

Role of routine urine culture in diagnoses of asymptomatic bacteriurea& hence decreasing UTI complication during pregnancy.

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ABSTRACT

In order to decrease the complications of urinary tract infection during pregnancy as abortion, preterm labor ,IUGR, stillbirth, and pregnancy induced hypertension and cost effective to decrease hospital admission .

prospective controlled study of 300 pregnant patients, were divided to groups according to presence of bacteriurea, and then to presence of symptoms. The age of patients were between 19 &42 years (average=30yr.)and the parity ranged from primigravida up to Para seven .urine examination and culture sensitivity done for all ,the patients who diagnosed and treated according to the results of investigations and before they developed symptoms ,they had less complications during their pregnancies and better outcome after delivery.

Conclusion: *Our study prove that routine urine examination ,and urine culture &sensitivity at every trimester in pregnant lady will gives cheap ,easy, and non invasive method for diagnosis and subsequent treatment of urinary tract infection.*

Keywords: urinary tract infection, symptomatic &asymptomatic bacteriurea pyelonephritis .preterm labor. Low birth weight, anemia.

Introduction: During pregnancy there are many physiological changes in the body of pregnant woman. These changes can be hormonal and mechanical which occurred in the urogenital tract increase the potential of colonization by pathogenic bacteria. tract to resist invading bacteria. These changes along with an already short urethra approximately (3-4 cm) in females and difficulty with hygiene due to distended pregnant belly increases the frequency of urinary tract infections in pregnant women(30)

Increased bladder volume and decreased bladder tone, along with decreased ureteral tone, contribute to increased urinary stasis and ureterovesical reflux (1). Increases in urinary progesterin and estrogen may lead to a decreased ability of the lower urinary tract to resist invading bacteria. Asymptomatic bacteriuria is defined as the presence of 100.000 organisms or more /ml of urine (as to increased urinary stasis and ureterovesical reflux at this level a chance of contamination from distal urethra is less than 1%) with accompanying pyuria (>7 WBCs / ml) in asymptomatic patient (30).

Concentration of 103 - 104 bacterial / ml , leads to a 50% chance of contamination which responsible for a positive culture Asymptomatic significant bacteriuria(>105 organisms/ml Of urine) is associated with adverse maternal outcomes.(20,21) These include symptomatic cystitis in approximately 30% of patients, development of pyelonephritis (in up to 50%) and preterm labor(36). Pyelonephritis in the pregnant patient leads to septicemia in 10 -20% of cases and acute respiratory distress syndrome in 2%. Associated adverse fetal outcomes include prematurity, low birth weight and increased perinatal mortality (36). In addition there are increased maternal risks reported for pre-eclampsia, anemia, chorioamnionitis and post partum endometritis in patients with significant bacteriuria. Fetal risks include fetal growth retardation, stillbirth, mental retardation and development delay(36).

Asymptomatic bacteriuria is twice as common in pregnant women with sickle cell trait and 3 times as common in pregnant women with diabetes as in normal pregnant women.(8). Diagnosis of UTI should be supported by uropathogen found in the culture with colony count of more than 105 organisms /mm of urine in 2 consecutive specimens (8) it is up to 70% of pregnant women develop glycosuria this can encourage bacterial growth in the urine,Pregnancy enhances the progression from asymptomatic to symptomatic bacteriuria, Which could lead to pyelonephritis and adverse obstetric outcomes(6).To avoid adverse effect of undiagnosed asymptomatic bacteriuria on mother and child, routine culture screening for all pregnant women attending antenatal clinic is recommended.(30)

AIMS&OBJECTIVES:-

To study the benefits of doing urine routine exami-

nation in pregnant lady monthly &urine culture &sensitivity at least at every trimester even in asymptomatic patients.

METHODS&MATERIAL;-

This study was prospective randomised controlled study ,the cases were collected and followed at Lamis clinic from January 2022 till December 2023.

300 pregnant patient included who followed up through out there pregnancies

The majority of these patients are first seen obstetric outpatient clinic for follow-up pregnancy ,some have been refereed by their general practitioner .

