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Prevalence of Urinary Tract Infection Bacterials Among Internally Displaced Pregnant Women in Selected Camps in Anambra State

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Abstract
This study investigated prevalence of urinary tract infection bacterials among internally displaced pregnant women in selected camps in Ogbaru, Anambra State. The population of the study comprised 380 internally displaced pregnant women who also formed the study sample as no sampling method was adopted due to the limited number of study participants. The tools for data collection was midstream urine samples collected using sterile screw capped universal containers, the instruments used in isolating the bacterial uropathogens, include Cysteine-Lactose Deficient (CLED) agar, MacConkey and Nutrient agar plates as well as a structured checklists in socio-demographic characteristics of the pregnant women. Descriptive statistics of frequency and percentage was used for data analysis and the Statistical Package for Social Sciences (SPSS) software was employed in the analytical process. Results from the study showed the prevalent urinary tract infection bacterials among internally displaced pregnant women in some selected camps in Ogbaru local government areas of Anambra State are Enterococcus faecalis, Staphylococcus aureus, Streptococcus sp, Klebsiella sp, Escherichia coli. ($P>0.05$), factors responsible for urinary tract infection among internally displaced pregnant women in selected camps in Ogbaru local government areas of Anambra State are history of UTI, genital hygiene (wash/wipe after sex), Defecation facility etc ($P<0.05$) and risk factors were preterm birth, low birth weight, premature labour and hypertension/preeclampsia. The study concluded that there is an increasing incidence of bacterial urinary tract infection among internally displaced pregnant women linked to lack of education. Based on the study findings, early routine screening of all internally pregnant women presenting or not presenting with clinical symptoms of urinary tract infection is recommended. The need for good personal and environmental hygiene to be encouraged in internally displaced persons' camps.

INTRODCUTION

The most prevalent infection in women globally, particularly during pregnancy, is urinary tract infection (Dielubanza et al. 2017). In pregnancy, the worldwide prevalence of urinary tract infection ranged from 3 to 35%. Bacterial urinary tract infection is expected to impact 10-20% of pregnant women, according to Lee et al. (2015). The prevalence of urinary tract infection during pregnancy, on the other hand, differs by continent and country. In Saudi Arabia, the prevalence was 20%, 7.7% in India, 30% in Libya, 15.5% in Tanzania, 14% in Khartoum, Sudan, and 75% in Niger, while in Ethiopia, the prevalence was 11.6% in Addis Abeba, 12% in Gondar, 9.5% in Bahir, Dar, and 38% in Nigeria (Derese et al., 2015).

Urinary tract infection is defined as the microbial invasion and subsequent growth of these germs on the infected individual's complete urinary tract (Baqui et al., 2019). A urinary tract infection, according to Al-Badr and Al-Shaikh (2016), is defined by the presence of more than 100,000 microscopic cells in 1 ml of urine and is accompanied by clinical signs of cystitis, pyelonephritis, and asymptomatic bacteria. It can vary from the presence of bacteria in the urine without causing symptoms (asymptomatic bacteriuria) to infections that cause mostly bladder symptoms (symptomatic urinary tract infection). Bacterial urinary tract infection, according to Bacak et al., (2015), is a serious health concern that affects 20% of pregnant women and is a common reason for admission to obstetrical wards.

According to Derese et al. (2015), bacteria, particularly stomach bacteria, cause the majority of urinary tract infections by contaminating the region around the rectum and moving to the bladder. Because of changes in the urinary system, urinary tract infections are more likely during pregnancy. Because the uterus rests directly on top of the bladder, the uterus's increasing weight as it grows might obstruct urine outflow from the bladder, resulting in infection (Lee et al., 2015). Other risks include upper extremity and increased urine urethral recurrence, as well as reduced bladder size owing to uterine contraception, which raises the filtration rate, putting the kidneys under stress (Flore-Mireles et al., 2015). In addition to pregnancy, there are host-related variables that enhance the likelihood of urinary tract infection, such as sexual factors, urine factors, urine osmolality, introital factors, vaginal pH, and secretor status. Some of the most common causes of urinary tract infections are Escherichia coli, Staphylococcus aureus, Streptococcus, Proteus, Klebsiella, Corynebacterium, Neisseria, and Pseudomonas, which represent the major types of bacterial urinary tract infection prevalent in most pregnant women based on maternal characteristics.

