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PREVALENCE OF ASYMPTOMATIC BACTERIURIA IN NON-PREGNANT REPRODUCTIVE AGE WOMEN.

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Abstract: **Introduction:** Prevalence of asymptomatic bacteriuria in non-pregnant reproductive age women population was found to be 7.5%.The prevalence was found to be higher in the 41-43 years age group and it increases with age. **Materials and methods:** 400 non-pregnant reproductive age women were screened for the presence of asymptomatic bacteriuria. In all the cases clean catch mid-stream urine specimens were analysed by various screening methods and traditional culture technique. Culture was taken as a gold standard against which the screening methods were compared. **Results:** Maximum number of positive cases were identified in 31-40 years non-pregnant reproductive age women who formed 9% of the study. *Escherichia coli* was the predominant organism isolated (53.3%). The drug resistant pattern revealed that different bacterial species were resistant to cotrimoxazole followed by Gentamicin and Nalidixic acid. The sensitivity to drugs which are routinely used to treat asymptomatic bacteriuria such as ceftriaxone, Cefatoxime, Cipro floxacin and Amikacin were found to be less and the use of Cetriaxone with the sensitivity needs prospective study. Conclusion: Antimicrobial drug treatment is highly successful in women with symptomatic, uncomplicated urinary tract infection but ultimately, the efficacy of specific antimicrobial drugs is limited by increased antimicrobial resistance.

Keywords: Asymptomatic bacteriuria, Antimicrobial resistance, Urinary tract infection

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INTRODUCTION

Urinary tract is second only to the respiratory tract in acquiring microbial infection, especially in females because of short urethra and various positions of the urethral opening. Urinary tract infection is a relatively common medical complication of pregnancy and asymptomatic bacteriuria is the most prevalent of these infections. As observed in a few recent studies, pregnancy alone is not believed to be a predisposing factor in the development of asymptomatic bacteriuria many studies have shown the overall prevalence of bacteriuria in non pregment women ranges from 5 to 8 per cent; although in certain sub-populations lower or higher rates were reported, these differences could be explained by risk factors such as age, sexual activity, socio economic status (or) history of recurrent UTIs.

Asymptomatic bacteriuria is defined by the presence of at least 10^5 colony forming units of a urinary tract pathogen per milliliter in a culture of a midstream urine specimen obtained from an asymptomatic woman on a routine scheduled visit. Non pregnant women with asymptomatic bacteriuria are likely to have had a symptomatic infection in the past year than non-infected women of the same age. Non pregnant women with asymptomatic bacteriuria are more likely to develop pyelonephritis, chronic renal failure, septicemia, if untreated the incidence of these can be decreased by treating asymptomatic bacteriuria. The aim of the study has been to evaluate the prevalence of asymptomatic bacteriuria in non-pregnant women of child bearing age.

MATERIAL AND METHODS:

The prospective study of asymptomatic bacteriuria in non-pregnant reproductive age women was under taken by collection of 300 urine samples from women aged 15-45 years, who attended to the outpatient departments of S.V.R.R. General Hospital, Tirupati without UTI symptoms and 100 samples of urine from married women in working Women's Hostel.

Clean catch mid-stream urine about 10ml was collected in a universal container. Samples thus collected were transported to the microbiology laboratory and processed within one hour.[1] In case of delay; the sample was refrigerated at 4^0C for as long as 24 hours. The urine samples were observed macroscopically for its colour, and deposits. A drop of uncentrifuged well mixed urine was taken on a clean slide and was allowed to air dry. It was heat fixed and stained by Grams method of staining for a qualitative and quantitative study of the microorganisms, and epithelial cells present in urine.

A semi quantitative method was adopted for the primary isolation organisms using a calibrated loop which delivers 0.01 ml of urine on Blood agar with 5 % sheep blood and MacConkey's agar.

The culture plates were incubated at 37°C for 24-48 hours -: bacteriuria with $> 10^5$ cfu/ml of urine was confirmed by the count.[2]

On the basis of the colonial morphology and cultural characteristics the isolates were further identified by Gram's staining and a battery of biochemical reactions using appropriate sugars and special tests were performed according to the standard methods given in practical medical microbiology.

