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INCIDENCE OF URINARY TRACT INFECTION AMONG PREGNANT WOMEN ATTENDING AMINU KANO TEACHING HOSPITAL

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ABSTRACT

Background: To investigate the most isolated pathogens from pregnant women urine sample base on their age group during the study period.

Aim: The aim of this study is to determine the incident rate of bacterial infection among pregnant women who came for Antenatal Care at Aminu Kano Teaching Hospital Kano from January 2017 – April 2017.

Methods: Mid-stream urine samples of 150 were collected from pregnant women attending Aminu Kano Teaching Hospital, Kano and were subjected to culture and sensitivity during the period of four month. The specimens were cultured immediately on Cysteine Lactose electrolyte Deficient Medium (C.L.E.D) and incubated for 24 to 48 hours at 37^{o}C. Isolates were differentiated to Gram positive and Gram negative using Gram staining Techniques. The isolates where also identified morphologically as well as using biochemical testing.

Results: Out of The Isolates from the cultured samples were *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella aeruginosa* and *Proteus mirabilis*, *Escherichia coli* (50.0%) and *Staphylococcus aureus* (23.9%) were more prevalent than the others which shows *Klebsiella aeruginosa*(17.2%) and *Proteus mirabilis* (8.9%).But the age group with the highest prevalence rate of infection in pregnant women in this study was 21 – 30years(29.2%)

Conclusion: The result from the study indicates that out of 150 women who were tested for possible UTI, 107 of the subjects were infected. While the remaining 28 subjects were not infected and showed no form of clinical manifestation. And also *Escherichia coli* were found to be the most predominant organism among other isolates from the cultured urine.

Keywords: Urinary tract infections, *Escherichia coli*, Pregnant women, AKTH

INTRODUCTION

Urinary tract infection (UT I) is one of the most prevalent infection among pregnant women (Bahadi , El Kabbaj D, Elfazazi H, *et al*. 2010).One or more parts of urinary system become infected usually after bacteria overcome the natural defense mechanisms of the urinary tract. These infection can either be asymptomatic or symptomatic bacteriuria and is present in about 5 -10% and 1 – 3% among women that are pregnant (Gilstrap *et al.* 2001), But just few women (1%) without bacteriuria do experiences symptomatic cystitis (Patterson and Audiole, 1987). UTI can also result in complications to the fetus and also the mother (Macejko *et al* 2007).

In pregnant women physiological and hormonal changes do occur in the urinary tract which can make women that are healthier be susceptible to complications due to UTI. In view of study it is recorded that 90% of women that are pregnant do experience urethral dilatation (Hydonephrosis of pregnancy), which continue until after child birth (Santos *et al*., 2002).The literally mode of the infection is the ascending route, whereby micro organisms of the bowel flora which contaminate the urethra ascends via the bladder and moves to the kidney or prostate and this contamination is particularly during neonatal period (Azubuike *et al*., 1999).

Apart from *Staphylococcus aureus, Proteus mirabilis, klebsiella aeruginosa* and other Gram negative organism, The most common and high amount of organisms that is isolated from culture samples of pregnant women is *Escherichia coli* which share common virulence factors profiles (Obata Yasuoka M, Ba-Thein W, *et al*. 2002). UTIs might be caused by Gram-negative or Gram-positive bacteria (Flores Mireles AL, Walker JN, *et al.,* 2015).

MATERIALS AND METHODS

Study Area

This study was carried out in Aminu Kano Teaching Hospital at the Antenatal Care unit in Kano State.

Study population and samples

A total of 150 pregnant women with age range of 18 – 45 years were subjected to this study after obtaining their consent. The women were selected from Aminu kano teaching Hospital Kano after been given the go ahead by the authorities during the period from January 2017 to April 2017. Sterile urine samples for culture were collected from all studied cases.

Sampling/Data Collection

Selected women related to the presence of suspected UTI-related clinical symptoms were given specimen containers. These symptoms included hematuria, dysuria, frequent urination, painful burning sensation, abdominal pain or pressure and abdominal urine smell. All women were instructed how to give a clean-catch midstream urine specimen. They were asked to clean the area around the urethra opening with clean water, dry it and then collect a midstream urine sample by discarding the first part of the urine and collecting 10-20ml of the midstream in clean and sterile containers. Each sample were properly labeled and sent to the laboratory for culture.

