,

medical history, clinical presentation, and associated risk factors.

In the current study the prevalence rate of UTIs in symptomatic and asymptomatic pregnant women was 9.5% in which 12(89.47%) of them were symptomatic and 7(10.52%) were asymptomatic. Similar results were reported by Obirikorang et al. [2] among pregnant women attending antenatal clinic at the university hospital, Kumasi Ghana with a prevalence rate of 9.5% and Ali et al. reported a prevalence of 5% among pregnant women of DHQ, faisland Pakistan hospital [6]. The prevalence of asymptomatic bacteriuria was reported to be as high as 21% in a study from Ibadan city, Nigeria [17] and 86.6% in another study from Benin City, Nigeria [18]. The prevalence of asymptomatic bacteriuria in pregnant women in this study is lower than the 23.9% from the study in Sagamu, Nigeria, and higher 7.3% reported in Ghana and 7% reported in Ethiopia. It is lower than the 86.6% earlier reported in Benin City, Nigeria and 78.7% reported in Abakaliki, Nigeria. The most commonly encountered organism was in the current study is E. coli followed by Streptococcus group D.

This research also found out there was a statistically significant association between culture positive test result and possible risk factors included in the questionnaire. The other risk factors with a statistically significant relation with culture positive test result were also found. Out of the 12 possible risk factors, 6 were found to be statically significant (p<.05) which included subjects are not washing their genitals, previous UTI, having a blood relative with a UTI, having signs and symptoms, multiparity and being in the third trimester of pregnancy.

When the risk factors were compared between pregnant women who were found to be positive for UTI and those who are negative for UTI, the risk factors and practices which were statistically significant, were; not washing genitals, previous UTI, blood relatives with UTI, signs and symptoms and parity the remaining factors were insignificant. In order to determine the strength of the association of the risk factors and practices, odds ratios were calculated as shown in Table 5. Those pregnant women who were not washing their genitals had 3.8 times higher risk (95% CI; 1.411-10.295) when compared with those who were washing. Having previous UTI and blood

relative with UTI increased the risk of UTI by 34% and by 9% respectively. Moreover pregnant women who had signs and symptoms of UTI had a 26% increased risk compared to those without signs and symptoms of UTI. Multiparous pregnant women were 6.87 times more at risk (95%CI; 0.098-0.699) of infection when compared with the pregnant women who were having their first child. However, in a study conducted in Sri Lanka there was no significant association between bacteriuria and the risk factors; gestational diabetes, past urinary tract infection, multiparity, advanced maternal age, lower education level, advanced gestational age and lower socioeconomic status when analyzed using the Fisher exact test.

4. CONCLUSION

This study was conducted to determine the prevalence of Urinary Tract Infections (UTI) among pregnant women of SAHC. Out of the total 200 subjects 19(9.5%) had positive culture results while the remaining 181(90.5%) had negative culture results. It is therefore imperative that pregnant women are screened for UTI periodically every trimester of the gestational period.

Risk factors which showed significant association with urinary tract infection were gestational age, parity, blood relative with a UTI, previous history of UTI and not washing the genitals. In this study pregnant women in the first trimester were more likely to have urinary tract infections compared to those in their second and third trimesters, and multiparous women had higher prevalence of UTI, compared to nulliparous. Pregnant women who did not wash their genitals showed significant bacterial growth.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore

been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Garingalo-Molina FD. Asymptomatic bacteriuria among pregnant women; Overview of diagnostic approaches. Phil J Microbial Infect Dis. 2000;29:177–86.

2. Obirikorang C, Quaye L, et al. Asymptomatic bacteriuria among pregnant women attending antenatal clinic at the University Hospital, Kumasi, Ghana. Journal of Medical and Biomedical Sciences. 2012;1(1):38-44.

3. Davis NF, Flood HD. The pathogenesis of urinary tract infections. In clinical management of complicated urinary tract infection. Book editor: Ahmad Nikibakhsh; 2011. under CC BY-NC-SA 3.0 lincense. DOI: 10.5772/22308.

4. Ahmed S, Shakooh S, Salati SA, Muniem A. Prevalence of asymptomatic bacteriuria among pregnant women in Kashmir. Sri Lanka Journal of Obstetrics and Gynaecology. 2011;33:158-162.
Available:http://dx.doi.org/10.4038/sljog.v3 3i4.4804

5. Hooton TM, Stamm WE. Urinary tract infections and asymptomatic bacteriuria in pregnancy.
Available:http://www.uptodate.com/content s/urinary-tract-infections-and-asymptomatic-bacteriuria-in-pregnancy

6. Ali R, Afzal U, Kausar S. Asymptomatic bacteriuria among pregnant women. Annals of Punjab Medical College. 2011;5(2).

7. Hamdan HZ, Ziad AH, Ali SK, Adam I. Epidemiology of urinary tract infections and antibiotics sensitivity among pregnant women at Khartoum North Hospital. Ann Clin Microbiol Antimicrob. 2011;10(2).

8. Fekete T, Hooton TM. Approach to the adult with asymptomatic bacteriuria. N Engl J Med. 2000;343:992.

9. Blomberg B, Olsen BE, Hinderaker SG, Langeland N, Gasheka P, Jureen R, Kvale G, Midtvedt T. Antimicrobial resistance in urinary bacterial isolates from pregnant women in rural Tanzania: Implications for republic health. Scandinavian Journal of Infectious Diseases. 2005;37(4):262-8.

10. Delzell JE Jr, Lefevre ML. Urinary tract infections during pregnancy. Am Fam Physician. 2000;61:713–21.

11. Zhanel GG, Harding GK, Guay DR. Asymptomatic bacteriuria. Which patients should be treated? Arch Intern Med. 1990;150:1389-1396.

12. Mittendorf R, Williams MA, Kass EH. Prevention of preterm delivery and low birth weight associated with asymptomatic bacteriuria. Clin Infect Dis. 1992;14(4):927-32.

13. Gratacos E, Torres PJ, Vila J, Alonso PL, Cararach V. Screening and treatment of asymptomatic bacteriuria in pregnancy prevent pyelonephritis. J Infect Dis. 1994;169(6):1390-2.

14. Ronald AR. Optimal duration of treatment for kidney infection. Ann Intern Med. 1987;106(3):467-468.

15. McGregor JA, French JI, Richter R, Franco-Buff A, Johnson A, Hillier S, Judson FN, Todd JK. Antenatal microbiologic and maternal risk factors associated with prematurity. Am J Obstet Gynecol. 1990;163:1465-1473.

16. Schultz R, Read AW, Straton JA, Stanley FJ, Morich P. Genitourinary tract infection in pregnancy and low birth weight: Case control study in Australian aboriginal women. BMJ. 1991;303(6814):1369–1373.

17. Ugbogu O, Ogbonnaya R, Nworie O. Asymptomatic bacteriuria among pregnant women in ABA ABIA state, Nigeria. Nigeria

Journal of Microbiology. 2010;24(1):2024-2027.

18. Akerele J, Abhulimen P, Okonofua F. Prevalence of asymptomatic bacteriuria among pregnant women in Benin City, Nigeria. J Obstet Gynaecol. 2001;21(2): 141–4.

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