Prevalence and antibiogram among asymptomatic and symptomatic uropathogens associated with pregnant women in some selected Lgas in Taraba State, North East, Nigeria

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Abstract
Urinary Tract Infections (UTIs) have been proven to be the most reoccurring human diseases among hospitalized and non-hospitalized male and female of all age groups. Owing to the anatomy of the female reproductive organ, uropathogen causing UTIs are commonly isolated among adult women; nonetheless, adult male are also at risk of UTIs. This research aimed at investigating the prevalence and antibiogram among asymptomatic and symptomatic uropathogens associated with pregnant women in some selected LGAs in Taraba State, North East, Nigeria. The population of this study included pregnant women attending antenatal care (ANC) at General Hospital Wukari, Private hospital and Federal Medical Center, Jalingo. The study excluded individuals on any form of antibiotics medication.Three hundred (300) urine specimens were collected for the study using standard bacteriological techniques. The results of the investigation showed six (6) different isolates namely: *Escherichia coli* 9(8.7%), *Staphylococcus aureus* 1(1.0), Coagulase Negative *staphylococci* 4(3.9), *Citrobacter species* 3(2.9), *proteus species* 3(2.9) and *Streptococcus species* 1(1.0) were obtained for symptomatic pregnant women while for asymptomic pregnant women, *Escherichia coli* 17(8.6), *Staphylococcus aureus* 7(3.6), Coagulase-negative staphylococcio (CoNS) 4(2.0), *Klebsiella pneumonia* 4(2.0) and *proteus species* 3(1.5) were obtained. The antibiogram of isolates from both symptomatic and asymptomatic urine samples of pregnant women were subjected to antimicrobial activities of some selected antibiotics and the result revealed that ampicillin on *Proteus* species, *Klebsiella pneumonia*, and *Streptococcus* species gave 100% resistance. *Escherichia coli*, *Proteus* species, *Klebsiella pneumonia*, *Citrobacter* species. *Staphylocuccus. aureus*, CoNs, and *Streptococcus* spp. showed 3.8%, 0%, 25%, 0%, 0%, 4% and 0% resistance for ciprofloxacin respectively. Also, *Citrobacter* isolates exhibited the most resistance to Ampicillin (66.67%), Gentamicin (66.67%) and ceftriaxone (66.67%). Conclusively, our findings showed that early screening of pregnant woman for UTI causing bacterial uropathogens and determining their antibiotic susceptibility pattern is an important intervention to prevent complications that may endanger the life of both the pregnant women and the fetus. Hence, it is recommended that both symptomatic and asymptomatic pregnant women should have antibiotics inculcated in their treatment and regular test for uropathogens should be carried out.

Keywords: Antibiogram, Asymptomatic, Pregnant women, Symptomatic and Uropathogens, Urine

1. Introduction
Urinary tract infection is an infection which results from the successful interaction between microbial virulent factors and the host's factors. It may result from direct or indirect infection; direct infection involves introduction of microorganisms through the use of indwelling catheters, unhygienic practices or from sexual partners. Indirect infection may be from hematognous spread of pathogenic organisms from other infected organs or tissues [1]. UTIs have been proven to be the most reoccurring human diseases [2], among hospitalized and non-hospitalized male and female of all age groups [3]. Over 49% of women are infected with UTIs at least in their lifetime [4]. Owing to the anatomy of the female reproductive organ, uropathogen causing UTIs are commonly isolated among adult women; nonetheless, adult male are also at risk of UTIs [5].

UTIs however, are more prevalent in females than males owing to the shorter urethra in females which promotes ascending infection to the bladder (cystitis) and occasionally the kidney [6]. UTIs affect the lower urinary tracts (bladder) to cause cystitis and the upper urinary tracts (Kidney) to cause pyelonephritis [7].

As observed in many other bacterial infections, Uropathogens have assumed antimicrobial resistance which has become a major public health burden particularly in sub-Saharan Africa. Imarenezor *et al*. [8] has blamed antimicrobial resistant occurrence on indiscriminate and prolong use of antibiotics in both health care settings. This unfortunate occurrence has instigated the need to understand trends of antibiogram of uropathogens for effective use of the right antibiotics in managing UTIs and to avoid drug abuse. UTIs which are most common among pregnant women contribute significantly to the rates of morbidity and mortality during pregnancy [9]. *Escherichia coli*, *Klebsiella pneumoniae* and *Staphylococcus aureus* are the most frequently isolated uropathogens. These uropathogens are sensitive to Ampicillin, Augmentin, Nitrofuradantoin, Ceftazidime, Genticin, Nalidixic Acid and Ciprofloxacin [3]. The long term application of these antibiotics has resulted in pathogenic resistance [9].

