
Research Article,

Associated Risk Factors for Bacterial Urinary Tract Infection among Internally Displaced Pregnant Women in Niger Delta Camps, Nigeria

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Abstract:

This study investigated associated risk factors for bacterial urinary tract infection among internally displaced pregnant women in Niger Delta camps. The objectives of the study were to determine the association between age, parity, trimester of pregnancy, religion and the incidence of bacterial urinary tract infection among internally displaced pregnant women. The population of the study comprised 108 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 there was no significant association between age, parity, trimester of pregnancy and the incidence of bacterial urinary tract infection among internally displaced pregnant women ($P>0.05$). However, religion was significantly associated with the incidence of bacterial urinary tract infection among internally displaced pregnant women ($P<0.05$). The study concluded that there is an increasing incidence of bacterial urinary tract infection among internally displaced pregnant women linked to religious beliefs. 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.

Keywords: Associated risk factors, Bacterial urinary tract infection, Internally Displaced Women, Camps, Niger Delta.

Interoduction:

Urinary tract infection is the most common infection in women worldwide especially during pregnancy^[1]. The global prevalence of urinary tract infection in pregnancy ranged from 3 to 35%^[2]. According to Lee^[3], bacterial urinary tract infection is estimated to affect about 10-20% of pregnant women. However, the prevalence of urinary tract infection during pregnancy varies across different continent and nations of the world. An overall prevalence of 20% from Saudi Arabia, 7.7% from India, 30% from Libya, 15.5% from Tanzania, 14% from Khartoum, Sudan, and

75% from Niger was reported, whereas in Ethiopia, the prevalence of 11.6% from Addis Ababa, 12% from Gondar, 9.5% from Bahir, Dar and 38% from Nigeria^[4,5].

Urinary tract infection refers to the microbial invasion and subsequent multiplication of these microbes on the entire urinary tract of the infected individual^[6]. According to Al-Badr and Al-Shaikh^[7], a urinary tract infection is characterized by the presence of more than 100,000 microscopic cells in 1 ml of urine and accompanied by clinical symptoms of cystitis, pyelonephritis and

asymptomatic bacteria^[8]. It can range from presence of bacteria in urine without symptoms (asymptomatic bacteriuria) to infections producing chiefly bladder symptoms (symptomatic urinary tract infection)^[9]. According to Bacak, Callaghan, Dietz and Crouse^[10], bacterial urinary tract infection is a major health problem reported among 20% of the pregnant women and a common cause of admission in obstetrical wards.

According to^[8], most cases of urinary tract infection are caused by bacteria, especially gastrointestinal bacteria, which infect the urethra through contaminating the area that surrounds the rectum and spreading to the bladder. Urinary tract infections are more common during pregnancy due to changes in the urinary tract. Since the uterus sits directly on top of the bladder, the increased weight of the uterus, as it grows, can block the drainage of urine from the bladder which results in an infection^[11]. However, other factors include upper extremities and increased urinary urethral recurrence as well as reduced bladder size due to uterine contraception which increases the filtration rate thus stressing on the kidneys^[12]. In addition to the factor of pregnancy, there are other factors pertaining to the host that increases the rate of infection of the urinary tract including sexual factors, urine factors, osmolality of urine, introital factors, vaginal pH, and secretor state^[13]. Some of the main and common causes of urinary tract infections are *Escherichia coli*, *Staphylococcus*, *Streptococcus*, *Proteus*, *Klebsiella*, *Corynebacterium*, *Neisseria* and *Pseudomonas* and these represents the major types of bacterial urinary tract infection prevalent in most pregnant women patterned based on maternal characteristics^[11].

