International Journal Dental and Medical Sciences Research
Volume 3, Issue 4, July-Aug 2021 pp 378-382 www.ijdmsrjournal.com ISSN: 2582-6018

Prevalence of Asymptomatic Bacteriuria in Antenatal Women Attending Tertiary Care Hospital

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Submitted: 20-07-2021 Revised: 29-07-2021 Accepted: 31-07-2021

ABSTRACT:
Asymptomatic bacteriuria is a major health concern in antenatal women since it is associated with serious maternal and fetal complications. Antenatal women with asymptomatic bacteriuria have 20-30 fold increased risk of developing pyelonephritis than those without bacteriuria and around 15-20% of antenatal cases with pyelonephritis have bacteremia [16]. Antenatal mothers with asymptomatic bacteriuria may develop symptomatic UTI and subsequently several complications such as acute renal injury, pregnancy induced hypertension (PIH),pre-eclampsia, sepsis, septic shock and Acute Respiratory Distress Syndrome(ARDS) [17,18]. Antimicrobial treatment of asymptomatic bacteriuria in early pregnancy has shown to decrease the incidence of pyelonephritis from 20-35% to 1-4% and Low Birth Weight (LBW) from 15% to 5%. This is an observational study of 6 months duration duration from April 2016 to September 2016 which included 300 antenatal women without any symptoms of UTI. Out of 300 antenatal mothers tested, 9 showed significant bacterial growth which indicates that the prevalence rate of asymptomatic bacteriuria was 3% in our study. Escherichia coli was the most common organism isolated in this study. The commonest affected age group was 24-29 years followed by 18-23 years. Diagnosis and treatment in early pregnancy has shown significant reduction in maternal and fetal complications. So it is mandatory to screen all the antenatal mothers for asymptomatic bacteriuria and to treat those with significant bacteriuria to lower several maternal and fetal adverse events significantly.

Keywords: Asymptomatic bacteriuria(ASB), Urinary tract infection (UTI), Antenatal women and Semi quantitative method.

I. INTRODUCTION:

Urinary tract infection (UTI) continues to be a major health concern in antenatal women since it is associated with potential maternal and fetal complications [1]. In pregnancy UTI may present as asymptomatic bacteriuria (ASB) or symptomatic UTI. In case of asymptomatic bacteriuria the patient being without any clinical symptoms of UTI and infections limited to bacterial growth in urine but there is active invasion of urinary tract tissues by bacteria, hence asymptomatic bacteriuria as well as UTI with symptomatic bacteriuria both subsequently may cause several maternal and fetal complications [2]. The present study was conducted to determine the disease burden of asymptomatic bacteriuria in antenatal women attending Out Patient Department of Obstetrics and Gynecology, Coimbatore Medical college Hospital,CoimbatoreThe prevalence of asymptomatic bacteriuria in antenatal women varies from 2%-17% worldwide [1]. The pre-pregnancy UTI and previous antenatal UTI are the factors found to be strongly associated with asymptomatic bacteriuria [3]. The potential threat of untreated asymptomatic bacteriuria in antenatal female is acute pyelonephritis which shows the incidence of 30-40% as compared with 3-4% in asymptomatic bacteriuria treated patients [5].

Antenatal women with asymptomatic bacteriuria have 20-30 fold increased risk of developing pyelonephritis than those without bacteriuria [8],9,11. Around 15-20% of antenatal women with pyelonephritis have bacteremia [16]. They may also develop several complications such as acute renal injury, anaemia, pre-eclampsia, pregnancy induced hypertension (PIH), sepsis, septic shock, haemolysis, thrombocytopenia and ARDS [17,18]. These complications seem to be due to renal or other tissue damage caused by bacterial endotoxins and a systemic inflammatory response with endothelial injury [10.12]. Furthermore, preterm birth and low birth weight are most common adverse fetal events in antenatal cases with asymptomatic bacteriuria [13].7,10The chances of developing maternal fetal complications are higher in late detected bacteriuria in antenatal women as compared with early detected and treated cases [14].

The consequences of asymptomatic bacteriuria during pregnancy could be reduced by proper antimicrobial treatment in early pregnancy [6]. So it is mandatory to incorporate screening and

International Journal Dental and Medical Sciences Research
Volume 3, Issue 4, July-Aug 2021 pp 378-382 www.ijdmsrjournal.com ISSN: 2582-6018

treatment of asymptomatic bacteriuria in routine antenatal checkup for an integrated method to save maternal and fetal health. In accordance with Adam et al, screening and treatment of asymptomatic bacteriuria during antenatal period will be the most cost effective interventions at the primary care level for mothers and newborns in developing countries to achieve the millennium goals for health [15].