Full history is taken followed by general obstetrical examination Ultrasonography is usually performed .urine analysis and hemoglobin are checked . An appropriate specimen must be collected. The midstream-voided technique is as accurate as catheterization if proper technique is followed.

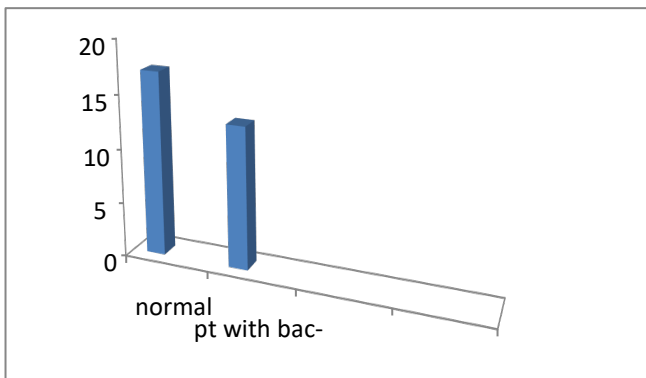
The finding are explained to patient and plane of management as well. Any further investigation required are ordered and the admission is arranged if needed. midstream urine culture and sensitivity done to the patients who routine urine examination parameters are indicative or if the patient are symptomatic. Either oral or paranteral antibiotics started according to the type of organism and its sensitivity. All the patient where followed up for any complications such as abortion , pregnancy induced hypertension, IUGR, preterm labor and still birth. after delivery the condition of the baby followed: the 1st minutes apgar score ,the baby birth weight, and the condition of the baby during the 1st 24 hr.

The results:

Table(1):prevalence and distribution of bacteriuria In symptomatic and non symptomatic patients groups

Numbers of patients with-out bacteriurea	Numbers of patients with bacteriurea.	
130 43.3%	170 56.7%	
	Symptomatic bacteriurea.	Asymptomatic bacteriurea.
	92 54.1 %	78 26 % of total patients

From these results we found that prevalence of bacteriuria in pregnancy was 56.7%, and prevalence of asymptomatic group was 26% of the total number of cases.

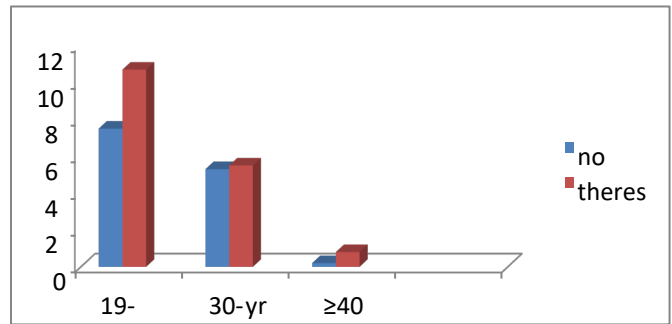


Table(2): age distribution according to presence or absence of bacteriurea

Age group	19 – 29	30 – 39	≥ 40
There's bacteriurea (Total 170)	107 62.9%	55 32.4 %	8
No. bacteriurea (Total 130) .	75 57.7 %	53 40.8 %	2

There was a significant difference in the prevalence

of bacteriuria with respect to age, the prevalence of bacteriuria was increasing with age (p.value 0.072 significant)



This explained by as the age increase the parity maybe increased.

After the diagnosis of bacteriurea is done either symptomatic or asymptomatic according to urine routine examination, midstream urine culture and sensitivity is done & the results as follows:

Table (3) Distribution of presence or absence of symptoms According to urine culture

Significant . bacteria growth.		Non significant bacteria growth	
144		26	
A symptomatic Bacteriurea	Symptomatic bacteriurea	A symptomatic bacteriurea	Symptomatic bacteriurea
74 (95%)	70 (76%)	4 (5%)	22 (24%)

From the results ,the diagnosis of asymptomatic bacteriurea according to urine routine examination which inform us to do urine culture & sensitivity was significant bacterial growth in about 95% of patients.