According to Odum (2017), there is an association between the level of education and the occurrence of urinary tract infection; however, maternal age, parity, trimester, and income are not associated with the occurrence of bacterial urinary tract infection. There was a greater prevalence of bacterial urinary tract infection among women over the age of 36, women with poorer parity, and women in their first trimester of pregnancy. Escherichia coli is the most common kind of bacterial urinary tract infection, followed by Enterococcus and Klebsiella pneumonia. Similarly, Hannan et al. (2016) stated that the most common bacterial urinary tract infections among pregnant women are Escherichia coli, Proteus mirabilis, Klebsiella species, Staphylococcus aureus, Staphylococcus faecalis, and Streptococcus species.

The severity of a urinary tract infection is determined by both the virulence of the bacteria and the host's susceptibility (Chan et al., 2018). Internally Displaced Persons (IDPs) are at a high risk of infection because of overcrowding, increased exposure to disease vectors, poor hygiene and sanitation, and a lack of standard essential healthcare services. Internally Displaced Persons (IDPs) are people who have been forced to leave their homes due to wars, violence, or other natural or man-made catastrophes and have not crossed a recognised state boundary, according to the United Nations High Commission for Refugees (2018). The process of relocation invariably adds to the receiving state, region, or country's health and social burden (Odum, 2017). Population movements always have an impact on health-care systems. Internally Displaced Persons are among the most vulnerable of the forced migrants. In internally displaced people, there has been an increase in mortality among children under the age of five and pregnant women. According to reports, internally displaced people, particularly

pregnant women, are at a greater risk of illness and infectious disease, with bacterial urinary tract infection ranking high among the infections.

Bacterial urinary tract infection in pregnant women can cause an inflammatory response that includes the production of chemokines and cytokines, which can cause decidual activation, prostaglandin release, and cervical ripening, raising the risk of preterm c. Historically, 30-50% of women with pyelonephritis delivered prematurely, according to research. Preterm delivery and low birth weight are substantially related with asymptomatic bacteriuria. Furthermore, maternal urinary tract infection has been linked to an increased risk of stillbirth and newborn sepsis (Ajayi & Cadmus, 2016).

Bacterial urinary tract infection causes low birth weight foetus, intrauterine growth retardation, preterm labour and premature newborns, intrauterine foetal death, and increased prenatal mortality and morbidity, according to a research by Austin et al., (2018). Anaemia, preeclampsia, renal failure, septicemia, and adult respiratory syndrome are all examples of maternal problems (Austin et al., 2018). Thus, bacterial urinary tract infection is especially harmful in pregnant women, where up to 50% of those with asymptomatic bacteriuria develop pyelonephritis (Odum, 2017). As a result, early detection and treatment of urinary tract infection during pregnancy is critical. Bacterial urinary tract infection is diagnosed using clinical symptoms, urine laboratory analysis data, and cultural findings. However, detecting a urinary tract infection can be challenging because the symptoms and indicators are often non-specific in women.

Women and children account for more than 70% of internally displaced people, and they face a variety of health concerns (Hannan et al., 2016). Pregnant moms are particularly vulnerable to health and associated issues, particularly infection. Several risk factors that cause infection interact during relocation. Pregnant women are especially vulnerable to urinary tract infections. They are most common between the ages of 16 and 35, with 10% of women infected each year and more than 40-60% infected at some time in their life. These infections account for around 20% of pregnancy complications and the bulk of antepartum admissions to the maternal-foetal unit in hospitals (Lee et al., 2015). Bacterial urinary tract infections in pregnant women result in a variety of unfavourable pregnancy outcomes, including preterm, foetal loss, congenital abnormalities in infants, and neonatal sepsis (Lee et al., 2015). This condition has the potential to jeopardise pregnancy and delivery outcomes.

