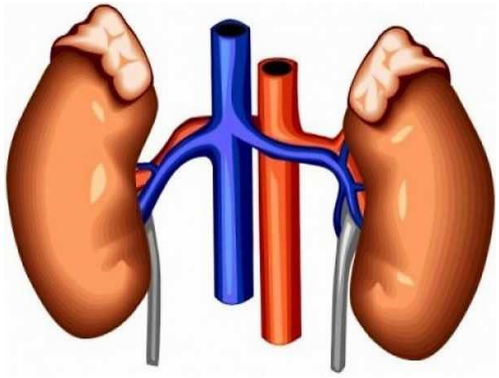
BACTERIOLOGY & ANTIBIOTIC SENSITIVITY PATTERNS OF URINARY TRACT INFECTION IN A TERTIARY HOSPITAL IN BANGLADESH





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Original Article

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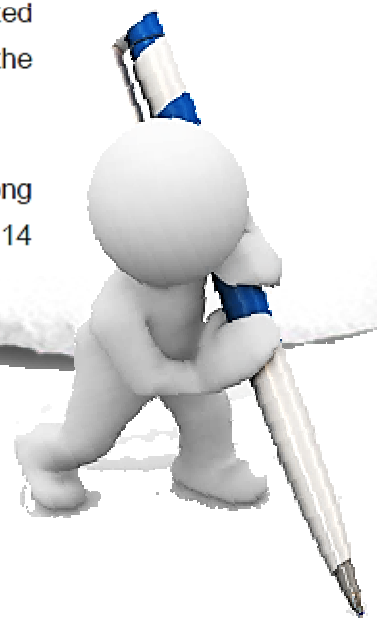
M. I. Majumder[1], T Ahmed[2], D Hossain[3], S Begum[4]

Summery

Background: Urinary tract infection (UTI) is common bacterial infection in mankind. The changing antimicrobial sensitivity in UTI demands use of appropriate antibiotics.

Material and Methods: A prospective study was performed in Comilla Medical Collage during the period of January 2011 to December 2011 with 551 adult patients presented with symptoms suggestive of UTI. The study was designed to isolate and identify the nature of bacteria in UTI with their sensitivity pattern to common antibiotics.

Results: Of the 551 tested sample 131 samples showed growth of pathogens among which the most prevalent were E. coli 98 (75%) followed by Klebsiella pneumonia 14



Ref: Mymensingh Med J. 2014 Jan;23(1):99-104.
Index with PubMed, MEDLINE Research gate



- Urinary tract infection (UTI) is the common bacterial infection in mankind.[1]
- Cystitis - .70 episodes / person / year.[2]
- Worldwide, about 150 million people are suffer from UTI / year, costing 6 billion US dollars.[3]
- Females are more affected than males except at the extremes of life.[4]

1. Emerg Infect Dis, 2005,11(10):1503-6.
2. NEJM 2012; 366:1028-37.
3. J. Cell Tissue Res., 2005, 5(2), 445-448.
4. BMJ 2000, 321:1368-1369.



- Uncomplicated UTI are common in adult women across the entire age spectrum, with mean annual incidence of 15% and 10% in those aged 15-39 and 40-79 years, respectively.[5]

5. J Pak Med Assoc. vol 60, no1, 2010



- Almost 95% of cases of UTI are caused by bacteria that typically multiply at the opening of the urethra and travel up to the bladder.[4]
- Pyelonephritis usally blood borne infection.

4. BMJ 2000, 321:1368-1369



- Usually 10^5 cfu/ml colony count is considered significant in urine C/S.
- But in 30-50% cystitis colony count is10^2 -10^4cfu/ml.[6]
- Upto 2/3rd cases of recurrent infections – are recurrences of initial infection.

6. NEJM 2012; 366:1028-37.



- E.coli is responsible in 75-95% cases.
- Staphylococcous ranks 2nd, than Proteus,Klebsiella and others.
- Recurrence – 25% within 6 months of 1st episode.[6]

6. NEJM 2012; 366:1028-37.



- Globally – first line sensitive drugs are:

  »Nitrofurantoin, Fosfomycin, Cotrimoxazole & Pivmecillinum[6]

- Prevalence of resistance – if >20% with Cotrimoxazole & > 10% with Flouroquinolones.