Major risk factor associated with UTIs is poor socioeconomic factor [5]. Sex, age, poor hygienic condition during pregnancy, Non-communicable diseases including diabetes mellitus as well as increased of sexual activity are also blamable for high prevalence of UTI [10]. Many researchers have reported on the prevalence and antibiotic resistance of uropathogens in pregnant women is several locations in Nigeria. However, there is little or no information on the prevalence and antibiotic resistance profile of uropathogens in pregnant women in Wukari and Jalingo Local Government Areas of Taraba State. Therefore, this study aimed at investigating the prevalence and antibiogram among asymptomatic and symptomatic uropathogens associated with pregnant women in some selected LGAs in Taraba State, North East, Nigeria.

2. Material and Methods

2.1 Study area

The study was conducted in Wukari and Jalingo Local Government Areas of Taraba State, North East Nigeria. Wukari lies between latitude 7°55'42" North and longitude 9°47'59" East. Wukari covers an area of 4,308 km2. Jalingo on the other hand, is not only the administrative Headquarter of Jalingo Local Government Area but the State capital of Taraba State. Jalingo lies between latitude 8°54'42" North and longitude 11°47'59" East. It covers an area of 191.00km2.

2.2 Study design

A cross-sectional approach was used in conducting this research. Urine samples were obtained from pregnant women. Using a structured questionnaire, demographic data such as age, level of income, religion, gestational stage, pregnancy category, raw meat consumption habit, level of education, and source of drinking water as well as previous history of UTI was obtained from participants.

2.3 Sample size determination

The needed sample size for this research was calculated using N = Z2 (P x q)/d2. P represents prevalence of 18.8% from previous similar study. N is the required sample size, Z is the score for 95% confidence interval (1.96), d represent the acceptable error (5%), and q is derived from 1-P = 1–0.188 = 0.812. A total of 234 sample size was obtained using the above formula adopted but was was raised to 300 to augment for fall-out of responses.

2.4 Sampling methods

A comprehensive list of pregnant women was gotten from hospitals' administration and subjected to simple random sampling technique. Sample size was unevenly assigned as follows. General Hospital Wukari (n=220), Private Hospital (n=30) and Federal Medical Center, Jalingo (n=50).

2.5 Sample collection, uropathogen isolation and identification

15 ml of midstream urine samples were obtained from pregnant women and stored at a temperature of between 2–8℃ and immediately transported to the laboratory [1]. In the laboratory, urine samples were centrifuged at 1500 RPM for 5 min. Following centrifugation of urine at 1500 RPM for five minutes, a drop of the sediment was introduced on the grease free slide, covered and viewed using a microscope with a high-power objective lens (40X) [1]. Using standard microbiological procedure, 0.001 ml of urine was inoculated on Blood agar, Cysteine lactose electrolyte deficient medium, and MacConkey agar respectively. Following incubation at 37 ℃ for 24 h, visible colonies were counted. Positive cases of UTI are determined by significant bacteria colony count of ≥105 cfu/ml [1].

2.6 Antimicrobial susceptibility testing (AST) of uropathogens

Agar disk diffusion technique using commercially obtained disks containing antibiotics was used in determining the antimicrobial susceptibility of isolates. Antibiotics used includes Augmentin (AMC, 30 µg), Norfloxacin (NOR, 10 µg), Ampicillin (AMP, 30 µg), Ciprofloxacin (CPR, 5 µg), Erythromycin (E, 15 µg), Gentamicin (GM, 10 µg), Nitrofurantoin (NIT, 300 µg), Cotrimoxazole (SXT, 1.25 µg) and Ceftriaxone (CRO, 10 µg).

2.7 Statistical analysis

Data obtained from this study were organized using Microsoft applications and analyzed using STATA. Data was summarized using descriptive statistics. Prevalence and differences in the positive and negative results were determined using Chi-square test. The prevalence of UTI was calculated. P-value of <0.05 was considered statistically significant.