Despite the high number of internally displaced people (IDPs) in Sub-Saharan African countries and the potentially negative impact of displacement on these populations' health, there is little or no data on the types and patterns of urinary tract infections among internally displaced pregnant women in the Anambra State. This study explored the related type and pattern of urinary tract infection among internally displaced pregnant women in Anambra State camps as a means of acquiring data critical to reducing the risk of bacterial urine infection among pregnant women.

1.3 Aim and Objectives of the study

The study is aimed at investigating types of bacterial urinary tract infection among internally displaced pregnant women in selected camps in Ogbaru, Anambra State. The specific objectives will be to;

1. assess the prevalence of urinary tract infection bacterials among internally displaced pregnant women in selected camps in Ogbaru local government areas of Anambra State.
2. ascertain the factors responsible for urinary tract infection among internally displaced pregnant women in selected camps in Ogbaru local government areas of Anambra State.

METHODOLOGY

This study was a cross sectional study. The study population included 380 pregnant women in any trimester with or without urinary symptoms in internally displaced camps in Ogbaru local government areas of Anambra State. The sample size was determined by using the formula given below. The prevalence of urinary tract infection in pregnant women in internally displaced camps in Ogbaru local government areas of Anambra State is 48%. Total sample The pregnant and non-pregnant women who met the inclusion criteria for selection were enrolled consecutively into the study within a time frame of three months until the sample size will be achieved. The pregnant women recruited will be stratified into three subgroups depending on their trimester (0-13weeks, 14-26weeks, 27-39weeks). Each subgroup consisted of 140 pregnant women. The controls included age-matched, non-pregnant females. Informed written consent will be obtained from each patient prior to the interview and sample collection. Socio- demographic data will be obtained from each patient by means of personal interviews. The socio- demographic data will include, age, ethnicity, religion, level of education, occupation and income. Other data will include the frequency of sexual intercourse, trimester, parity, personal hygiene and past history of urinary tract infection.

3.6 Specimen Collection and Handling

3.6.1 Urine sample collection

Mid-stream urine samples was collected in sterile universal bottles after the patients was advised to wash their hands with soap and water and part their labia to reduce contamination of the urine samples. The urine samples to be collected was sent to the Microbiology department, University of Port Harcourt Teaching Hospital within 30 minutes of collection for analysis.

3.6.2 Urine sample analysis

The urine was analysed in batches by the same personnel using Combi 10 Uristrip by Axiom Medical Limited, United Kingdom brand (UK) to assess urine chemistry. The urine was inoculated in Cysteine lactose electrolyte deficient agar by Oxoid (UK) using drop delivery of 0.002mls of urine. The plates were incubated aerobically at 37^{O}C for 24 hours. Colony count greater than 100,000 per milliliter of urine of an organism will be regarded as significant for infection. Bacterial characterization of the isolates will be by sugar fermentation test, catalase test and coagulase test. Anti-microbial in-vitro susceptibility testing will be performed using the disc diffusion method. Ten milliliter of each urine sample will be transferred to a sterile

centrifuge tube and centrifuged at 3000rpm for 10 minutes. The supernatant were discarded, and the sediments will be examined microscopically at high magnification by a qualified staff and under the supervision of the microbiologist for pus cells, red cells, epithelial cells, casts, crystals, yeast –like cells.

Pus cell greater than 5 WBC/ml will be significant for infection.

3.6.3 Blood sample collection

Five millilitre of blood was also be collected from the ante-cubital fossa to evaluate complete blood count, serum creatinine, genotype, blood group and random blood sugar.

3.6.4 Blood sample analysis

Complete blood count was analysed using the Coulter auto-analyser. The serum creatinine was assessed using the Kinetic Jaffe Picrate method with a kit that had been standardized against Isotope Dilution Mass Spectrometry (IDMS) with CV of 0.7% and 2.3% within run and between run respectively. Blood group will be evaluated using anti A monoclonal antibody LOT: 267085, anti B monoclonal antibody LOT: 089036 and anti D monoclonal antibody LOT: 025016 while the genotype will be evaluated using the Sediamini-PHE 160 hemoglobin electrophoresis machine. Blood sugar will analysed using the Accu-Chek glucometer.