6. NEJM 2012; 366:1028-37.

Background of the study

- The changing antimicrobial resistance caused a demand for new microbial agents.[1]

- The irrational use of antibiotics has an influence in the spread of antimicrobial resistance among bacteria.[2,4]

1. Emerg Infect Dis, 2005,11(10):1503-6.
2. J. Cell Tissue Res., 2005, 5(2), 445-448.
4. BMJ 2000, 321:1368-1369.

Background of the study

- The widespread use of broad spectrum antibiotics has led to the emergence of nosocominal infection caused by drug resistant microbes.[7]

- The local data about the antimicrobial sensitivity should be available for proper therapeutic interventions of UTI.

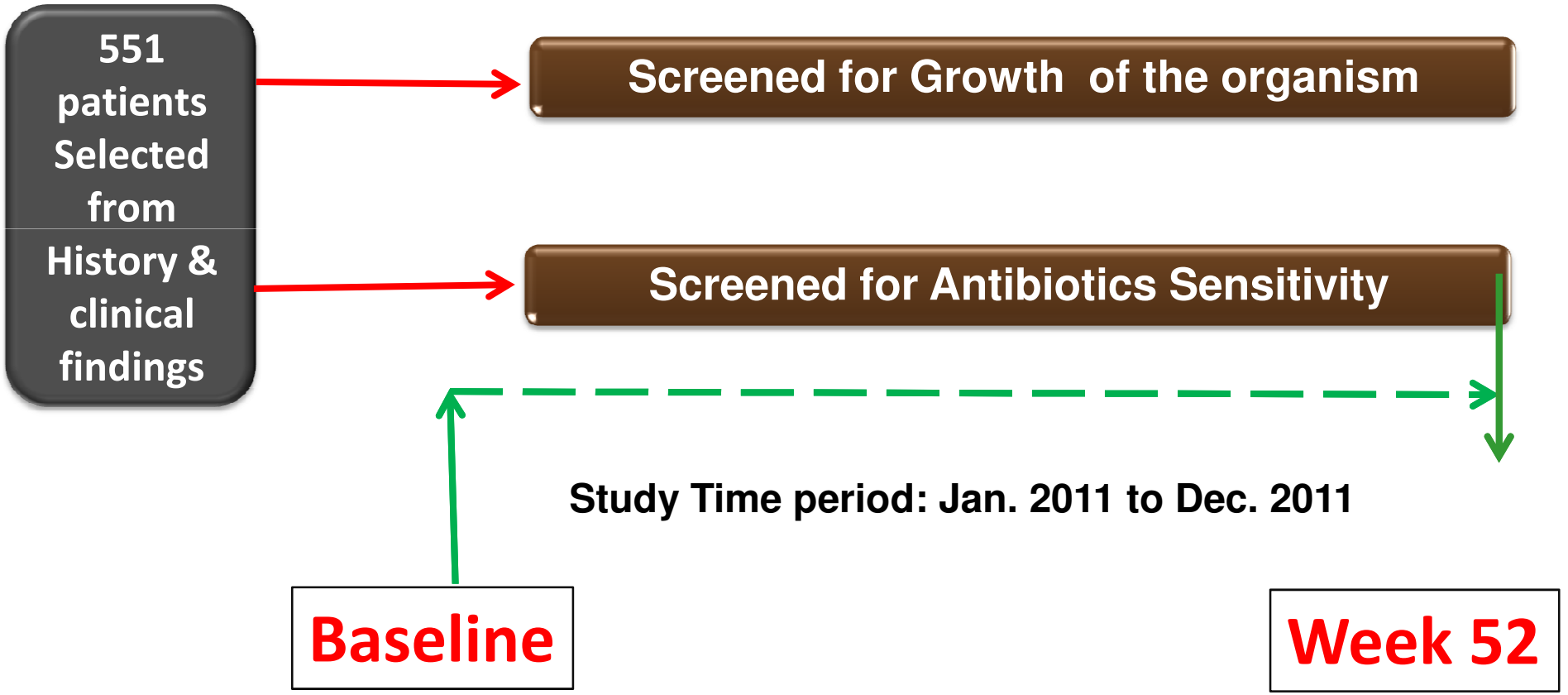
7. J. Clin. Microbiol. 2006, 44:3318-3324.

