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RESEARCH ARTICLE

BACTERIOLOGICAL PROFILE OF URINARY TRACT INFECTION (UTI) AND THEIR ANTIBIOGRAM IN WOMEN OF REPRODUCTIVE AGE GROUP IN A TERTIARY CARE HOSPITAL

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Abstract

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Introduction:-

Urinary tract infection (UTI) is the most common bacterial infection and it is a serious health problem that occur in millions of people. In each year, worldwide about 150 million people are diagnosed with UTI.Urinary tract infections (UTIs) are infections caused by the presence and growth of microorganisms anywhere in the urinary tract. Women are more prone to urinary tract infections due to short urethra and it is closer to anal sphincter. More than 50% of women develop at least one episode of UTI at some point in their lifetime, and many will have recurrences.The most common symptoms are dysuria and frequency.More than 80% of the patients with UTI complains of urinary tract symptoms, one third or more of the patients with these symptoms do not have bacteriuria.More than 90% of UTI are effectively diagnosed by history alone. Almost in all cases of UTI, empirical antimicrobial treatment initiates before getting the laboratory results of urine culture.Antibiotic resistance may increase in uro-pathogens due to frequent use of antibiotics.Most of the UTIs are less severe, but such infections can cause patients significant distress and are associated with high healthcare costs and social burden.The present study was done to find out the causative organisms of UTI in females with reproductive age group and antibiotic susceptibility pattern in a tertiary care hospital.

Methods:-

This is a prospectivestudy done in the department of Microbiology,Siddhartha Medical College, Vijayawada for a period of 10 months (October 2019-July 2020).150 samples were collected from females of reproductive age group(15-45yrs) who were symptomatic and clinically suspected for UTI.Clean catch mid-stream urine specimens were collected for culture.The samples were processed by using standard conventional culture methods, incubated aerobically at 37◦ C for 24 hrs.The isolated bacteria were identified phenotypically by Gram's stain, motility and biochemical tests with proper standardization using ATCC control stains.Antibiotic susceptibility pattern of isolated organisms were determined on Muller-Hinton agar by using Modified Kirby-Bauer disc diffusion methods, and results were interpreted as per CLSI guidelines.

Result:-

Out of 150 samples processed, 46(30.66%) samples were culture positive for UTI. 104(69.33%) samples were culture sterile. Among 46, both gram negative31(67.39%), gram positive bacteria15(32.60%) were isolated. Among gram negative bacteria Escherichiacoli 20(64.51%) was most commonly isolated organism followed by Klebsiella

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8(25.80%), Pseudomonas 2 (6.45%)and Acinetobacter 1 (3.22%). Among gram positive bacteria Staphylococcus spp 12 (80%)was the predominant organism followed by Enterococcus spp 3 (20%).

Gram positive bacteria were sensitive to Vancomycin (100%), Linezolid (100%), Nitrofurantoin (93.33%), Amikacin (86.66%). Resistant to Nalidixic acid (86.66%), Ampicillin (73.33%) Norfloxacin (80%).