Escherichia coli is the commonest causative organism isolated from antenatal women with asymptomatic bacteriuria [16]. Klebsiella pnemoniae, Staphylococcus aureus, Staphylococcus saprophyticus, Enterococcus speciesand group B streptococcus are the other common organisms associated with asymptomatic bacteriuria in antenatal women.

From a randomized study, it is found that the antimicrobial treatment of asymptomatic bacteriuria during antenatal period has shown to decrease the incidence of pyelonephritis from 20-35% to 1-4% and Low Birth Weight (LBW) from 15% to 5%. Since it is costly to screen all the antenatal patients to rule out ASB, it is not carried out routinely in many developing countries [6]. So alternative method of diagnosing ASB such as assessing the risk factors related to ASB like gestational diabetes mellitus (GDM), past urinary tract infection(UTI), multipara, advancing maternal age, lower socioeconomic status to be used to screen for asymptomatic bacteriuria. Semi-quantitative culture is the gold standard method for diagnosing asymptomatic bacteriuria [19].

II. MATERIALS AND METHODS:

It is an observational study of 6 months duration from April 2016 to September 2016 which included urine samples from 300 antenatal women irrespective of their age, parity and socioeconomic status. This study was conducted after obtaining informed consent of the patients, and processed urine samples received in the Microbiology diagnostic laboratory,Coimbatore Medical college Hospital , Coimbatore. Antenatal women with history of intake of antibiotic, symptoms of UTI (increased frequency of urination, burning micturition, fever with chills, suprapubic pain), multi-parity, history of preterm delivery, premature rupture of membrane (PROM), Intra Uterine Growth Retardation (IUGR), Pregnancy Induced Hypertension (PIH) in previous pregnancy, recurrent UTI and diabetes mellitus were excluded from this study. Clean catch mid-stream urine (CCMSU) was obtained from all the antenatal cases without symptoms of UTI sand processed by semi-quantitative method. Sample with a single organism obtained in counts of $>10^5$ CFU/ml was considered as significant. The samples were labeled properly and transported to the Microbiology diagnostic laboratory and processed according to standard microbiological techniques.

The specimens were processed in blood agar and Mac-Conkey agar plate by standard semi quantitative method and the isolates were identified using standard methods. Antibiotic susceptibility test was done in Muller Hinton Agar (MHA) plate using Kirby Bauer disc diffusion method with safe drugs in antenatal period (Cotrimaxazole, Ampicillin, Amoxycillin, Cephelexin, Cefixime, Cefotoxime, Gentamycin, Amikacin,Nalidixic acid and Nitrofurantoin). The zone size was measured and the results were recorded for analysis.

III. RESULTS:

Out of 300 antenatal women screened for asymptomatic bacteriuria (ASB), 9 cases showed a significant bacterial colony count ($>10^5$CFU/ml) which indicates the prevalence rate as 3% in our study.The most commonly affected age group was 24-29 years (3.2%) followed by 18-23 years (1.3%). It was also found that the incidence of asymptomatic bacteriuria was increased along with the increased parity. The most commonly isolated etiological agent in this study was Escherichia coli (n=7) followed by Klebsiella pnemoniae (n=1), and Staphylococcus aureus (n=1). Escherichia coli isolates were sensitive to Nitrofurantoin, Nalidixic acid, Cephelexin, Gentamycin, Amikacin and Cefotaxime while few strains were found resistant to Cotrimaxazole and Amoxycillin. Staphylococcus aureus was resistant to Amoxycillin and sensitive to all the other first line drugs. Klebsiella pnemoniae was sensitive to all drugs except Cotrimaxazole.

Table No.1: Prevalence of asymptomatic bacteriuria in pregnancy according to trimester

Antenatal period	No. of cases screened for ASB	No. of patients positive for ASB
I trimester	102	6 (6%)
II trimester	87	1 (1%)
III trimester	111	2 (2%)
Total	**300**	**9 (3%)**

International Journal Dental and Medical Sciences Research
Volume 3, Issue 4, July-Aug 2021 pp 378-382 www.ijdmsrjournal.com ISSN: 2582-6018

The prevalence of asymptomatic bacteriuria was high in early pregnancy in our study.