3.7 Questionnaire

A structured questionnaire was administered to the subjects. Information regarding the patients' demographic characteristics, socio-economic status, medical, sexual and obstetric histories will be obtained.

3.8 Data Analysis

Collected data was entered into the excel spread sheet and analysed using IBM SPSS statistics version 22. Continuous data will be presented as means and standard deviation. Categorical data will be presented as proportions and percentages. The prevalence of urinary tract infection were presented as a percentage. Patterns were determined using chi-square depending on distribution. Regression statistics will be applied to determine relationships or associations. Difference will be considered significant at $p<0.05$.

RESULT AND DISCUSSION

4.1 Result

Table 4.1: Socio-Demographic Characteristics of the Study Participants

Variable	Category	Percentage (%)
Age	<20	11.1
	21–25	25.0
	26–30	36.1
	31–35	22.8
	>36	5
	Total	**100**
Parity	None	7.40
	1	13.0
	2	52.0
	3-4	27.6
	Total	**100**
Religion	Christianity	46.3
	African Traditional	32.4
	Islam	21.3
	Total	100
Trimester	1st	13.0
	2nd	42.0
	3rd	45.0
	Total	**100**

Table 4.1 shows the socio-demographic characteristics of the study participants. The study revealed that, (11.1%) of the participants were aged below 20 years, (25.0%) were aged 21-25 years, (36.1%) were aged 26-30 years while (22.8%) were aged 31-35 years and 5% aged 36 years and above. (7.40%) have no child, (13.0%) had a child, (52.0%) had 2 children while (27.6%) had 3-4 children. (46.0%) were Christians, (32.4%) were African Traditional Religion practitioners while (21.3%) were Muslims. (13.0%) were in their first trimester, (42.0%) were in their second trimester while (45.0%) were in their third trimester of pregnancy.

Research Question one: what the prevalence of urinary tract infection bacterial among internally displaced pregnant women in some selected camps in Ogbaru local government areas of Anambra State?