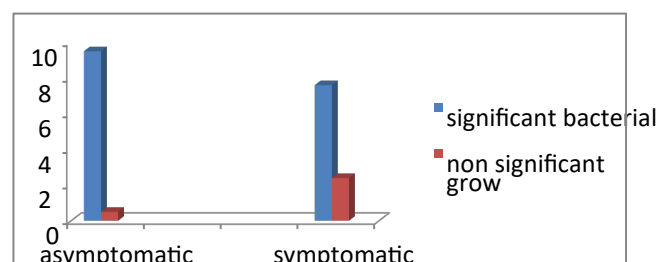


Table (3) distribution of bacteriuria according to type of bacteria in urine cultur & sensitivity:

This study showed that, staphylococcus aureus followed by E.coli are the most common organisms causing bacterurea.

Type of bacteria	Fre-quency	Percent
staphylococcus aureus	90	52.9%
E.coli	42	24.7%
klebsiela pneumoniae	17	10%
pseudo-monas B-haemo-lytic	9	5.3%
strepto-coccus proteus	8	4.7%
	4	2.4%
Total	170	100.0%

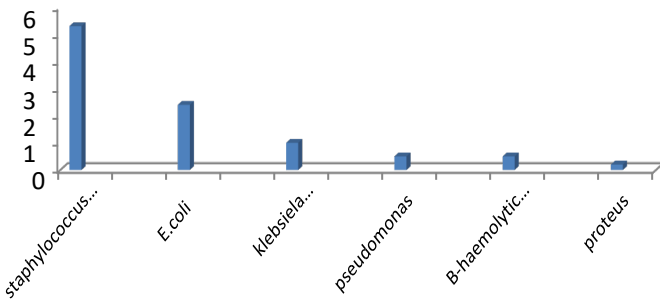


Table (4) Distribution of Mode of delivery according to presence or absence of bacteriuria in symptomatic and asymptomatic patients

Mode of de-livery	Spontaneo us vaginal delivery	Instru-ment al delivery	Cesaria n sec-tion	Induc-tio n of labour	abor-tio n
asymptoma tic bac-triurea. (Total no. 78)	56 (71.8%)	5 (6.4%)	5 (6.4%)	10 (12.8%)	2 (2.6%)
Symptoma tic bac-triurea. (Total no. 92)	59 (64.1%)	2 (2.2%)	19 (20.7%)	4 (4.3%)	8 (8.7%)
No bacteriu-rea (normal) (Total 130)	95 (73.1%)	2 (1.5%)	27 (20.8%)	3 (2.3%)	3 (2.3%)

From these results we notice that the asymptomatic bacteriuria near to be the same as the normal patients in incidence of spontaneous deliveries or abortions and even better than the normal patients in cesarian section rate and there is comparable increase in the rate of induction of labour which needs more evaluation.(N.B: all asymptomatic patients were treated)

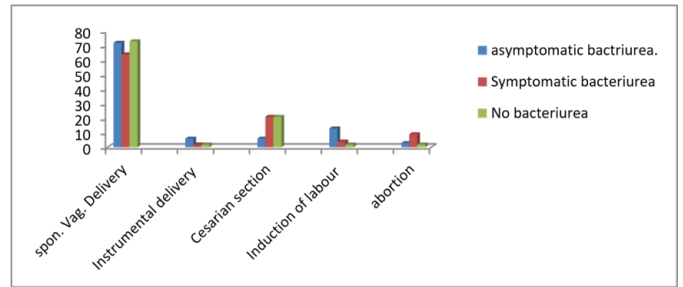


Table (5) Distribution of baby birth weight according to presence of symptomatic or asymptomatic bacteriuria.

Baby birth weight	Asymptomatic bac-triurea (total no.76)	Sympto-matic bac-triurea. (total no.84)
1.2 - 2.4 kg	2 (2.5%)	9 (9.8%)
2.5 - 3.5 kg	70 (89.7%)	45 (48.9%)
>3.5kg	4 (5.1%)	30 (32.6%)

There is significant differences in fetal birth weight in the same bacteriurea group when divided into symptomatic & asymptomatic bacteriurea , this because asymptomatic bacteriurea patients where diagnosed and so treated before complications starts.(the total no. of asymptomatic bacteriurea where decreased because two patients aborted, the same at symptomatic bacteriurea where 8 patients aborted.)