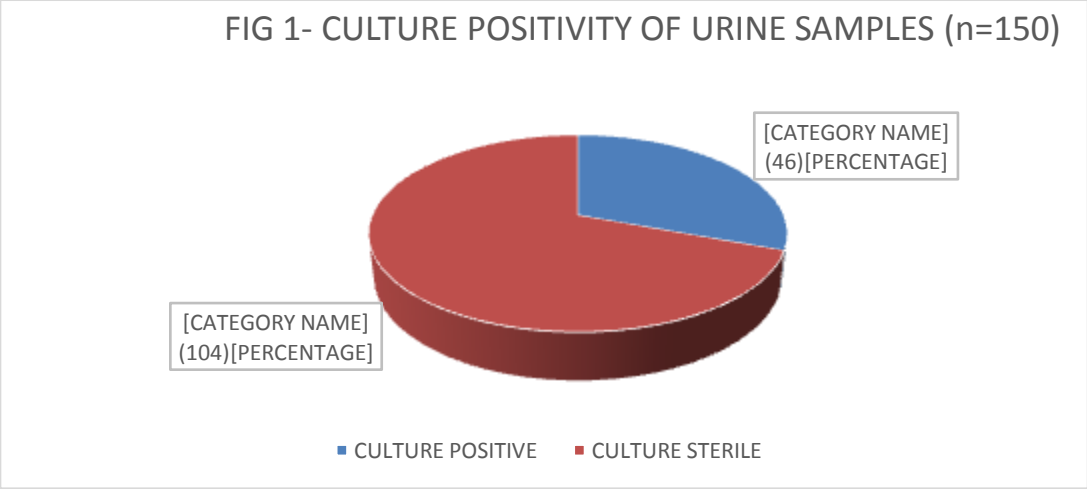
Gram negative bacteria were sensitive to Meropenem(100%),Nitrofurantoin(93.54%),Amikacin(90.32%),Ceftriaxone+Sulbactum(83.87%),Ciprofloxacin(83.87%)Cefixime(77.41%),Norfloxacin(54.83%)and resistant to Amoxyclav(8O.64%), Nalidixicacid(77.41%),Cotrimoxazole(74.19%).

Discussion:-

Urinary tract infection (UTI) is one of the most common bacterial infection seen in women with reproductive age group.UTI is one of the major reason for frequent outpatient hospital visits and frequent cause of morbidity in patients. By knowing of correct uropathogens and their antibiotic susceptibility from positive cultures can reduce the frequent use of antibiotics. This study with culture positivity result of 30.66% (46 samples), is similar with the results of Rozina Aktar Zahan , salwah H Almukhtar and Taye et.al ,following as 33.55%, 27.39% and 26% respectively. Some of the studies showed low culture positivity i.e Alemu et al 10.4%, Sabita R et al 16.8%, Gasses et al 18.7%, Muthulakshmi et al 20.4%, Zeleke Gizachew 22.9%.Similarly high urine culture positivity was showed by Al-Zaharani et al 56.46%,Paudel et al 54%, Tahira et al 49.62%, Shaifali et al 45.32%, Thapa et al 43.3%, Sadia saber 41.20%.The present study showed both isolates of gram negative 67.39% and gram positive organisms32.60%, which correlates with the other studies Alemu et al with 67.5% gram negative and 32.5% gram positive isolates, Gassese et al with 69.6% gram negative and 30.4% gram positive organisms.

The most commonly isolated uropathogen in thisstudy was Escherichia coli 43.47%, which has similarity with studies of Tahira et al 49.3%, Alemu et al 47.5%, Sabita R et al 69%, Gassese et al 66.7%, Sadia Saber 64%, Paudel at al 62.35%.Among gram negative isolates also Escherichia coli is the predominantly isolated organism which coincides with above studies, where E.coli has showed most common uropathogen, followed by Klebsiella pneumoniae. Staphylococcus species 26.08% were the most common gram positive isolates,similar results were found by Sadia Saber 19%, Muthulakshmi et al 12%.Among staphylococcus sp., Coagulase negative staphylococcus(CONS) were predominant isolates followed by Staphylococcus aureus,which showed similar results with the study of Alemu et al.

Gram negative bacteria were sensitive to Meropenem(100%) Nitrofurantoin(93.54%), Amikacin(90.32%), Ceftriaxone+Sulbactum(83.87%), Cefixime(77.41%),Norfloxacin(54.83%) which were correlates with other studies Al-Zahrani et.al, Alemu et.al, Thapa et.al, Tahira et.al, and resistant to Amoxyclav(80.64%),Nalidixic acid(77.41%),Cotrimoxazole(74.19%), which were in line with other studies Tahira et.al.Gram positive bacteria were sensitive to Vancomycin (100%), Linezolid(100%), Nitrofurantoin(93.33%), Amikacin(86.7%), which showed similarity with Tahira et.al, Baneerjee et.al, and Resistant to Ampicillin(86.7%), Nalidixic acid(73.4%), Norfloxacin(80%), Ciprofloxacin(80%),which correletes with the studies of Tahira et al,Alemu et.al.