Basic Study Objective/ Aim

The aim and objective of this study was to detect culture and sensitivity pattern of bacteria implicated in UTI which will help to adopt more effective strategies in treatment of UTI.



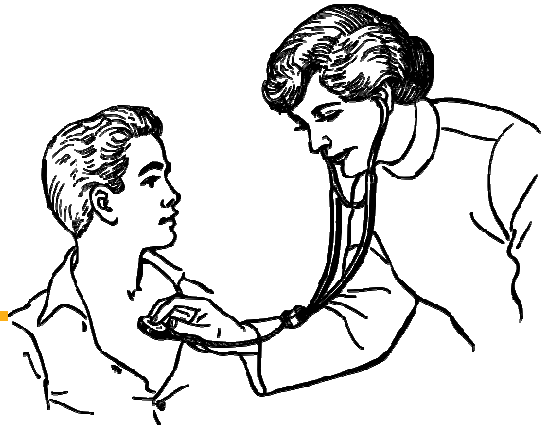
Study Design



Baseline Patient Characteristics

Male, N (%)	**221 (40.10)**
Female, N (%)	330 (59.90)
Age	Over 12 Years
Type	Asian, Bangladeshi

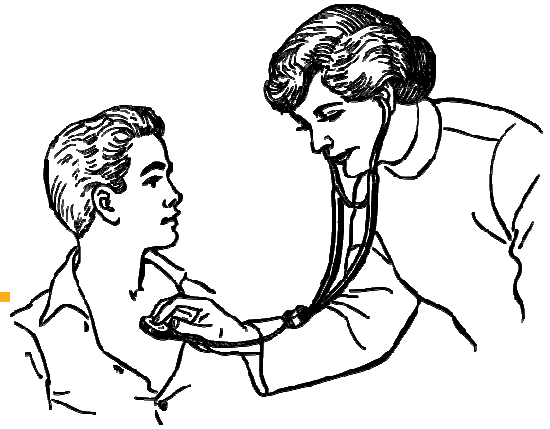
Materials & Methods



Inclusion criteria:

- Patients above 12 years of age.
- Presented with the complains of dysuria, frequency, urgency and fever with pain in suprapubic area / lion with or without tenderness.
- Those patients are on antibiotic advised to stop drug for 48 hours and included in this study.

Materials & Methods



Exclusion Criteria:

- Patients presented with active menstruation PID, tuboovarian, disease, appendicitis, colitis, epididymitis and orchitis diagnosed either clinically or by investigations were excluded from this study.

Materials & Methods



- Prospective study in Comilla Medical Collage including 551 adult patients presented with symptoms suggestive of UTI.
- Study period was in between January 2011 to December 2011.
- Urine samples were collected both from the out patients and inpatients dept. of Medicine.



Materials & Methods



- The mid-stream urine specimens were collected and cultured within hour of collection.
- The samples were incubated aerobically overnight at 37ºc after plated out on MacConkey and Blood agar media.
- The characteristic bacteria on the culture media were isolated.



Materials & Methods



- Antimicrobial sensitivity tests were carried out by disc diffusion technique Kirby- Bauer disc diffusion technique as recommendation of CLSI (Clinical and Laboratory Standard Institute)
- The plates were then incubated at 37℃ for 18-24 hours.



Materials & Methods



- Growth of $>10^5$ cfu/ml was considered as significant growth.