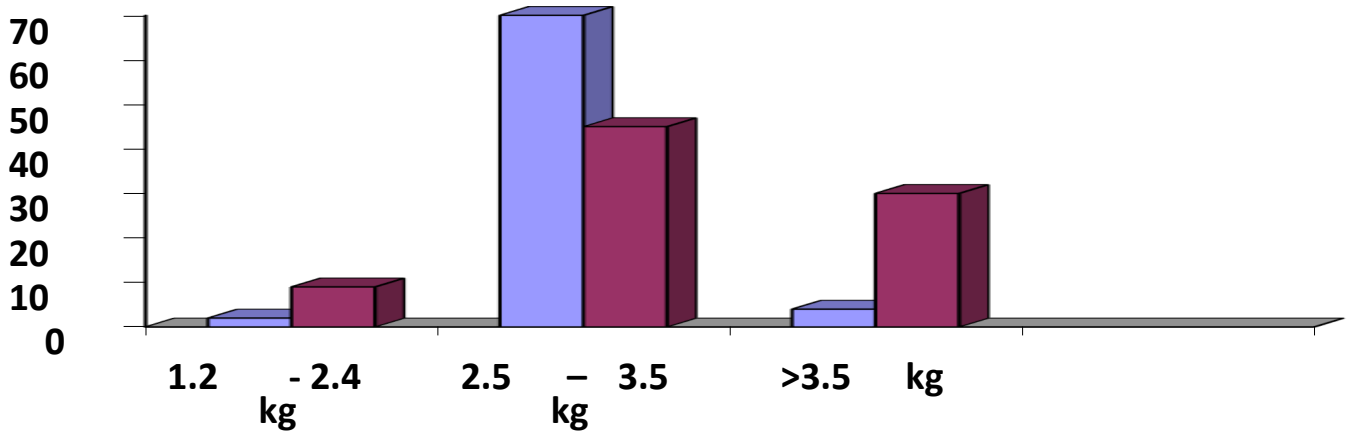


Table (6) 1st minute apgar score of babies delivered to mothers suffering from asymptomatic bacteriurea during their pregnancies in compare with symptomatic bacteriurea mothers babies.

APgar score	0	≤5	≥6
Asymptomatic bact.	1(1.3%)	3(3.9%)	72(94.7%) (Total no.76)
Symptomatic bact.	8(9.5%)	11(13.1%)	65(74.4%) (Total no.84)

From these results there was significant difference in the apgar score in the two groups ,babies delivered to mothers with symptomatic bacteriuria were with higher incidence of still birth ,IUFD(intra uterin death) &low apgar score.

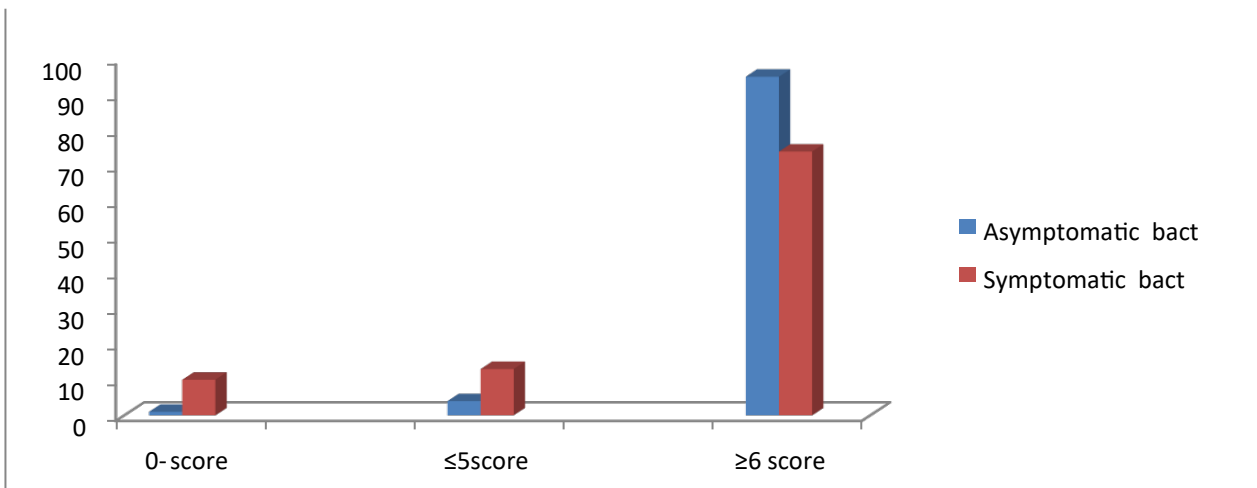


Table (7) Condition of the baby during the first 24h after delivery irrespective of the mode of delivery &according to presence or absence of bacteriuria:

