

# Isolation, Identification and Antibiogram Activity of Bacteria from Urinary Tract Infected Women in Gwagwalada, Abuja – Nigeria

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## Abstract

This research shows that that 15 out of 30 samples collected and screened for UTI yielded positive bacterial culture. Gram negative bacteria (*Salmonella typhi* 13(86.7) % and *Klebsiella* spp 2(13.3) %) was observed to be the major bacteria in this study and they were almost sensitive to ciprofloxacin and tarivid.

**Keywords:** UTI (Urinary Tract Infection), Pregnant Women, Prevalence

## Introduction

UTIs become more common as people become older with 25-50% of women aged between 80 and up having bacteriuria. UTIs are caused by interactions among the uropathogen as well as the host, and their aetiology is complicated. The uropathogenic organism first adheres to the epithelial surface before colonizing and disseminating all across the mucosa, producing tissue destruction [1].

It is among the greatest prevalent bacterial infections encountered in a clinical practice, especially in developing nations with high percentage of morbidity and economic cost, poor hygiene practices and urinary system abnormalities have been identified as some of the variables that predispose to UTI. The agents that causes UTI differ from one location to the next, as do their sensitivity and development of resistance [2].

## Materials and Method

30 mid stream urine samples were collected from pregnant women in sterile containers from the university of Abuja Teaching hospital. Samples were then transported to the microbiology laboratory of University of Abuja within 1hour of collection. Verbal informed consent was obtained from all patients prior to specimen collection and the study was conducted after obtaining due ethical approval from the ethical committee of the hospital

Urine samples were cultured on different media including Cysteine Lactose Electrolyte Deficient (CLED) agar, MacConkey agar, Eosin Methylene Blue (EMB) agar, Mannitol Salt Agar and incubated at 37o C for 24hours. Thereafter, bacteria were isolated and purified by streaking four times on the same media [3]. The suspected colonies were observed and antimicrobial susceptibility test was done by Kirby-Baure method [4].

## Results

**Table 1: Identification of Isolates**

No of positive cases	Sample	Color of colonies	organism	Media
5	5a	-	-	MSA
		Mixture of black centred and pink	<i>Salmonella typhi</i> and <i>Klebsiella</i> spp	EMB
		Mixture of black and red	<i>Salmonella typhi</i> and <i>Klebsiella</i> spp	SS
		Mixture of colorless and pink	<i>Salmonella typhi</i> and <i>Klebsiella</i> spp	MA

		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	5b	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	5c	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	5d	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	5e	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
Mixture of blue-green and yellow		Salmonella typhi and Klebsiella spp	CLED	
7	7a	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	7b	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	7c	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	7d	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	7e	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	7f	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB

		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	7g	-	--	MSA
			Salmonella typhi and Klebsiella spp	EMB
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
2	2a	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
	2b	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
		Mixture of black and red	Salmonella typhi and Klebsiella spp	SS
		Mixture of colorless and pink	Salmonella typhi and Klebsiella spp	MA
		Mixture of blue-green and yellow	Salmonella typhi and Klebsiella spp	CLED
1	1a	-	-	MSA
		Mixture of black centred and pink	Salmonella typhi and Klebsiella spp	EMB
			Salmonella typhi and Klebsiella spp	SS

**Abbreviation:** MSA-Manitol Salt Agar, MA: MacConkey Agar, SS: Salmonella Shigella Agar, EMB: Eosin Methylene Blue Agar, CLED: Cysteine Lactose Electrolyte Deficient Agar.