3. Results

3.1 Biochemical identification of bacterial uropathogens from symptomatic and asymptomatic UTI among pregnant women

Table 1 shows the biochemical identification of bacterial uropathogens from symptomatic and asymptomatic urinary tract infection among pregnant women. Out of the samples examined, most of the isolate were positive to catalase test except for Streptococcus spp. Which was negative to catalase test. The gram reaction revealed that the isolates were gram-negative bacilli and gram- positive cocci. Also, the probable organisms in the isolates were Escherichia coli, Staphylococcus aureus, CoNs, Klebsiella pneumoniae, citrobacter spp, and Streptococcus spp. Escherichia coli reacted positively to indole test whereas Proteus spp,

Klebsiella pneumoniae and Citrobacter spp. reacted negatively to indole test.

Table 1: Biochemical identification of bacterial uropathogens from symptomatic and asymptomatic UTI among pregnant women

S/No.	Gram Rxn	Biochemical tests								Probable organism
		CAT	COAG	IND	CIT	H_2S	TSI RXN	MAN	HEM	
1.	Gram-negative bacilli	+	NA	+	-	-	Acid slant/acid butt with gas production	NA	NA	*Escherichia coli*
2.	Gram-positive cocci	+	+	NA	NA	NA	NA	+	+	*Staphylococcus aureus*
3.	Gram-positive cocci	+	-	NA	NA	NA	NA	-	-	CoNS
4.	Gram-negative bacilli	+	NA	-	+	+	Alkaline slant/acid butt with gas production	NA	NA	*Proteus* Spp.
5.	Gram-negative bacilli	+	NA	-	+	-	Acid slant/acid butt with gas production	NA	NA	*Klebsiella pneumoniae*
6.	Gram-negative bacilli	+	NA	-	+	+	Acid slant/acid butt with gas production	NA	NA	*Citrobacter* Spp.
7.	Gram-positive cocci	-	NA	NA	NA	NA	NA	-	+	*Streptococcus* Spp.

*KEY: CAT: Catalase; COAG: Coagulase; IND: Indole; CIT: Citrate; TSI: Triple sugar iron; RXN: Reaction; MAN: Mannitol fermentation; HEM: Hemolysis; NA: Not applicable; H2S: Hydrogen sulfide; CoNS: Coagulase-negative Staphylococci

3.2 Prevalence of UTI in symptomatic and asymptomatic pregnant women

The overall UTI prevalence among women who are pregnant with symptoms and those without symptoms is presented in table 2. Out of the three hundred (300) samples examined, 103 were symptomatic and 179 were asymptomatic. Out of seven (7) isolates obtained, Escherichia coli was the most the most prevalent, recording 9(8.7%) and 17(8.6%) for symptomatic and asymptomatic pregnant women respectively. Streptococcus spp. was found to be the least prevalent isolate which recorded 1 (1%) and 0(0%) for pregnant women showing UTI symptoms and those not showing symptoms respectively. Other organisms isolated from this study with their corresponding prevalence include: Staphylococcus aureus, which recorded 1(1%) and 7(3.6%) for symptomatic and asymptomatic pregnant women respectively. CoNs recorded 4(3.9%) and 4(2%) respectively for symptomatic and asymptomatic pregnant women. Proteus spp. recorded 3(2.9%) and 3(1.5%) respectively for symptomatic and asymptomatic pregnant women. Klebsiella pneumoniae recorded 0(0%) and 4(2%) for symptomatic and asymptomatic pregnant women respectively. Citrobacter spp. recorded 3(2.9%) and 0(0%) for symptomatic and asymptomatic pregnant women respectively.

Table 2: Overall and bacterial level of prevalence of UTI in symptomatic and asymptomatic pregnant women

Isolated Bacteria	Prevalence		Total Positive N (%)
	Symptomatic (103)	Asymptomatic (197)	
	Number positive (%)	Number positive (%)	
E. coli	9 (8.7)	17 (8.6)	26 (8.7)
S. aureus	1 (1.0)	7 (3.6)	8 (2.7)
CoNS	4 (3.9)	4 (2.0)	8 (2.7)
Proteus Spp.	3 (2.9)	3 (1.5)	6 (2.0)
Klebsiella pneumoniae.	0 (0.0)	4 (2.0)	4 (1.4)
Citrobacter Spp.	3 (2.9)	0 (0.0)	3 (1.0)
Streptococcus Spp.	1 (1.0)	0 (0.0)	1 (0.3)
Total	21 (20.4)	35 (17.8)	56 (18.7)

3.3. Socio-demographic characteristics of study participants

The result for demographic characteristics of the study participants is presented in table 3. The socio-demographic variable captured in this study were age of the subjects, gestation stage of subjects, pregnancy category of subjects, employment status of subjects, residential area of subjects, education status of subjects, monthly income of subjects, raw meat, raw vegetable and raw milk consumption status, water source and UTI history.