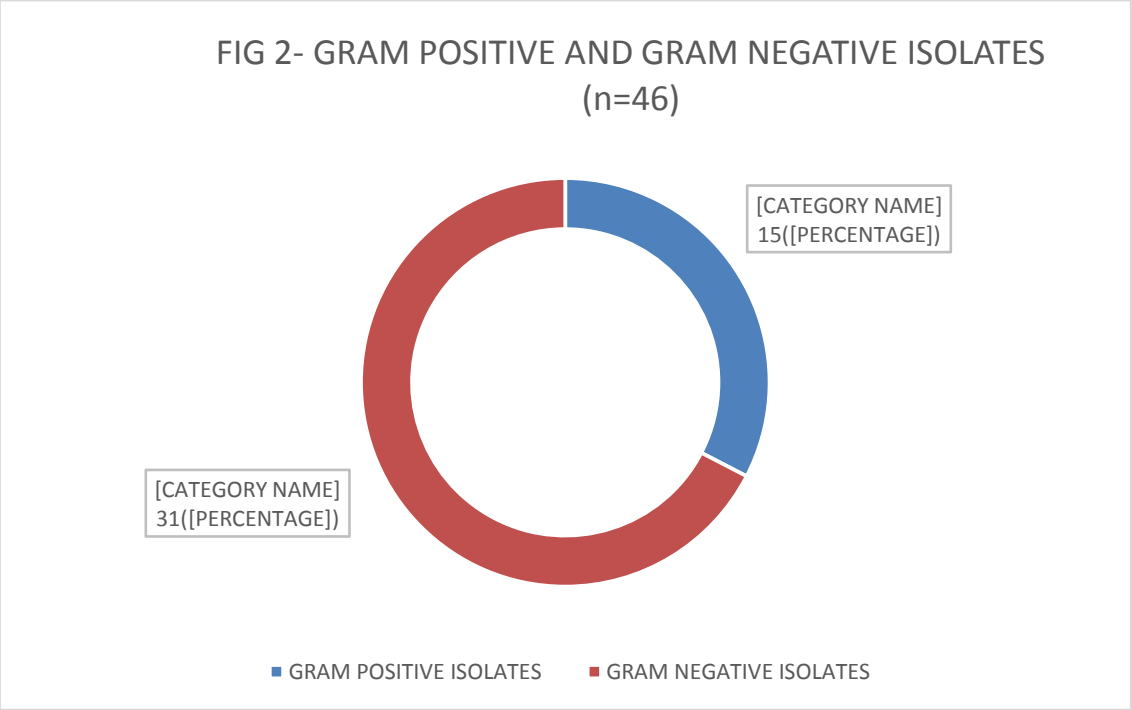


FIG 2- GRAM POSITIVE AND GRAM NEGATIVE ISOLATES (n=46)
[CATEGORY NAME] 15([PERCENTAGE])
[CATEGORY NAME] 31([PERCENTAGE])
GRAM POSITIVE ISOLATES
GRAM NEGATIVE ISOLATES