The antibiotic sensitivity of aerobic bacterial isolates were performed by disc diffusion method recommended by Kirby Bauer. Mueller Hinton agar plates were used for antibiotic sensitivity test. The zone of inhibition was measured and reported. A clear zone of inhibition around the disc indicates sensitivity and their absence resistance.[3]

RESULTS AND ANALYSIS:

Out of the total number of 400 non pregnant women (15-45 years) included in this study 30 (7.5%) individuals were identified by culture to have significant bacteriuria. Diagnostic criteria for asymptomatic bacteriuria at least two consecutive urine specimens with $> 10^5$ cfu/ml of urine in the absence of symptoms.

Table – 1 Prevalence of asymptomatic bacteriuria among different age groups

Age in years	Number of cases tested	Number positive significant bacteriuria	Percentage
15 – 19	61	3	4.9
20 – 30	166	11	6.62
31 – 40	154	14	9
40 – 43	19	2	10.5
Total	**400**	**30**	**7.5**

It is clearly evident from table – 1 that maximum number of tested individuals belonged to the age group between 20 – 30 yrs with 166 (6.62%) individuals, and highest percentage of positive cases of asymptomatic bacteriuria 10.5% (200/19) was identified in the 40-43 yrs group. Lower percentage of positive cases 4.9% was seen in individuals over 15-19 yrs, sixty one were studied in this groups.

Table – 2 Incidence of non-pregnant reproductive age asymptomatic bacteriuria individuals based on their socio-economic status.

Income groups	Number of cases tested	Significant bacteriuria	Percentage
Low Income	286	26	9
High Income	114	4	3.5%
Total	400	30	

Table – 2 shows the distribution of non-pregnant reproductive age asymptomatic individuals based on their socioeconomic status. The percentage of positives with significant bacteriuria were high among the lower socio economic group 9% (2600/286) which from the major population of 286 in this study. Out of the socio economic group four shows significant bacteriuria (3.5%).

Table – 3 Isolated organisms causing asymptomatic bacteriuria

S.No.	Organisms isolated	Number of organisms	Percentage
1	*Escherichia coli*	16	53.3
2.	*Klebsiella pneumoniae*	4	13.3
3.	*Staphylococcus aureus*	2	6.6
4.	*Staphylococcus aureus & Klebsiella pneumoniae*	4	13.3
5.	Enterococci	2	6.6
6.	*Proteus mirabilis*	2	6.6
	Total	30	

Table - 3 describes the pattern of isolates. Out of the total 30 isolates, 16 (53.3%) Escherichia coli were the predominant organisms isolated followed by other uropathogens such as Klebsiella spp (13.3%) Enterococci (6.6%), *Proteus mirabilis* (6.6) and four polybacterial isolates. *Staphylococcus aureus* & Klebsiella (13.3%).

Table -4 Antibiotic sensitivity pattern of 30 isolates

Organisms	Total number tested	No. & (%) sensitive to all antibiotics	No.& resistant to 2 antibiotics	(%) 1or	No.& % resistant to multiple antibiotics
Escherichia coli	16	3 (18.75)	6 (37.5)		7 (43.75)
Klebsiellapneumoniae	6	2 (33.3)	1 (16.6)		3 (50)
Proteus mirabilis	2	0	1(50)		1 (50)
Staphylococcus aureus	4	1(25)	2 (50)		1 (25)
Enterococci	2	0(0)	1 (50)		1(50)

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Out of 16 *Escherichia coli* isolated from nonpregnant reproductive age of asymptomatic individuals 3 (18.75%) were sensitive to all antibiotics, 6 (37.5%) were resistant to one or two antibiotics and 7 (43.75%) were resistant to three or more antibiotics. Among *Klebsiella pneumoniae* isolated 2(33.3%) were sensitive to all antibiotics, 1(16.6%) were resistant to two antibiotics, and 3(50%) were resistant to three or more antibiotics. From above table it can be seen that the commonest etiological agent is Escherichia coli and nearly 43.75% of them are multi drug resistant strains (MDR) though the number of isolates among the other isolates also MDR is noticed.

DISCUSSION:

The Prevalence of asymptomatic bacteriuria similar in both pregnant and non-pregnant women. Its prevention may be considerable importance not only to forestall pyelonephritis and chronic renal failure in the reproductive age of non-pregnant women. But also to reduce further complications like septicemia, toxaemia of pregnancy in later life. The early detection and follow up is necessary to overcome complications of asymptomatic bacteriuria. It is not possible to detect in non-pregnant women of reproductive age as they are aware of asymptomatic bacteriuria.