Of the 300 subjects examined, 18.7% were positive to bacterial culture whereas 81.3% were negative to bacterial culture. Under the category of age, age range 35-44 years had the highest percentage of positive subjects and the least percentage of negative subjects; 31% and 69% respectively.

Age range 15-24 years had the highest percentage of negative subjects (82) while age range 25-34 years had 19% positive subjects and 81% negative subjects.

Of the total number of subjects examined under gestation stage category, 23% subjects in their second trimester tested positive to bacterial culture whereas 120 subjects tested negative to bacterial culture. 33% subjects tested in their third trimester tested negative.

The highest percentage of pregnant subjects who tested positive to bacterial culture (35%) were those residing in periunrban areas. Pregnant subject residing in urban areas had the highest number who tested negative to bacterial culture.

Considering the employment status of examined pregnant subjects, unemployed subjects had more people who tested positive to bacterial culture (20%) compared to employed subjects who had more people that tested negative to bacterial culture (83%).

Pregnant subjects with and without UTI history were examined. Out of all those UTI history examined, 27% tested positive to bacterial culture while 73% tested negative. Out of all those without UTI history were examined. Out of all those with UTI history examined, 27% tested positive to bacterial culture while 73% tested negative. Out of all those without UTI history examined, 16% tested positive to bacterial culture while 84% tested negative to bacterial culture.

Pregnant subjects with different educational status were examined. Of the four (4) categories of educational status examined, illiterate pregnant subjects tested positive to bacterial culture the most (20%) whereas most pregnant subjects in university class tested negative to bacterial culture.

Under water source category of pregnant subjects examined, pregnant subjects that depend on spring water as their water source had the highest number of subjects that tested positive to bacterial culture (32%). Pregnant subjects that depend on other sources of water besides spring water and tap water recorded the highest number of subjects that tested negative to bacterial culture (91%).

Pregnant subjects who drink raw milk had fewer subjects that tested positive to bacterial culture (18%) than pregnant subjects who do not drink raw milk (19%). However, the difference in value was not significant.

Table 3: Socio-demographic characteristics of study participants

Socio-demographic variables	Bacterial Culture (%)		Total	X^2	p-value
	Positive= 56 (18.7)	Negative= 244 (81.3)			
Age in years					
15-24	27 (18)	126 (82)	153	1.359	0.51
25-34	25 (19)	109 (81)	134		
35-44	4 (31)	9 (69)	13		
Gestation stage					
Second trimester	23 (16)	120 (84)	143	1.201	0.27
Third trimester	33 (21)	124 (79)	157		
Pregnancy category					
Primiparous	25 (18)	113 (82)	138	0.051	0.82
Multiparous	31 (19)	131 (81)	162		
Employment					
Employed	17 (17)	86 (83)	103	0.483	0.49
Unemployed	39 (20)	158 (80)	197		
Residency					
Urban	37 (17)	187 (83)	224	5.096	0.08
Rural	10 (20)	40 (80)	50		
Periurban	9 (35)	17 (65)	26		
Education					
Illiterate	10 (20)	41 (80)	51	0.170	0.98
Primary school	20 (19)	85 (81)	105		
Secondary school	13 (19)	55 (81)	68		
University	13 (17)	63 (83)	76		
Income/month					
<500	32 (19)	85 (81)	117	14.079	0.007
501-1000	18 (25)	77 (75)	95		
1001-1500	3 (8)	36 (92)	39		
1501-2000	1 (9)	22 (91)	23		
>2001	2 (15)	24 (85)	26		
Eat raw meat					
Yes	28 (24)	87 (76)	115	3.965	0.046
No	28 (15)	157 (85)	185		
Drink raw milk					
Yes	14 (18)	63 ()82	77	0.016	0.90
No	42 (19)	181 (81)	223		
Eat raw vegetable					
Yes	19 (24)	61 (76)	80	1.857	0.17
No	37 (17)	183 (83)	220		
Water source					
Others	2 (9)	20 (91)	22	3.418	0.18
Spring water	6 (32)	13 (68)	19		
Tap water	48 (19)	211 (81)	259		
UTI history					
Yes	18 (27)	48 (73)	66	4.128	0.04
No	38 (16)	196 (84)	234		