Urine Examination

Macroscopic Investigation:

The urine samples were observed by their physical appearance which includes:

- The colour of the urine (i.e. Pale/Deep amber or just amber).
- The appearance of the urine (i.e. Clear or Turbid or slightly Turbid)

Microscopic Investigation:

Wet preparations were made from sediment of each urine sample after centrifugation at 3000 rpm for 3minutes. It was transferred into the center of grease free slide then covered with a cover slip .it was then viewed microscopically and examined at X40 for detection of white blood cells as an indicator of pyuria, red blood cell as an indicator of hematuria, cast, yeast cells, *T. vaginalis, S. haematobium* eggs according to the method of Cheesbrough (2006).

Urine Culture

Urine sample was cultured on CLED (cystine-lactose-electrolyte-deficient) agar using standard calibrated loop delivering 0.01 mL of urine. After streaking, plates were incubated at 37ºC for 24 to 48 hours. The plates were then examined macroscopically and microscopically for bacterial growth. The diagnosis of UTI was made when there was at least 10^5 colony forming unit (CFU)/ml of urinary tract pathogen in culture of midstream urine sample. Urine cultures with one pathogen were regarded as suspected infections, while cultures with no growth of bacteria were said to be negative. As for contaminated specimen repeated culture was performed. Identification of bacterial pathogens was confirmed by observation of Gram staining and biochemical analysis.

Method of Staining

Gram staining method was used in differentiating the organism from positive ones and negative.

Procedure:

After making a smear on a clean grease free slide and the slide was fixed by passing it through a Bunsen burner.

The slide was gently flooded with crystal violet (primary stain) and let to stand for 1 minute. The slide was tilt slightly and gently rinsed with tap water.

Secondly iodine was gently used to flood the slide and was allowed to stand for 1 minute also. The stained slide was rinsed with tap water. The smear appeared purple circle on the slide.

Acetone (Decolorizer) was used by adding drop by drop for 5 to 10 seconds. Immediately the slide was rinsed with tap water.

Safranin (counter-stain) was used to flood the slide and allow standing for 45 seconds.

The slide was tilt slightly and gently rinsed with tap water.

The slide was blotted dry.

Biochemical Testing

The following biochemical test method was used for confirmation/Identification of Isolates from cultured urine:

- Coagulase and Catalase Test :- For Identification *Staphylococcus aureus*
- Indole Test :- For Identification of *Escherichia coli*
- Citrate utilization and Oxidase Test :- For Identification of *Klebsiella aeruginosa*
- Catalase and Citrate utilization Test :- For Identification of *Proteus mirabilis*

RESULTS

In this study, a total of 107 bacterial pathogens were isolated from 150 urine samples that were sent to the laboratory for investigation of possibly urinary tract infection. **Table 1** shows the incidence report of UTIs in relations to their age group of the subjects. A higher percentage of pregnant women with UTIs were found within the age group of 21 – 30 years having (29.2%) in February. The others were age group of 31– 40years (14.3%), 18 – 20years having (13.6%), and 41– 45years (7.1 %) respectively.

Table 2 Shows the numbers and various types of organism Isolated from urine culture of pregnant women. Out of all the bacterial isolated *Escherichia coli* 50.0% was the highest occurring pathogens than other bacterial pathogens that were incriminated in this study. **Table 3** shows the general overview of bacterial pathogens isolated from the urine of pregnant women within their respective age groups.

Table 1. The number of Positive and negative case of infection in relation to age group in pregnant women from January to April 2018.

Age group	No. of urine collected	No. of positive cases(%)	No. of negative cases(%)	Total (%)	Months
18 – 20yrs	35	15(13.6)	11(11.9)	26(25.5)	January
21 – 30yrs	50	40(29.2)	7(15.9)	47(45.1)	February
31 – 40yrs	25	20(14.3)	6(4.6)	26(18.9)	March
41 – 45yrs	40	32(7.1)	4(3.4)	36(10.5	April
Total	**150**	**107(48.4)**	**28(22.1)**	**135(70.5)**	

TABLE 2: The numbers and types of organism Isolated from the urine culture of pregnant women.