According to Odum^[14], the pattern of bacterial urinary tract infection is such that 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. A higher occurrence of bacterial urinary tract infection in the age group 36 years and above, women with lower parity and those in their first trimester of pregnancy was reported^[15,16]. The predominant types of bacterial urinary tract infection include *Escherichia coli*, followed by *Enterococcus* and *Klebsiella pneumoniae*. Similarly, some scholars reported that most prevalent bacterial urinary tract infections among pregnant women include *Escherichia coli*, *Proteus*

mirabilis, *Klebsiella* species, *Staphylococcus aureus*, *Staphylococcus faecalis* and *Streptococcus* species among others^[17].

The severity of a urinary tract infection depends both on the virulence of the bacteria and on the susceptibility of the host^[18]. Among groups susceptible to infections, internally displaced persons occupy a focal position as they are faced with increased risk of health problems associated with overcrowding, increased exposure to disease vector, poor hygiene and sanitation as well as lack of standard essential healthcare services^[19]. According to the United Nations High Commission for Refugees^[20], internally displaced persons (IDPs) are individuals who have been forced to leave their places of residence due to conflicts, violence or other natural or manmade disasters and who have not crossed a recognized state border. The process of displacement inevitably leads to an added health and social burden on the receiving state, region or country^[21]. Population displacements always affect health systems. Of the forced migrants, internally displaced persons are among the most vulnerable. Increased mortality among children under five and pregnant women has been recorded in internally displaced persons^[22]. Reports show that internally displaced person especially pregnant women at high risk for infection and infectious disease and of the infections, bacterial urinary tract infection ranks high^[23].

Bacterial urinary tract infection in pregnant women may trigger an inflammatory response, including the release of chemokines and cytokines that may result in decidual activation, prostaglandin release, and cervical ripening, thereby increasing the risk of preterm birth^[24]. In historical studies, approximately 30–50% of women with pyelonephritis delivered preterm^[25]. Asymptomatic bacteriuria is significantly associated with preterm delivery and low birth weight^[26]. In addition, maternal urinary tract infection has been associated with increased risk of stillbirth and early onset neonatal sepsis^[27].

According to a study^[28], bacterial urinary tract infection results in low birth weight fetus, intrauterine growth retardation, preterm labor and premature babies, intrauterine fetal death, and increased prenatal mortality and morbidity. Maternal complications include anemia, preeclampsia, renal failure, septicemia, and adult respiratory syndrome^[29]. Thus, bacterial urinary tract infection can be particularly dangerous in

pregnant women among whom it has been shown that up to 50% of those with asymptomatic bacteriuria go on to develop pyelonephritis^[30]. Hence the need for early diagnosis and prompt treatment of urinary tract infection during pregnancy. Bacterial urinary tract infection is diagnosed based on the clinical findings, laboratory analysis results of the urine and cultural findings. However, diagnosing urinary tract infection could be difficult because the presenting symptoms and signs are non-specific most times in women.

Women and children constitute over 70% of internally displaced populations and they experience a wide range of health risks^[31]. Among women groups, pregnant mothers are even at high risk for health and related problems especially infection^[32]. Several risk factors, which promote infection, work in synergy during displacement. Of all infections, pregnant women are highly predisposed to urinary tract infection.

They occur most frequently between the ages of 16 and 35 years, with 10% of women getting an infection yearly and more than 40–60% having an infection at some point in their lives^[33]. These infections cause about 20% complication during pregnancy and are responsible for the majority of antepartum admissions into the maternal–foetal unit in hospitals^[34]. Bacterial urinary tract infections among pregnant women bring out negative pregnancy outcomes such as prematurity, fetal loss, congenital defects in newborns and neonatal sepsis among other problems^[23]. This situation could compromise pregnancy and childbirth outcomes.

Despite the large number of internally displaced persons (IDPs) in Sub-Saharan African countries and the potentially negative impact of displacement on the health of these populations, there are little or no data on the types and pattern of urinary tract infections among internally displaced pregnant women in Niger Delta. As a way of gathering data crucial to curtailing the risk for bacterial urinary infection among pregnant women, this study investigated the associated risk factors for bacterial urinary tract infection among internally displaced pregnant women in Niger Delta camps.