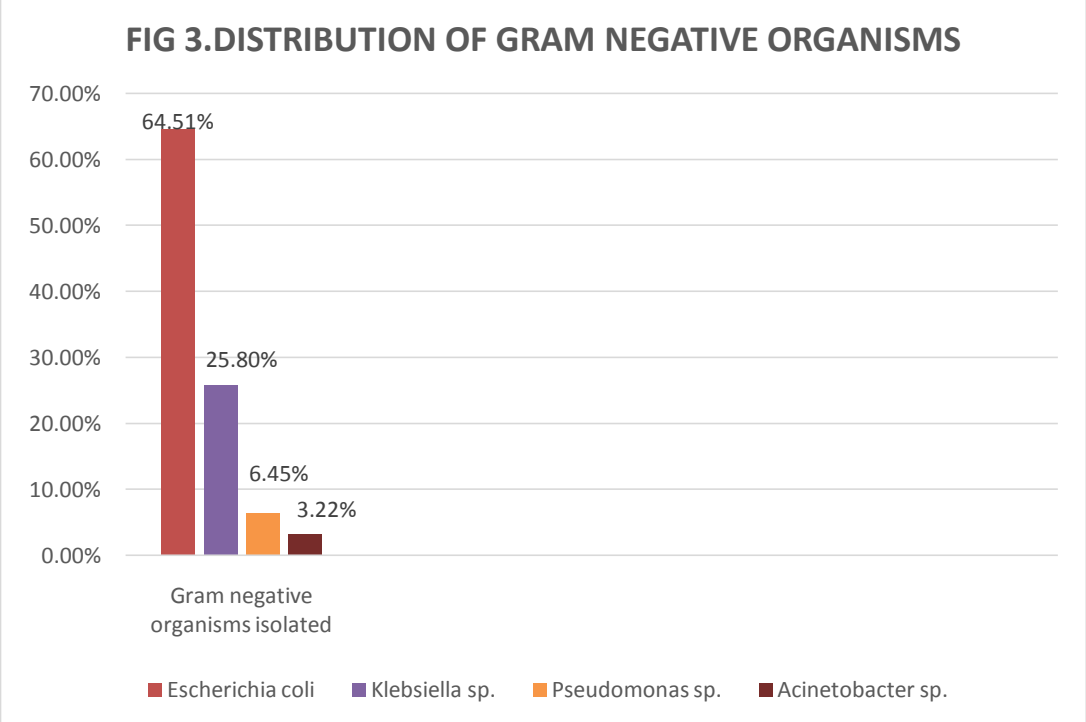


FIG 3.DISTRIBUTION OF GRAM NEGATIVE ORGANISMS
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
64.51%
25.80%
6.45%
3.22%
Gram negative organisms isolated
Escherichia coli
Klebsiella sp.
Pseudomonas sp.
Acinetobacter sp.