S/N	Organism isolated	Number	Percentage (%)
1	*Escherichia coli*	55	50.0
2	*Staphylococcus aureus*	25	23.9
3	*Klebsiella aeruginosa*	18	17.2
4	*Proteus mirabilis*	9	8.9
Total		**107**	**100**

TABLE 3: General overview of bacterial pathogens isolated from the urine of pregnant women within their age groups.

ISOLATES	No. of isolates	Age Group (%)			
		18 – 20yrs	21 – 30yrs	31 – 40yrs	41 – 45yrs
Escherichia coli	55	15(13.9%)	26(19.0%)	9(12.7%)	5(4.4%)
Staphylococcus aureus	25	3(3.1%)	7(6.7%)	10(8.7%)	5(5.4%)
Klebsiella aeruginosa	18	Nil	6(6.2%)	9(7.9%)	3(3.1%)
Proteus mirabilis	9	3(3.1%)	1(1.4%)	5(4.4%)	Nil
Total	**107**	**21(25.8%)**	**39(30.9%)**	**33(27.2%)**	**14(16.1%)**

DISCUSSION AND CONCLUSION

The data showed that during the period of 4 months a total of 150 urine samples were collected and analyzed and a total of 107 were reported cases of Urinary Tract Infection (UTI) while 43 samples obtained where negative for suspected case of infection. This result showed that there was a high incidence of UTI among pregnant women within the ages 21- 30 years (29.2%) in February and 31 – 40 years (14.3%). This analysis is similar to the findings reported by (Adeyeba *et al.* 2002). It is suspected that the pregnant women in these group where more sexually involved with their spouse resulted to UTIs. Also UTI is more common during pregnancy because of changes in the urinary tract. The uterus sits directly on top of the bladder, as the uterus grows, its increases weight can block the drainage of urine from the bladder causing an infection. (Alfredo Ovalle, & Marco Levancini 2001)

In this result the most common pathogen isolated were *Escherichia coli* (50.0%) isolated from the urine sample collected from 150 pregnant women at Aminu kano teaching hospital. The others are *Staphylococcus aureus* (23.9%), *Klebsiella aeruginosa* (17.2%) and *Proteus mirabilis* (8.9%). It also shows that *Escherichia coli* 55(50.0%) which is more prevalent than other isolates is almost contrary to the findings of (Omonigho *et al*. 2001), whose in his own findings discovered *Klebsiella spp* to be more prevalent than *Escherichia coli* in UTIs. *Escherichia coli* normally lives harmless in the human intestinal tract, but it can cause serious infection if it gets into the urinary tract, this usually happens when tiny or even microscopic bits of feces gets into the urinary tract. In pregnant women, the trip from the anus to the urethra is a short one. This is the reason why "wiping form front to back" while cleaning after using the toilet is helpful from this study considering the fact without doubt that 107 out of 150 pregnant women who came for Antenatal Care at Aminu kano teaching hospital from January to April 2018 all were infected with bacterial infections.

Recommendations

From this study the results indicates that micro-organism are found to be responsible for urinary tract infection in pregnant women, which shows *Escherichia coli* as the major causes of the infection as well as other microbes. It is therefore recommended that UTI in pregnancy be treated with a cephalosporin being a bacteria causing infection. These can prevent urinary tract infections on both the mother and the foetus.

Also couples should be sensitized /educated on the ways of preventing urinary tract infection. It is recommended that pregnant women be properly advised on the ethics on how to clean themselves and what to do before and after using the toilet.

Government should also encourage the funding for the diagnosis and treatment of these infections in pregnant women and also Public awareness campaign programme on health education, proper maintenance of personal hygiene and construction of toilet facilities. Also pregnant women should always avail themselves for antenatal care and also either takes safety measures when having sexual intercourse with their spouse.

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