This study included 400 non-pregnant women of reproductive age. The overall prevalence of asymptomatic bacteriuria in the present study is 7.5% and it has increased with age from 4.9% to 10.5% and is in similar with previous studies where the prevalence increases from 5% to 20% has been reported.[4,5] In the present study the prevalence of asymptomatic bacteriuria in the age group of 20-30 years is 6.62% and 31-40 years is 9% this increased prevalence probably due to more sexual activity., Which is one of predisposing factor according with studies *of-Hooton TM, Scholes D, Hughes JP,* et al., 1996.[6,7]

The prevalence of infection is most closely dependent on socio economic status and is similar in both pregnant and non-pregnant women present study with regard to socio-economic status the percentage with significant bacteriuria were high among the lower socio-economic group is 9%.which from the major population of 286 in this study. Out of the high income group four shows significant bacteriuria (3.5%). This high prevalence of asymptomatic bacteriuria in low income group is in agreeable accordance with studies of *Bengtsson C, Bengtsson U Lincoln* 1980)[8]. Among the total 30 isolates of asymptomatic bacteriuria, *Eacherichia coli* (53.3%) were the predominant organisms. And this may be because of special uropathogenic potentiality of some of the Escherichia coli strains this accordance with *JRantz* 1962 .[9]

Other pathogens are Klebsiella (13.3%) *Proteus mirabilis* (6.6%). *Staphylococcus aureus* 6.6% this may be because of descending route of infection i.e hematogenous route of infection. This is in accordance with *(Kunin CM* 1994) Hematogenous spread accounts for 5% of urinary tract

infections or may be because of contaminants derived from perineum.[10] The prevalence of Enterococci 6.6% and this may be because of Enterococci are common contaminants in urine because they are present in normal faeces are commonly found in the perineum and grow at low temperature.

All 30 isolated pathogens shows sensitive mainly to third generation of cephalosporins and resistance to early antibiotics cotrimoxazole, Nalidixicacid and Gentamicin. This shift may be due to the usage of higher antibiotics un-noticingly by the individuals for other complaints where the pathogens of asymptomatic bacteriuria also acquired resistance to the older antibiotics.

Out of 30 strains as pathogenic cause of asymptomatic bacteriuria, 16 *Escherichia coli* isolated from non-pregnant reproductive age of asymptomatic individuals as predominant pathogen, their antibiotic sensitivity pattern shows 3 (18.75%) were sensitive to all antibiotics 6 (37.5%) were resistant to one or two antibiotics and 7 (43.75%) were resistant to three or more antibiotics. The commonest etiological agent is Escherichia coli nearly 43.75% of them are multidrug resistant strains.

In the present study the results of drug sensitivity revealed that 93.75% Escherichia coli species were sensitive to Ceftriaxone followed by Cefatoxime (87.5%), Ciprofloxacin (87.5%), Amikacin (81.25%) Norfloxacin (68.75%), Nalidixicacid (56.25%), Gentamicin (43.75%) and Cotrimoxazole (37.5%).

Baerheime 2001 *Manges et al.,* their study asymptomatic bacteriuria observed that Trimethoprim is effective first line treatment of uncomplicated urinary tract infection in general practice, rates of resistance of Escherichia coli to Trimethoprim have been reported as 20-40%. In the present study Trimethoprim plus sulphomethoxazole showing resistance of 37.5% their findings are correlating to our present study.

MH Vedjdani, MR Nahale, in 1988 in their studies when antibiotic sensitivity tests were performed according to Kirby - Bauer method on Escherichia coli strains the following sensitivity pattern was observed.[11] Amikacin (100%), Nalidixicacid (94.6%) in comparison with present study. In the present study sensitivity pattern of Amikacin is 81.25% and Nalidixicacid is 56.25% the findings of Amikacin sensitivity almost correlating with present study. But Nalidixic acid showing more resistance in present study. The antimicrobial susceptibility of *Escherichia coli* shows similar pattern shifting the sensitivity to the third generation cephalosporins.

CONCLUSION:

Asymptomatic bacteriuria in healthy non-pregnant women is common and is benign. It does however; identify a group of women who are at risk for symptomatic urinary tract infection.

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Antimicrobial drug treatment is highly successful in women with symptomatic, uncomplicated urinary tract infection but ultimately, the efficacy of specific antimicrobial drugs is limited by increased antimicrobial resistance

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