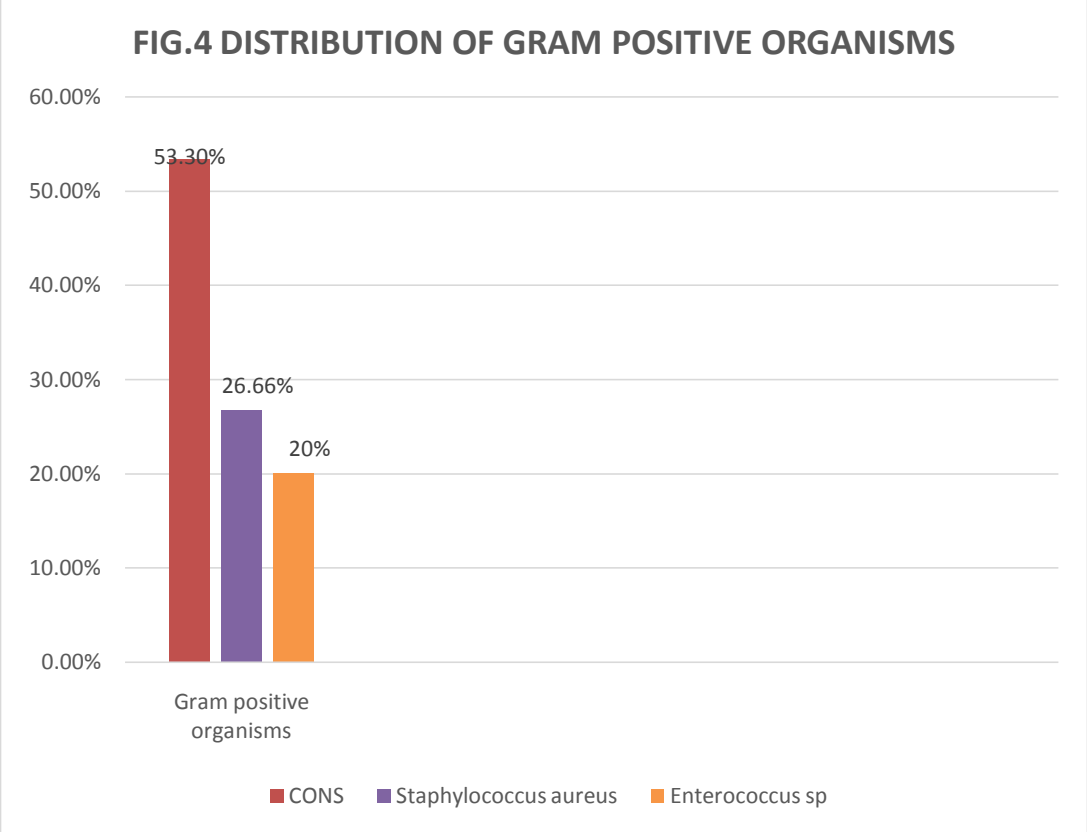


FIG.4 DISTRIBUTION OF GRAM POSITIVE ORGANISMS
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
53.30%
26.66%
20%
Gram positive organisms
CONS
Staphylococcus aureus
Enterococcus sp