- Interpretation of results was expressed in ***sensitive, moderate sensitive and resistant***

CONTINUE

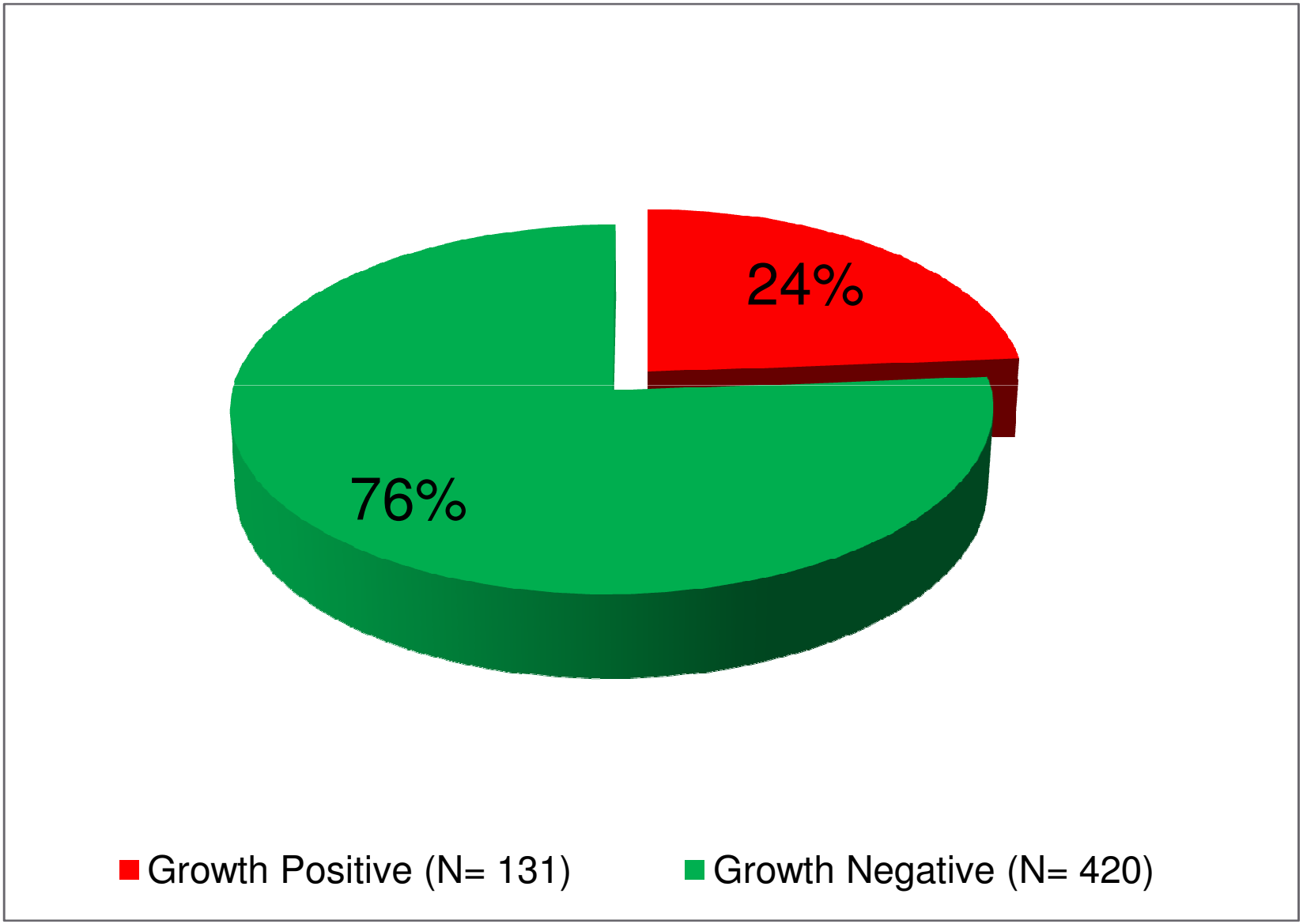
Materials & Methods



- The Antibiotics used for susceptibility testing in our study were
  - ***amoxycillin,***
  - ***amoxyclav,***
  - ***cefotaxime,***
  - ***ceftriaxone,***
  - ***cephalexin,***
  - ***nalidexic acid,***
  - ***nitrofurantoin,***
  - ***mecillinum,***
  - ***amikacin,***
  - ***cefixime,***
  - ***ceftazidime***
  - ***cefuroxime,***
  - ***cephradine***
  - ***ciprofloxacin***
  - ***cotrimoxazole,***
  - ***gentamycin,***
  - ***meropenem,***
  - ***and imipenem.***