3.4 Antimicrobial resistance pattern of Gram-negative and Gram-positive bacteria isolated from asymptomatic and symptomatic pregnant women

The pattern of resistance of the isolated bacteria from symptomatic and asymptomatic women who are pregnant is presented in table 4. Of all the urinary isolates subjected to ampicillin, Proteus spp., Klebsiella pneumonia, and Streptococcus spp. showed 100% resistance. Escherichis coli, Proteus spp., Klebsiella pneumonia, Citrobacter spp., S. aureus, CoNs, and Streptococcus spp. showed 3.8%, 0%, 25%, 0%, 0%, 4% and 0% resistance for ciprofloxacin respectively. Of all the antimicrobial agents Klebsiella pneumoniae was to, Klebsiella pneumoniae showed least resistance to contrimoxazole. Proteus spp. showed the highest resistance to ceftriaxone (83.33%) and the least resistance to ciprofloxacin (0%) and norfloxacin (0%). Citrobacter spp. showed the highest resistance to Ampicillin (66.67%), Gentamicin (66.67%) and ceftriaxone (66.67%).

Table 4: Antimicrobial resistance pattern of Gram-negative and Gram-positive bacteria isolated from asymptomatic and symptomatic pregnant women

Antimicrobial agents	Number of resistant urinary isolates (%)						
	Gram-Negative Isolates				Gram-Positive Isolates		
	E.coli (n=26)	*Proteus* Spp. (n=6)	*Klebsiella pneumoniae* (n=4)	*Citrobacter* Spp. (n=3)	*S. aureus* (n=8)	CoNS (n=8)	*Streptococcus* Spp. (n=1)
Ampicillin	16 (61.54)	6 (100)	4 (100)	2 (66.67)	6 (75.0)	6 (75.0)	1 (100)
Ciprofloxacin	1 (3.85)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	4 (50.0)	0 (0.0)
Norfloxacin	1 (3.85)	0 (0.0)	1 (25.0)	0 (0.0)	2 (25.0)	1 (12.5)	0 (0.0)
Gentamicin	16 (61.54)	4 (66.67)	3 (75.0)	2 (66.67)	2 (25.0)	1 (12.5)	1 (100)
Ceftriaxone	10 (38.46)	5 (83.33)	3 (75.0)	2 (66.67)	5 (62.5)	2 (25.0)	0 (0.0)
Augmentin	1 (3.85)	1 (16.67)	1 (25.0)	1 (33.33)	2 (25.0)	0 (0.0)	0 (0.0)
Nitrofurantoin	6 (23.08)	-	-	1 (33.33)	2 (25.0)	0 (0.0)	1 (100)
Cotrimoxazole	4 (15.38)	2 (33.33)	0 (0.0)	1 (33.33)	1 (12.5)	1 (12.5)	1 (100)

4. Discussion

Pregnant women are at increased risk of developing UTI mainly due to a shift in the position of the urinary tract and hormonal changes during pregnancy make it easier for bacteria to travel up the urethra to the kidney and lead to the development of bacteriuria both symptomatic and asymptomatic UTIs [11]. Unless intervention is made on time, UTI will cause serious problem on both woman as well as on the fetus life, therefore early screening and antimicrobial treatment is the best preferred interventions.

Escherichia coli are arguably the most isolated bacteria in reported cases of UTI in South West Nigeria [3]. Findings from this current study are in line with the observations of Akerele *et al*. [3] as E. coli was mostly isolated from clinical samples collected from both symptomatic and asymptomatic pregnant women. Furthermore, Escherichia coli are more prevalent among women. As earlier stated in the literature review chapter the close proximity of the female urethra to the anus where E. coli commonly colonizes is responsible for the high prevalent rates of E. coli instigated UTI in women when compared to men. This enhances the easy movement of the bacteria to the bladder to begin the colonization of other parts of the urinary tract [8]. Also, inappropriate cleaning (wiping) of the genitalia following urination also contributes to UTI. Wiping from the anus to the vagina instead of the other way round may facilitate the motility of E. coli from the anus to the urethra. Importantly, intense penetrative sexual activities may also increase the chances of E. coli colonizing the urinary tracts. Some professionals have argued that the increasing weight of a growing fetus can alter the position of the bladder of pregnant women making way for the ascension of E. coli from to the urinary tract [12].