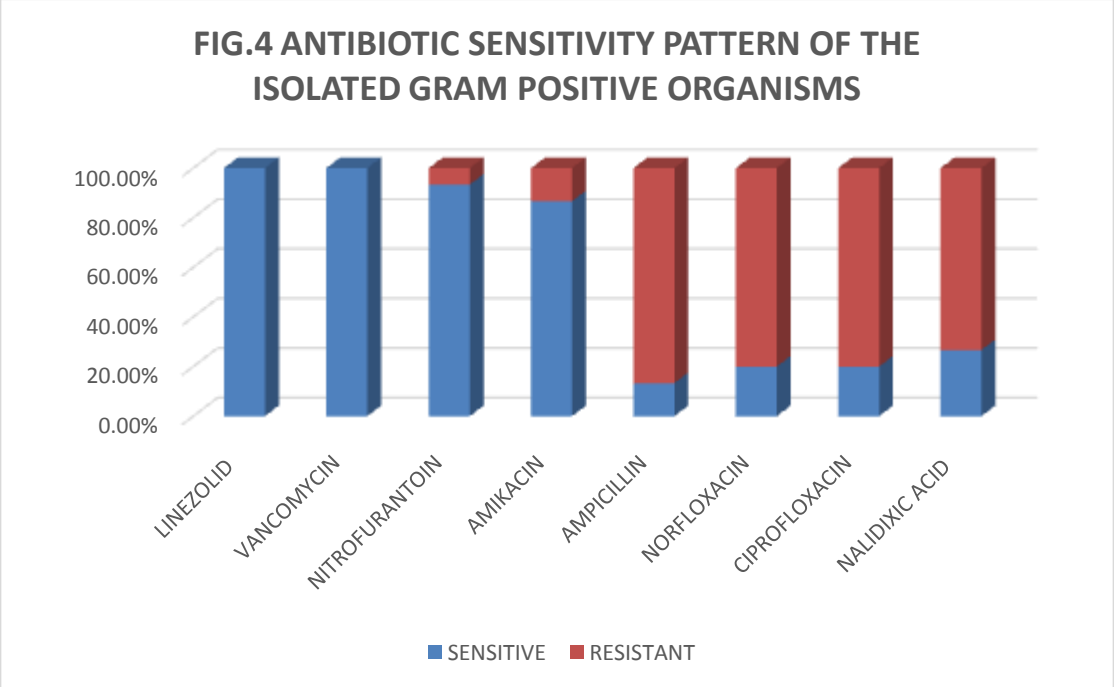
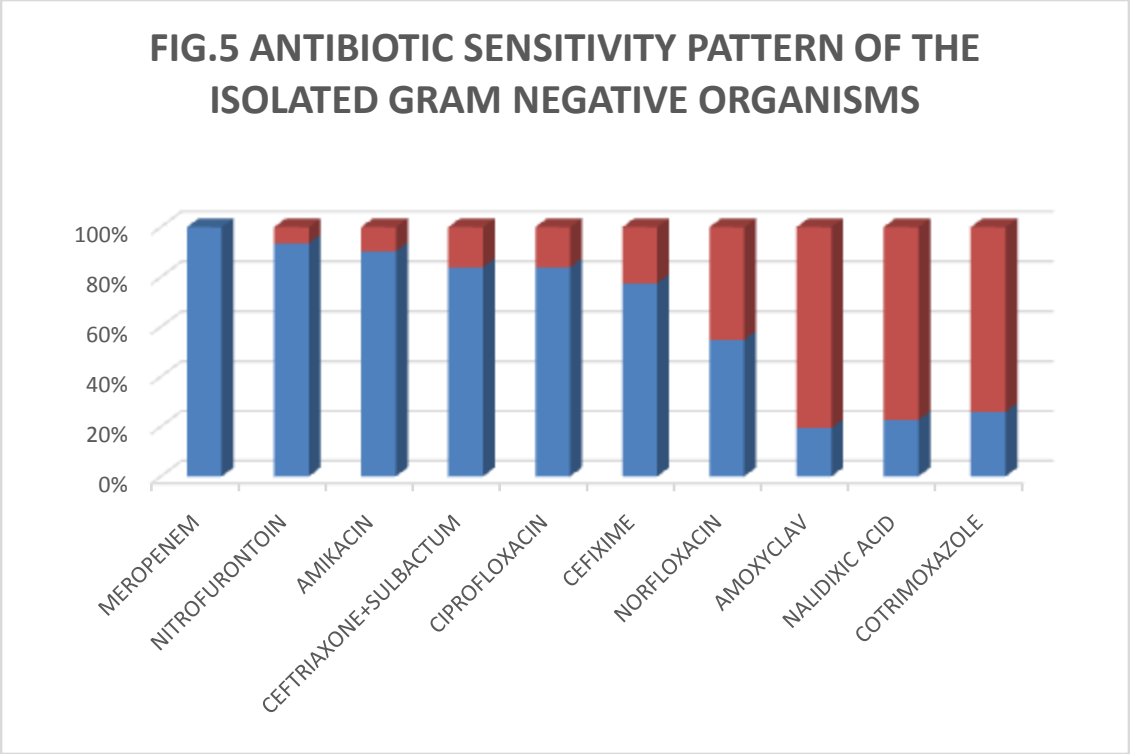


FIG.4 ANTIBIOTIC SENSITIVITY PATTERN OF THE ISOLATED GRAM POSITIVE ORGANISMS
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
LINEZOLID
VANCOMYCIN
NITROFURANTOIN
AMIKACIN
AMPICILLIN
NORFLOXACIN
CIPROFLOXACIN
NALIDIXIC ACID
SENSITIVE
RESISTANT



Conclusion:-

The study shows that themost common cause of UTI in females with reproductive age groupis Escherichia coli followed byStaphylococcus spp.It is necessary to know the susceptible drugsfor Urinary tract infections in reproductive female age group to give appropriate empirical treatment. In this study 43(93.47%) isolateswere sensitive to Nitrofurantoin (NIT) and 41(89.13%) weresensitive toAmikacin (AK) which can be given for empirical treatment of urinary tract infections (UTI).

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