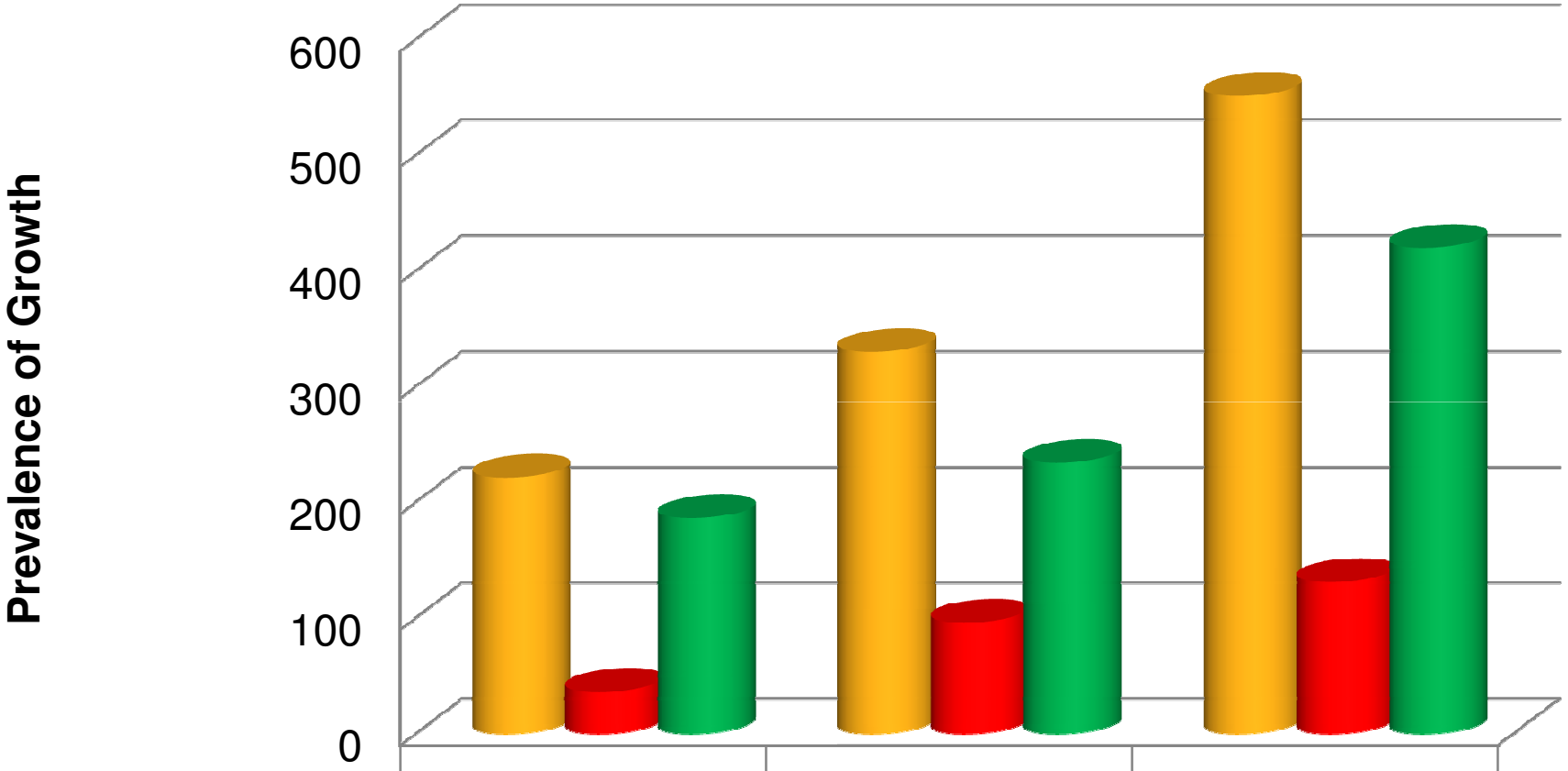


Results



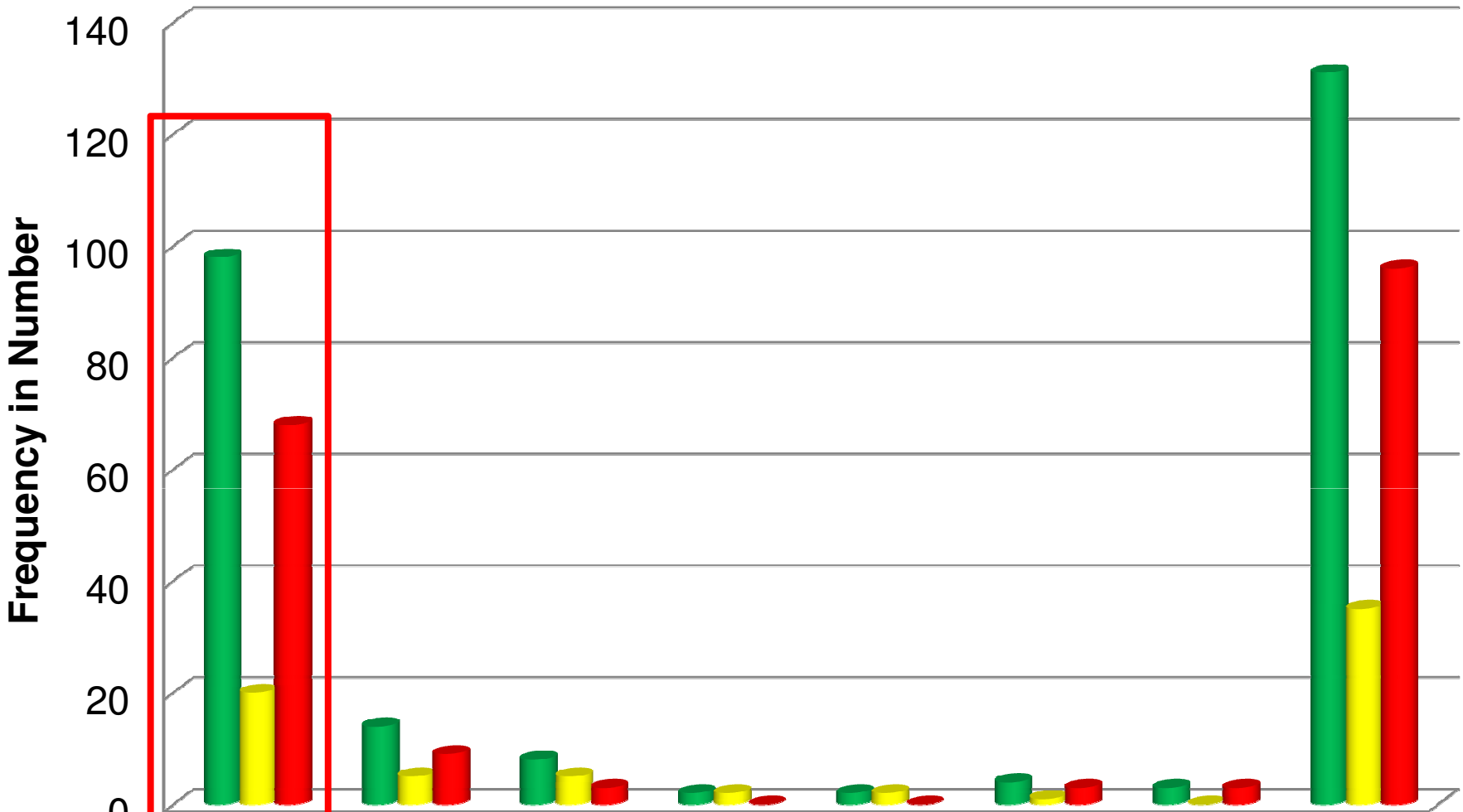
Results

Overall prevalence of growth and there sex distribution.