	Normal baby	Adm. To neonate unit	Dead baby
No bacteriuria (total130)	115 88.5%	11 8.5%	2 1.5%
Bacteriuria (total170)	147 85.5%	11 6.5%	4 2.4%

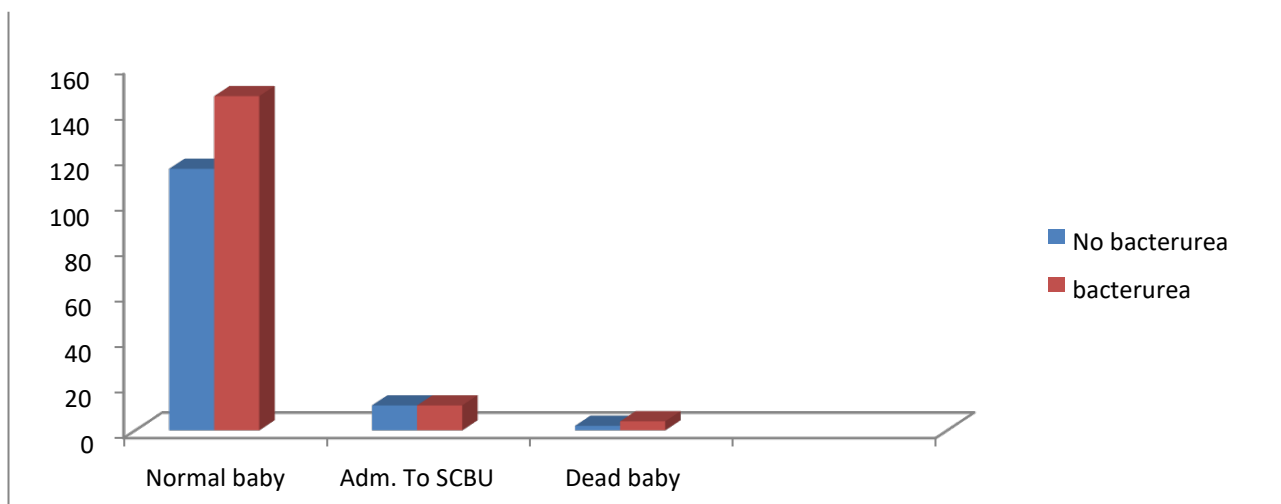
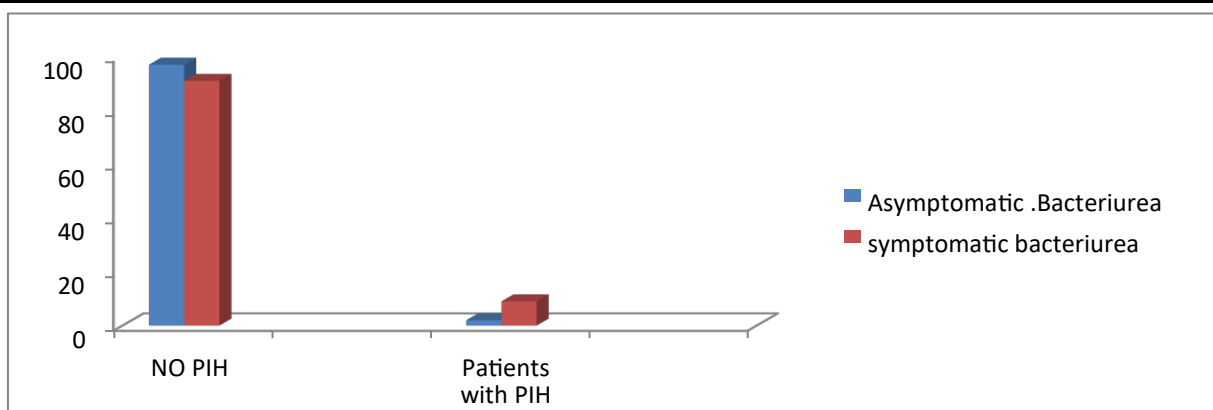