Chart No.1: Prevalence of asymptomatic bacteriuria in pregnancy according to trimester

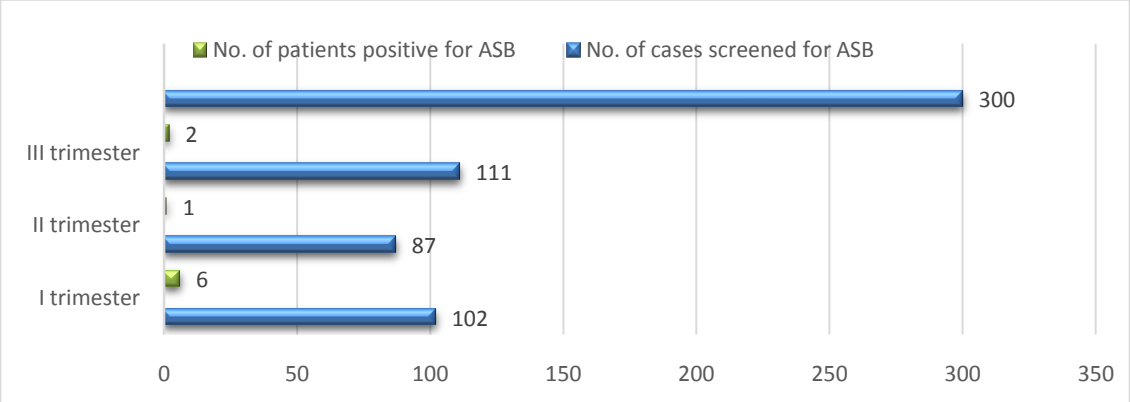
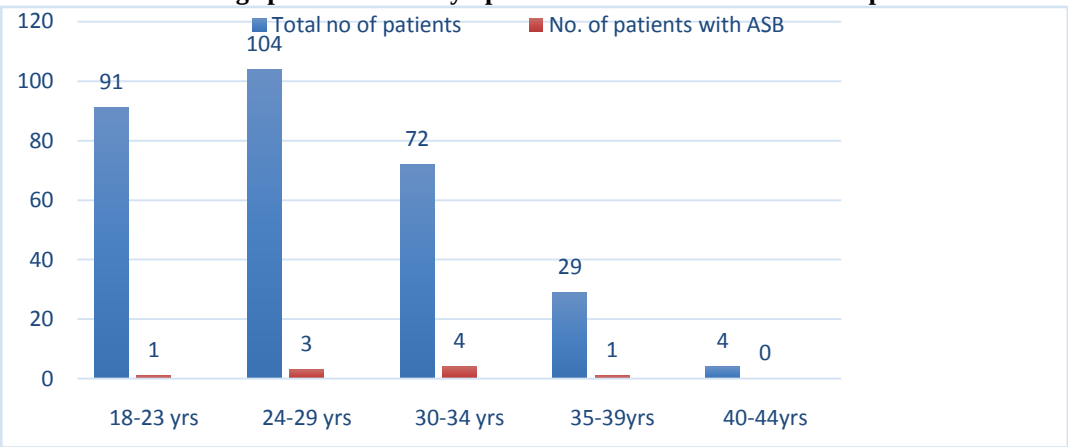


Table no.2: Age prevalence of asymptomatic bacteriuria in antenatal patients:

Age group	Total no of patients	No. of patients with ASB
18-23	91 (30%)	1 (1.3%)
24-29	104 (35%)	3 (3.2%)
30-34	72 (24%)	4 (5.6%)
35-39	29 (9.7%)	1 (3.4%)
40-44	4 (1.3%)	0
Total	**300**	**9**

Chart no.2: Age prevalence of asymptomatic bacteriuria in antenatal patients:



The commonest age group affected in our study is 24-29 yrs (3.2%) followed by 18-23 yrs (1.3%).

Table no.3: Asymptomatic bacteriuria in antenatal women in accordance with parity:

Parity	No. of patients with ASB (%)
0 (Primigravida)	2 (1.8)
1-3	4 (2.5)
>3	3 (10.8)
Total	**9 (3)**