	Male	Female	Total
No of tested	221	330	551
No of Growth	36	96	131
No of NO Growth	186	234	420

Frequency of Isolation of organism in relation to sex of pts.



	E. coli	Klebsiella	Enterococcus	Pseudomonas	Proteus	Staph. aureus	E. coli & Klebsiella	Total
Number	98	14	8	2	2	4	3	131
Male	20	5	5	2	2	1	0	35
Female	68	9	3	0	0	3	3	96

z/p values(affected total females vs males): 5.36/<.001

In vitro antibiotics sensitivity and resistance pattern of organism.

No.	Name of antibiotics	Sensitivity pattern			Resistance pattern
		Sensitive (%)	Moderately Sensitive (%)	Total (%)	
01	Imipenem	129 (98.5)	2(1.5)	131(100)	0(0)
02	Meropenem	127 (97)	1(1)	128(98)	3 (2)
03	Amikacin	127 (97)	1(1)	128(98)	3 (2)
04	Nitrofurantoin	115 (88)	4(3)	119(91)	12 (9)
05	Gentamycin	112(85)	1(1)	113(86)	18(14)
06	Mecillinum	109(83)	4(3)	113(86)	18(14)
07	Amoxyclav	74 (56)	26 (20)	100(76)	31 (24)
08	Ceftriaxone	47 (36)	6(4)	53(40)	78 (60)
09	Cefotaxime	41 (32)	10(7)	51(39)	80 (61)

In vitro antibiotics sensitivity and resistance pattern of organism. Cont....

No.	Name of antibiotics	Sensitivity pattern			Resistance pattern
		Sensitive (%)	Moderately Sensitive (%)	Total (%)	
10	Cotrimoxazole	44 (34)	6(4)	50(38)	81 (62)
11	Cefuroxime	47 (36)	2(1)	49(37)	82(63)
12	Cephradine	31 (24)	17(13)	48(37)	83(63)
13	Cephalexin	35 (27)	11(8)	46(35)	85 (65)
14	Ciprofloxacin	36 (27)	9(7)	45(34)	86 (66)
15	Cefixime	38 (29)	2(1)	40(30)	91 (70)
16	Nalidexic acid	28 (22)	5 (3)	33(25)	98 (75)
17	Amoxycillin	17 (13)	0 (0)	17(13)	114 (87)

Overall Discussion

- 131 (23.77%) urine samples gave significant growth and no bacterial growth was recorded in 420 (76.23%) samples.
  - Cause of failure to growth in 76.23% samples possibly due to irregular intake of long acting antibiotics by our patients.
  - Research on UTI by ICDDRB observed growth only in 24.14% samples which was consistent with our study.



Overall Discussion

- **The most predominant organisms** isolated were Echeriachia coli (75%) and Klebsiella (10.7%).
- UTI was found **more in females than males.**
- **New Findings**: cotrimoxazole was found to be useful only in 44% cases.



Overall Discussion

- Study shows cephalosporin and fluoroquinolones are no more useful against uropathogens,
  - *only 30-40 % found sensitive to different members of cephalosporins.*
  - *& only 34% were sensitive to ciprofloxacin.*

Overall Discussion

- **The most powerful parentral antibiotics** in this study were imipenem, meropenem and amikacin as they shows efficacy against 98-100% of the isolates which was supported by data from other similar studies.[1]

1. *The Open Conferance Procedings Journal,2010,1:192-96.*

Conclusion

- This study concludes that urinary isolates were more sensitive to imipenem, meropenem, amikacin and nitrofurantoin in comparison to the other antibiotics in this region.

Contd…

- There is every need to -
  - constantly monitor culture and sensitivity pattern of specific pathogens in different health care centre.

- Guidelines for appropriate use of antibiotics in tertiary care hospitals in our country needs updating by large scale prospective study.

Say bye to UTI



THANK YOU