Okonko *et al*. [10] reported that if not treated, symptomless UTI in has repeatedly been linked with high incidence rates of pyelonephritis, premature birth and low birth weight resulting from maternal morbidity. In this study, other uropathogens than E.coli such as Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella spp, and Streptococcus spp were identified in collected samples. This finding is consistent with the findings of Akerele *et al*. [3] which isolated E.coli, Staphylococcus aureus, Pseudomonas aeruginosa, Klebsiella spp, and Streptococcus spp.

Findings from this study has made explicit that low socio-economic status is a determining factor of UTI linked with pregnancy. UTI was diagnosed in about 57% and 32% of women who are pregnant and whose monthly income is not more than 500 and between 501-100 respectively. This finding agrees with that of Sescon *et al*. [12] who discovered higher UTI prevalence among pregnant women with low income level than those with significant income. Lorenzo-Gomez [2] also reported a connection of low financial level with high UTI frequency. Lack of financial capacity of pregnant women coupled with low monthly income to maintain good dieting which is also strongly linked to host immune capacity.

In this study, poor medical history is sturdily associated with UTI prevalence. The findings of Sescon *et al*. [12] on UTI in Pakistan is in tandem with the findings of this study as regards UTI prevalence and past medical history of UTI.

Region of residency was strongly associated with the risk of UTI in pregnant women. Women in rural areas who are pregnant recorded the highest prevalence of UTI. These set of pregnant women would be more prone to self- treatment without a medical diagnosis of UTI. It is plausible that pregnant women in this geographical location would be farther in geographical distance to healthcare center thus, would wait longer to seek healthcare.

The findings of this study showed that based on education status, pregnant women at university level had the least number of positive UTI patients. This could be because this class of pregnant women have ample knowledge on UTI thus are aware of the preventive and curative measures of UTI. Johnson and Wolf [5] in their study stated that there is a direct relationship between educated females and low UTI prevalence.

Uropathogens responsible for UTI are the most often isolated microorganisms in the elderly population [2]. The risk of contracting UTI upsurges with age. As individual ages, their immunity against common infection decreases. The findings of this study agree with this assertion. 31% UTI prevalence was seen in the age group 35-44 which was higher than age group 15-24 (18%) and 25-34 (19%).

Upon comparing the rate of isolates of Gram negative and Gram positive bacteria, Gram negative bacteria were the dominant causative agent of UIT which is in line with others report [8, 13]. In general the uropathogens identified in our study are similar to those of many other studies conducted in different countries [8, 14].

Higher rate of antibiotic resistance was identified for Gram negative bacterial isolates which is comparable with the study done in Bahir Dar [14]. Among Gram negative bacteria E.coli isolates showed the greatest resistance to most antibiotics which is in conformity to study done in Bahir Dar [13]. Among Gram positive bacteria, S. aureus showed highest rate of resistance for ampicilin, norfloxacin, gentamicin, nitrofurantoin, Ceftrioxone, augmentin and nitrofurantonin which is similar to with previous studies in Bahir Dar [13], and in Addis Ababa [14]. The resistance of Gram negative and Gram positive

bacteria to nitrofurantoin was relatively low in our study. The reason could be due to the less frequent use of nitrofurantoin in the study area.

5. Conclusion

The prevalence of UTI in pregnant women in Wukari and Jalingo Local Government Areas of Taraba state is comparable with previous studies in Ethiopia and other developing countries elsewhere in the world. Conclusively, our findings showed that early screening of pregnant woman for UTI causing bacterial uropathogens and determining their antibiotic susceptibility pattern is an important intervention to prevent complications that may endanger the life of both the pregnant women and the fetus. Hence, it is recommended that both symptomatic and asymptomatic pregnant women should have antibiotics inculcated in their treatment and regular test for uropathogens should be carried out.

6. Acknowledgments

We would like to thank all the researchers that contributed to the success of this research work.

7. Ethical Considerations

Ethical clearance was gotten from the Ministry of Health Taraba State. The nature and scope of the research was made explicit to the volunteered participants and community members. Written consent was obtained from the 300 pregnant individuals included in the study.

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