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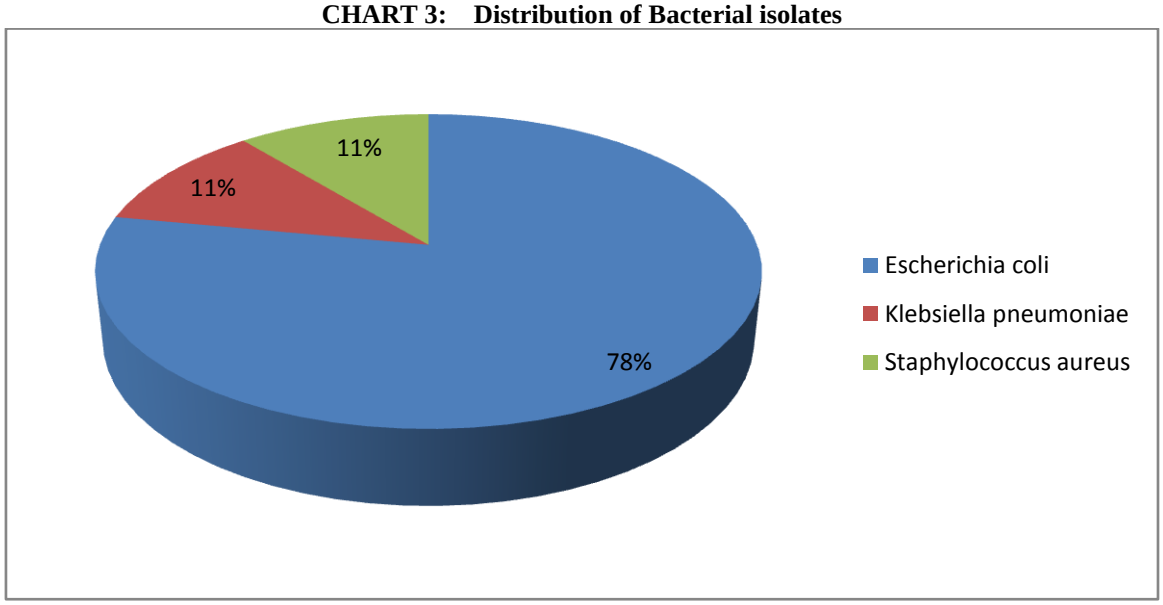
The incidence of asymptomatic bacteriuria was found to increase with the increasing parity.

Table No.4: Distribution of Bacterial isolates in AN women with asymptomatic bacteriuria:

Bacterial isolates	Total no. of patients
Escherichia coli	7 (78%)
Klebsiellapneumoniae	1 (11%)
Staphylococcus aureus	1 (11%)
Total	**9**

The most common bacterial isolate in our study was Escherichia coli.

CHART 3: Distribution of Bacterial isolates



IV. DISCUSSION:

Out of 300 antenatal women screened for asymptomatic bacteriuria (ASB), 9 cases showed a significant bacterial colony count (>10^5CFU/ml) which indicates the prevalence rate as 3% in our study. This is in accordance with the study by Perera Jennifer et al., which reported the prevalence of 3.6%. In contrast, the prevalence rate was 7.3% in a study by C.A, Turpin et al., while Vaishali Jain et al reported 17% as the prevalence rate. The wide difference in the result may be attributed to their different study design, lack of statistical information about methods of randomization, low statistical power and some substantial bias.

The most commonly affected age group was 24-29 years (3.2%) followed by 18-23 years (1.3%). It was also found that the incidence of asymptomatic bacteriuria was increased along with the increased parity. This study is in accordance with the study by C.A. Turpin et al., [20].

The global prevalence of asymptomatic bacteriuria in antenatal cases varies from 2%- 17%. A study reported that a single screening culture in antenatal women during the first trimester was cost effective if the prevalence of bacteriuria was >2% [21]. The prevalence of asymptomatic bacteriuria in our study was 3% which exhibits screening all antenatal patients for asymptomatic bacteriuria is essential. Also close follow up of the patients and further study is mandatory to diagnose, and treat the asymptomatic bacteriuria as well as its related complications. Oral Nitrofurantoin is a good antibiotic against asymptomatic bacteriuria in antenatal females. Ampicillin and oral cephalexin are also safe alternative drugs with fewer side effects. But, it was found that some strains showed resistance to them. So it is necessary to do antibiotic susceptibility test to determine the appropriate therapy and to prevent recurrence of asymptomatic bacteriuria and acute pyelonephritis later.

V. CONCLUSION:

This study exhibits the prevalence rate of asymptomatic bacteriuria in antenatal women was 3%. The major etiological agent was Escherichia coli. Immense importance should be given to

screen all antenatal patients attending antenatal clinic for early diagnosis of asymptomatic bacteriuria and to treat those with bacteriuria which could prevent the maternal and fetal complications and its related mortality and morbidity.

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