Materials and Method:

The study design was descriptive cross sectional survey conducted in four (4) internally displaced persons' camp (each in Edo, Delta, Bayelsa and Rivers States respectively). The study population

included all pregnant women in the selected IDP camps at the time of conducting this study which is totaled one hundred and eight (108). Ethical clearance for the study was obtained from relevant authorities. The entire one hundred and eight (108) pregnant women were used in this study. No sampling technique was employed in this study as the study population was small. Data source was primary as urine sample were collected from internally displaced pregnant women in the selected camps in Niger Delta, Nigeria. The tools for data collection were midstream urine samples gathered using sterile screw capped universal containers, the instruments used in isolating the bacterial uropathogens which 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. Midstream urine samples were used because they form constitute the types of specimens for culture and sensitivity testing as it is associated with reduced incidence of cellular and microbial contamination. The pregnant women were guided to first cleanse the urethral area with castile soap towelette and then instructed to void the first portion of the urine stream into the toilet (to reduce the opportunities for contaminants to enter the urine stream. The checklist contained information on the socio-demographic characteristics of the antenatal mothers, prevalence of occurrence of Chlamydia infection among pregnant women, the age of all women who accessed care in the antenatal clinic, their trimester of pregnancy, parity and religion. The urine midstream was then collected into the properly labeled sterile screw capped universal container containing few crystals of boric acid as preservatives. The sample containers were labeled accordingly and transported to designated laboratories close to the internally displaced persons' camps in an iced pack for processing to ensure maximum recovery of the microbes. Each of urine samples was streaked using a sterilized platinum wire loop onto the surface of freshly prepared Cysteine-Lactose Deficient (CLED) agar, MacConkey and Nutrient agar plates. The plates were incubated at 37⁰C for 24 hours to isolate the growing microorganisms. Representative of growing colonies were picked with a sterile wire loop and re-inoculated onto the surface of nutrient agar, pure cultures were made with repeated streaking. The resulting pure colonies obtained were used for biochemical tests aimed at

identifying the bacteria isolates. Isolates were particularly subjected to Gram staining, indole, citrate utilization, catalase, urease, methyl-red, voges proskauer and coagulase test. Descriptive statistics of frequency and percentage was used to analyze the research questions while inferential statistics of chi-square was used to test the hypotheses at 0.05 level of significance. Statistical Package for Social Science (SPSS) version 22 was used for statistical analysis of the data generated. All results were presented in table and charted to ensure clarity of study findings.

Results:

Table 1: Socio-Demographic Characteristics of the Study Participants (n=108)

Variable	Category	Frequency	Percentage (%)
Age	Below 25	12	11.1
	25-35	27	25.0
	36-46	39	36.1
	47 and above	30	27.8
	Total	108	100
Parity	None	8	7.40
	1	14	13.0
	2	56	52.0
	3-4	30	27.6
	Total	108	100
Religion	Christianity	50	46.3
	African	35	32.4
	Traditional	23	21.3
	Islam	108	100
	Total		
Trimester	1 st	14	13.0
	2 nd	45	42.0
	3 rd	49	45.0
	Total	108	100

Table 1 shows the socio-demographic characteristics of the study participants. Out of the 108 pregnant women studied, 12(11.1%) were aged below 25 years, 27(25.0%) were aged 25-35 years, 39(36.1%) were aged 36-46 years while 30(27.8%) were aged 47 years and above respectively. 8(7.40%) have no child, 14(13.0%) had a child, 56(52.0%) had 2 children while 30(27.6%) had 3-4 children. 50(46.0%) were Christians, 35(32.4%) were African Traditional Religion practitioners while 23(21.3%) were Muslims. 14(13.0%) were in their first trimester, 45(42.0%) were in their second trimester while 49(45.0%) were in their third trimester of pregnancy.