Table (8) Comparison between group of bacteriuria with group without bacteriuria according to incidence of pregnancy induced hypertension (PIH)

	NO PIH	Patients with PIH
Asymptomatic .Bacteriurea. (total no 78)	76 (97.4%)	2 (2.6%)
symptomatic bacteriurea (total no.92)	86 (91.3%)	8 (8.7%)



The results show that there's significant difference between symptomatic & asymptomatic bacteriuria groups in developing pregnancy induced hypertension (P value 0.001).

Table (9) causes of hospital admissions in asymptomatic bacteriuria group & symptomatic bacteriuria :

	fever	leaking	PET	abortion	Total
symptomatic bacteriuria	12(13%)	10(10.9%)	8(8.7%)	8(8.7%)	38
asymptomatic bacteriuria	0	0	2(2.6%)	2(2.6%)	4

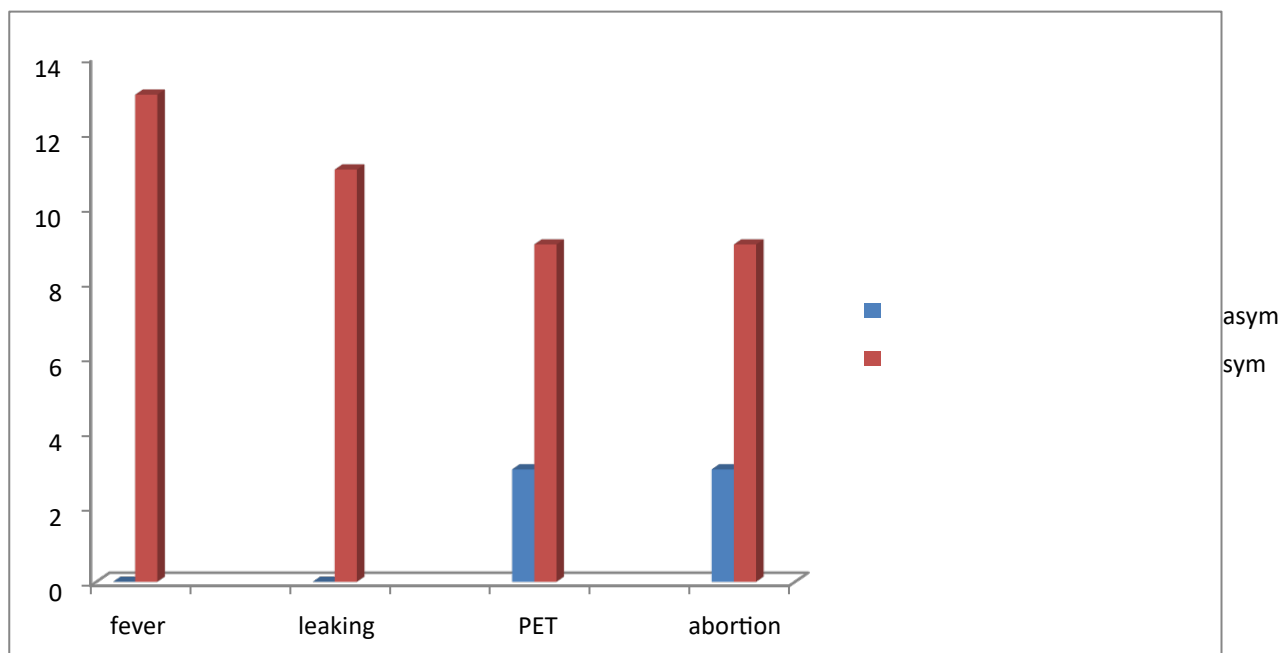
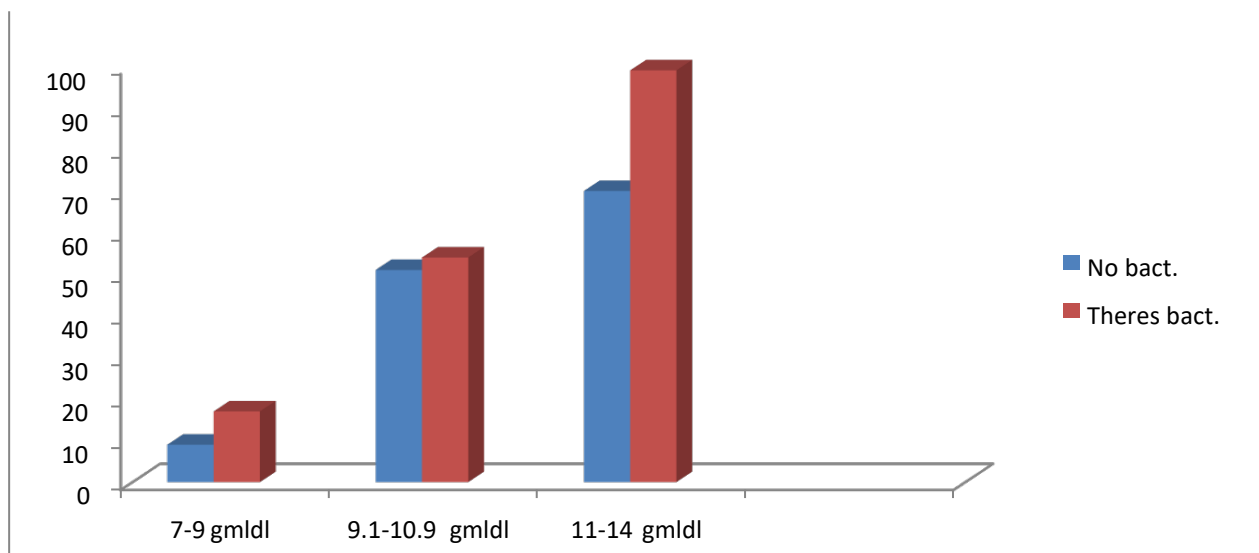