**Table 2: Prevalence of Urinary Tract Infection in Relation to Age**

Age Range(Years)	Total Number of Sample Tested (%)	Number of Positive Cases (%)	Number of Negative Case (%)
20-24	7(23.3)	5(33.3)	2(13.3)
25-29	13(43.3)	7(46.7)	6(40.0)
30-34	9(30.0)	2(13.3)	7(46.7)
35-39	1(13.3)	1(6.7)	0(0.0)
Total	30(100)	15(50.0)	15(50.0)

**Table 3: Frequency of Isolation of bacterial pathogens**

Isolates frequency %
Salmonella typhi 13(86.7)
Klebsiella spp 2(13.3)

**Table 4: Overall Prevalence with Age Distribution of Bacterial Pathogen**

Isolates	No. of positive cases	20-24	25-29	30-34	35-40
Salmonella typhi	13(86.7)	4(30.8)	7(53.8)	1(7.7)	1(7.7)
Klebsiella pneumonia	2(13.3)	1(50.8)	Nil	1(50.0)	Nil
Total	15(100)	5(33.3)	7(46.7)	2(13.3)	1(6.7)

**Table 5: Antibiogram of Isolated Bacteria**

	Salmonella typhi	Klebsiella spp
CPX	11(84.6)	2(100)
AM	3(23.1)	2(100)
AU	0(0.0)	0(0.0)
CN	1(7.7)	2(100)
PEF	7(53.8)	2(100)

OFX	8(61.5)	2(100)
S	5(38.5)	1(50.0)
SXT	4(30.8)	2(100)
CH	5(38.5)	2(100)
SP	5(38.5)	2(100)

**Abbreviation:** CPX: Ciprofloxacin, AM: Amoxicillin, AU: Ceprin CN: Augementin, PEF: Gentamycin, OFX: Tarivid, S: Streptomycin, SXT: Pefloxacin, CH: Chloramphenicol, SP: Sparfloxacin

### Discussion

Table 1 shows the colour of organisms on the selective media used. In all the positive samples there was a mixture of black centred and pink colonies on EMB agar which shows the presence of Salmonella typhii and Klebsiella spp, on SSA there was a mixture of black and red colonies which shows the presence of Salmonella typhii and Klebsiella spp. there was a mixture of colourless and pink colonies which shows the presence of Salmonella typhii and Klebsiella spp on MacConkey agar. On CLED agar there was a mixture of blue-green and yellow colonies which indicates the presence of Salmonella typhi and Klebsiella spp respectively. there was no colony on MSA which indicates the absence of gram-positive organisms.

The prevalence of urinary tract infection in relation to age is shown in table 2. The prevalence of urinary tract infection was highest among the age group 25-29 years with prevalence of 46.7%, this was followed closely by 33.3% prevalence in the age group 20-24 years. The age group 30-34 years has a prevalence rate of 13.3% and 35-39 years had a prevalence rate of 6.7%.

Table 3 shows the frequency of isolation of bacteria pathogens in the subjects of 15 bacterial pathogens, Salmonella typhi 13(86.7) % was the most common bacteria pathogen isolated followed by Klebsiella spp 2(13.3) %

Table 4 shows the overall prevalence with age distribution of bacterial pathogen in UTIs among pregnant women, this indicates that the highest number of bacterial isolates was obtained from pregnant women within the age bracket of 24-29 years followed by 20-24 years.

Table 5 shows the antibiogram activity of ten different antibiotics on the isolated Salmonella typhi and Klebsiella spp.

### Conclusion

This study investigated the susceptibility pattern of different bacteria isolated from urinary tract infection to different antibiotics. 15 uropathogenic bacteria were isolated from 30 urine samples taken from patients attended to university if Abuja Teaching hospital. The patients were females aged between 20 to 40 years. The Bacteria obtained from urine sample were cultured and tested for antimicrobial susceptibility to 11 different antibiotics. Urine samples were cultured on different media and incubated, thereafter, bacteria were isolated and purified by streaking four times on the same media; isolates were identified according to media. The isolated strains of bacteria were tested for their susceptibility to some antibiotics using disc diffusion method. The antagonistic activity was evaluated by observing a clear zone of inhibition growth.

Based on the findings of this research, we can therefore infer that Salmonella typhi is the common cause of urinary tract infection in pregnant women and suggest Tarivid and ciprofloxacin as the experimental treatment of urinary tract infection.

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