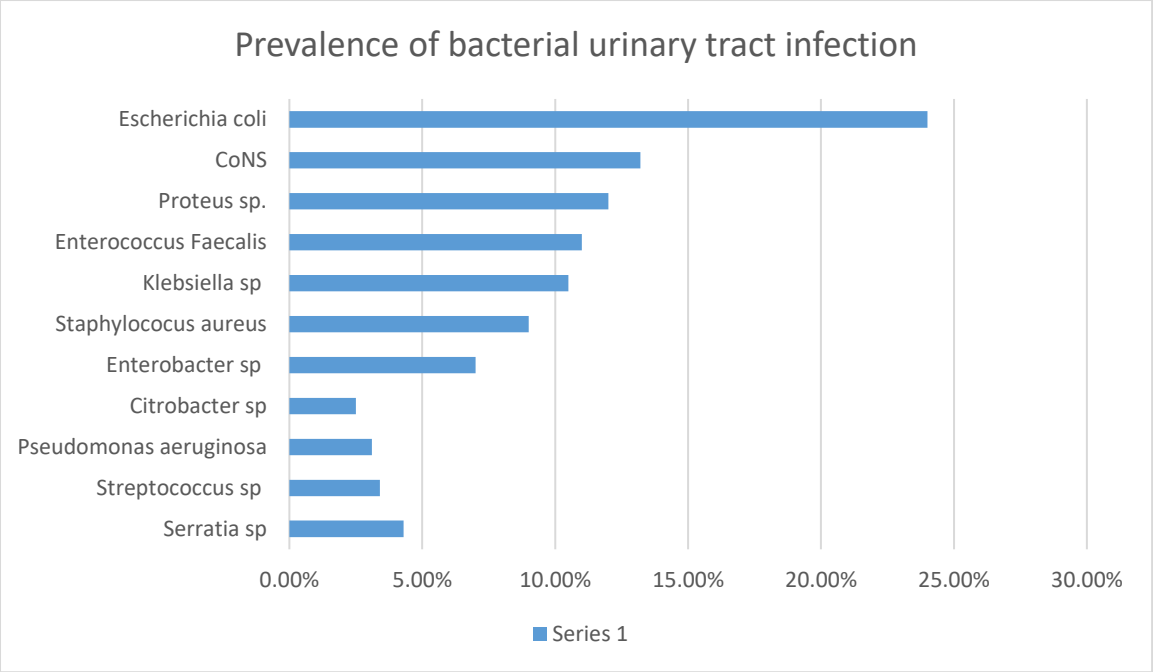

Figure 4.1 prevalence of bacterial urinary tract infection

Fig, 4.1 revealed that the commonest bacteria isolated from the urine cultures were *Escherichia coli* (24.00%) followed by CoNS (13.20%), *Proteus* species (12.00%), *Enterococcus fae-calis* (11.00%), *Klebsiella* species (10.50%), *Staphylococcus aureus* (9.00%), *Enterobacter* species (7.00%), *Citrobacter* species (2.50%), *Pseudomonas aeruginosa* (3.10%), *Strepto-coccus* species (3.40%), and *Serratia* species (4.30%).

Research Question 2: What are the factors responsible for urinary tract infection among internally displaced pregnant women in selected camps in Ogbaru local government areas of Anambra State?

Table 4.2: Factors Responsible for Urinary Tract Infection

Age	Positive (%)	Negative (%)	X^2,	*df*	*p-value*
<20	(46.2)	(53.8)			
21–25	(48.0)	(52.0)	40.5	4	<0.0001
26–30	(45.3)	(54.7)			
31–35	(17.1)	(82.9)			
>36	(11.9)	(88.1)			
Educational level					
None	(71.3)	(28.7)			
Primary	(27.8)	(72.2)	73.2	4	<0.0501
SSCE	(41.3)	(58.7)			
OND	(23.5)	(76.5)			
B.Sc	(0.0)	(100.0)			

Occupation					
None	(41.3)	(58.7)			
Trading	(37.3)	(62.7)			
Apprenticeship	(29.0)	(71.0)	17.5	4	0.0126
Farming	(54.8)	(45.2)			
Civil Service	(15.4)	(84.6)			
Gravidity					
1–3	(25.2)	(74.8)			
4–6	(48.1)	(51.9)			
6–9	(53.1)	(46.9)	32.8	3	<0.0001
>9	(29.2)	(70.8)			
Parity					
1	(35.9)	(64.1)			
2	(51.3)	(48.7)	11.7	2	0.0029
3-4	(35.3)	(64.7)			
Trimester					
First	(52.4)	(47.6)			
Second	(30.6)	(69.4)	21.4	2	<0.0001
Third	(40.0)	(60.0)			
UTI					
Symptomatic	(33.1)	(66.9)			
Asymptomatic	(41.8)	(58.2)			0.0806
History of UTI					
Yes	(27.8)	(72.2)			0.0004
No	(44.3)	(55.7)			
Genital hygiene					
No	(77.0)	(23.0)			
Once a while	(37.4)	(62.6)	123.5	2	<0.0810
Always	(9.3)	(90.7)			
Defecation facility					
Private	(12.4)	(87.6)			
Public	(42.5)	(57.5)	51.8	2	<0.0701
Mode of cleaning after defecation					
Open	(56.1)	(43.9)			
Water from Buta	(69.7)	(30.3)			
Tissue paper	(27.7)	(72.3)	83.7	3	<0.0201
Paper	(26.8)	(73.2)			
Others	(53.4)	(46.6)			

UTI, urinary tract infection; X^2, Chi-square value; df, degree of freedom; $p < 0.001$, statistically significant.

Table 4.2 revealed that significant bacteriuria was associated with low educational status (p = 0.0501) Mode of cleaning after defecation (p= 0.0201), Genital hygiene (p = 0.0810), defecation facility (p = 0.0701) and occupation (p = 0.0501).