Table (10) comparison of bacteriuric and non bacteriuric groups according to hemoglobin results

From these results we found that 10% of bacteriuric cases with hemoglobin 7-9 g/dl while only 6.9% of non bacteriuric cases have same hemoglobin level

	7-9g/dl	9.1-10.9	11-14
No bact. (total 130)	9 (6.9%)	51 (39.2%)	70 (53.8%)
There's bact. (total 170)	17 (10%)	54 (31.8%)	99 (58.2%)



Discussion asymptomatic bacteriuria in non pregnant patients require no treatment, however data from pregnant females shows that 66% will have persistent infection and in 13% it will subside spontaneously(36), even after adequate antimicrobial therapy the risk of recurrence is 16-26%,(12).Increased physiological vaginal discharge ,increased laxity of the pelvic tissues , and enlarging abdominal wall, all these factors increase the possibility of vulvovaginal contamination of mid stream urine (MSU) specimen . even with satisfactory standard technique ,the false positive rate may exceed of bacteriuria based on (MSU) specimens, account more the 10⁵ cfu/ml is required .(23)

Our study contained 300 pregnant patients ,these pregnant ladies followed up throughout their pregnancy since booking until delivery ,each patient Was clinically identified if she have any signs or symptoms of UTI or not and then she give clean catch mid stream urine sample in sterile universal container, the urine samples were examined microscopically and by culture method, identification of isolate was by standard microbiological technique. For all cases the urine culture was repeated later on, in pregnancy for screening of recurrence of bacteriuria at 3rd trimester ,all bacteriuric cases were treated with appropriate antibiotic according to urine culture which lead to decrease rate of pyelonephritis in our study as we will note in the statistics. The gold standard for screening for asymptomatic bacteriuria is growing bacterial cultures of urine samples from women in early pregnancy (12-16 weeks gestation).Non-culture methods are not, generally, reliable for the identification of bacteriuria in asymptomatic populations, including pregnant women. (1,12). Routine urinalysis is imprecise for identification of pyuria and other pyuria-based methods, particularly leukocyte-esterase dipstick, are subject to false negatives in bacteriuria Detection of asymptomatic bacteriuria in pregnancy.Incidence of asymptomatic bacteriuria in pregnancy is difficult to estimate since the reported figures vary widely , prevalence of asymptomatic bacteriuria was 26% (table 1),it was low in comparison To that of 45.3% in Benin city in Nigeria, and higher than prevalence of asymptomatic bacteriuria in ghana 7.3%, and 7% reported in Ethio-