Table 2: Associated Risk Factors for Bacterial Urinary Tract Infection among Internally Displaced Pregnant Women (n=108)

Characteristics	Positive	Negative	Total	P-value	OR	95% CI
Age						
Below 25	8	4	12			
25-35	17	10	27	0.134	0.534	(0.237, 1.211)
36-46	26	13	39	0.717	1.581	(0.481, 2.901)
47 and above	22	8	30			
Total	73	35	108			
Parity						
None	5	3	8			
1	9	5	14	0.133	0.471	(0.229, 0.113)
2	36	20	56	0.697	1.763	(0.388, 2.762)
3-4	23	7	30			
Total	73	35	108			
Religion						
Christianity	24	26	50			
African	29	6	35	0.003	4.088	(1.776, 10.827)
Traditional	20	3	23	0.001	2.116	(1.222, 7.317)
Islam	73	35	108			
Total						
Trimester						
1 st	9	5	14			
2 nd	30	15	45	0.245	0.518	(0.193, 1.493)
3 rd	33	16	49	0.267	0.566	(0.200, 1.522)
Total	73	35	108			

Table 2 shows the patterns of urinary tract infection in terms of maternal age, parity, religion and trimester of pregnancy. The p-values, odds ratio (OR) and 95% Confidence Interval (CL) on maternal age, parity and trimester of pregnancy which were greater than 0.05 indicates that the variables were not significantly associated with the prevalence of bacterial urinary tract infection among internally displaced pregnant women. However, the p-value of 0.003 and 0.001 on religion revealed that religion is significantly associated with the prevalence of bacterial urinary tract infection among internally displaced pregnant women

Table 3: Chi-square Analysis on the Association between Maternal Age, Parity, Trimester of Pregnancy, Religion and the Incidence of Bacterial Urinary Tract Infection among Internally Displaced Pregnant Women (n=108)

Characteristics	Positive	Negative	Total	P-value
Age				
Below 25	8	4	12	
25-35	17	10	27	0.134
36-46	26	13	39	0.717
47 and above	22	8	30	
Total	73	35	108	
Parity				
None	5	3	8	
1	9	5	14	0.133
2	36	20	56	0.697
3-4	23	7	30	
Total	73	35	108	
Religion				

Christianity	24	26	50	0.003
African Traditional Islam	29	6	35	
Total	20	3	23	0.001
73	35	108		
Trimester				
1 st	9	5	14	0.245
2 nd	30	15	45	
3 rd	33	16	49	0.267
Total	73	35	108	

Table 3 revealed p-values of 0.134, 0.717, 0.133, 0.697, 0.003, 0.001, 0.245 and 0.267 on age, parity, religion and trimester of pregnancy of internally displaced pregnant women. This implies 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. However, religion was significantly associated with the incidence of bacterial urinary tract infection among internally displaced pregnant women ($P < 0.05$).

Discussions:

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 [28,35] though inconsistent with a recent study [16] 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.

However, religion was significantly associated with the incidence of bacterial urinary tract infection among internally displaced pregnant women. This implies that the belief system and thus the perception of the internally displaced pregnant women significantly predicted the incidence of bacterial urinary tract infection. Categorically the study findings revealed a higher incidence of bacterial urinary tract infection among Traditional Religion practitioners and Muslims. There seem to be no clear explanation to these findings, however, religious beliefs and superstitions could compromise reproductive

hygiene and lifestyle, with more emphasis on spirituality than health promoting behaviours. The result was consistent with a study [36] that noted Traditional Religionist, Hindus, Muslims and other religious groups who exhibit a high level of doctrine-based spirituality are more prone to urinary tract infections. This according to the author is because spirituality has a way of making people play down on personal and environmental hygiene, a situation that has the potential to predispose individuals to infection.

Conclusions:

This study concludes 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. However, religion was significantly associated with the incidence of bacterial urinary tract infection among internally displaced pregnant women. Regardless of the associated risk factors or not, 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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