4.2 Discussion of Findings

Prevalence of bacterial urinary tract infection among internally displaced pregnant women

Most of the bacterial isolates from the urine samples of pregnant women in this study were Gram-negative. *E. coli* was the commonest bacteria isolates. A similar trend has been reported in Ghana (Egbe et al,. 2020; Dimetry et al., 2017) Nigeria Ageresw et al., (2019), Sudan Ramana (2017), , Libya Haider et al., (2018), and Ethiopia (Shaw et al., 2018). The possible ex- planation for the predominance of Gram-negative bacteria among isolated UTI aetiological agents may be because theyare common members of the vaginal and rectal flora (Gilbert et al., 2018; Bonckaert & Berglund, 2015). On the other hand, CoNS dominated the Gram-positive isolates, followed by *Enterococcus faecalis* and*Staphylococcus aureus*. While some studies have detected *CoNS* as the most frequently isolated bacteria Smaill et al., (2019) others detected *S. aureus* as the most frequently isolated Gram- positive bacteria (Dielubanza & Schaeffer, 2017). *Enterococcus faecalis* has also been reported as the predominant Gram-positive bacterial isolate in other studies (Demilie et al., 2019).

Factors responsible for urinary tract infection among internally displaced pregnant women

The study findings revealed that there was no significant association between age, parity, trimester of pregnancy and the incidence of bacterial urinary tract infection among internally displaced pregnant women. This implies that maternal age, parity, parity and trimester of pregnancy were not associated with bacterial urinary tract infection. However, similar findings have been reported though inconsistent with a recent study Baqui et al., (2019) which reported a higher occurrence in the age group 36 years and above, in multiparous women and in third trimester of pregnancy. This difference in findings may be associated with differences the geographical location where the women studied reside as internally displaced pregnant women have problems that stemmed more from the external environment, inadequacy of basic amenities and resources and overall poor sanitation. This finding concord with reports from studies conducted in Nigeria (Al-Badr & Al-Shaikh, 2018). , Egypt Flore-Mireles et al., (2018), and Iran (Romero et al., 2017). Conversely, no association was found betweenparity and UTI among pregnant women in cross-sectional studies from Sudan Masinde et al., (2019), Tanzania Austin et al., (2018), Ghana Barbosa-Cesnik et al., (2018), and West Ethiopia (Bonckaert & Berglund, 2015). Poor hygiene practices during preg- nancy have been associated with UTIs among pregnantwomen (Baqui et al., 2019). In this study, participants who frequently practice genital cleaning after sex had lower odds of getting a UTI. We also found out that those who use public defecation facilities and individuals who practice open defecation were fve and nine times, respectively, more likely to get UTIs. A cross-sectional study by Parasuraman et al. (2018) indicated that people who use public toilet facilities are at

risk of various bacterial infections. Terefore, the use of the same sanitary facilities by strangers comes with related risks of faecal bacteria transmission (Dimetry et al., 2017).

Conclusion

The current findings demonstrate that a high prevalence of UTIs exists among internally displaced pregnant women in selected camps in Ogbaru local government areas of Anambra State. Escherichia coli was the most predominant bacteria isolated. UTI in pregnancy was associated with risk factors such as the use of public defecation facilities, open defecation, and a lack of good practice in genital hygiene after sex.

Recommendations

Based on the findings of the study, the study recommends the following;

1) All pregnant women should be screened for UTI at each ante-natal clinic visit since all the pregnant women with culture positive UTI were asymptomatic.
2) Screening of UTI should be with urine dipstick that test for urine nitrite and leucocyte esterase.
3) All pregnant women with positive urine dipstick should have urine culture done and should be placed on empiric treatment for UTI with oral co-amoxiclav pending the result of the urine culture.
4) Pregnant women should be switched to the appropriate and safe anti-biotics to reduce the risk of drug resistance.
5) All pregnant women should be counselled on the importance of post coital voidingand with-holding urine.
6) Pregnant women should be advised to take their antenatal care very seriously.
7) Health education should be embarked upon in the mass media, through seminars, conferences and on each antenatal visit days.
8) Wareness should be created in the rural areas about personal hygiene.
9) Pregnant women should be given appropriate education on urinary tract infection as well as reproductive tract infection prevention strategies, and healthy sexual practices should also be encouraged as a way of reducing bacterial urinary tract infections among internally displaced pregnant women.

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