pia, 8.9% in Iran. (23,29). no cases of asymptomatic bacteriuria group developed pyelonephritis, this result is lower than initial and recent studies which give incidence of pyelonephritis of 13-27% in untreated asymptomatic bacteriuric cases (21,36), this can be explained by the treatment which was given to every case of significant bacteriuria included in this study, and leading to decrease the incidence of pyelonephritis to about 0.0%. In our study the urine culture was repeated for the cases which was positive for significant bacteriuria and there was recurrence rate of about 43.8% (63 cases of recurrent bacteriuria from 144 cases was bacteriuric in our study). There was a significant difference in the prevalence of bacteriuria with respect to age group ($P < 0.072$), age group > 40 years had the highest percentage of infection (80%), this agrees with other studies which also observed same age group to have highest percentage of infection (34,36), this finding could be explained by high parity at this age group and it has been reported that multiparity is a risk factor for acquiring bacteriuria in pregnancy. (17,18). The largest group of patients with UTI is adult women. The incidence increases with age and sexual activity. Rates of infection are high in older women because of bladder or uterine prolapse causing incomplete bladder emptying; and higher likelihood of concomitant medical illness, such as diabetes. (29,35,36)

The most common bacteria in our study was staphylococcus aureus which was not agree with previous studies which indicate that E.coli is the most common bacteria followed by staph. Aureus (in Benin city in Nigeria at Jun 2010), in another study in U.K the commonest type of bacteria was E.coli followed by streptococcus fecalis and B.haemolytic streptococcus (17,18).

According to antibiotics sensitivity, the most common effective antibiotic was nitrofurantoin followed by augmentin, amoxicillin, ceftriaxone, ampicillin, nalidixic acid, cephalexin and gentamycin. Association of asymptomatic bacteriuria with hypertension and preeclampsia is also documented, it is suggested that chronic subclinical infection causes increased maternal cytokines level sufficient to affect vascular endothelial function and prime individuals for subsequent development of preeclampsia. (11,18) In our study significant results were obtained considering developing of pregnancy induced hypertension in bacteriuric women as 8 patients (4.7%) and 2 (1.5%) in non bacteriuric patients were developed hypertension, this was not agree with other studies like pahawal Victoria hospital study in Pakistan which found that results was not significant according to relation of bacteriuria during pregnancy with developing of pregnancy induced hypertension or PET. (15) Similarly the incidence of small birth weight fetuses was 2 (2.5%) in treated asymptomatic bacteriuric patients and 9 (9.8%) in symptomatic bacteriuric patients came out to be statistically significant, also the average baby birth weight 70 (89.7%) in asymptomatic group while its 45 (48.9%) in symptomatic group, which not agree with the study which was done in Pahawal Victoria hospital study in Pakistan which reveal that no significant relation between bacteriuria in pregnancy and small baby weight, this could be due to prematurity rate which increase in bacteriuric

patients, this was also related to leaking during pregnancy that leads to preterm delivery. In the relation of symptoms according to presence of bacteriuria, there was nearly 95% of non-symptomatic patients present with significant bacterial growth in urine culture & sensitivity. Which explains that approximately majority of patients with significant bacteriuria were asymptomatic and this led to the fact that routine urine culture for every patient at her first antenatal visit is the most accurate test to screen bacteriuria in pregnancy. In table (15) there was significant statistical difference found in the incidence of anemia among the two groups as 9 (6.9%) suffering from bacteriuria and 17 (10%) of non-bacteriuric cases had hemoglobin level lower than 9, while at hemoglobin level more than 11 there was 70 (53.8%) of non-bacteriuric and 99 (58.2%) of bacteriuric cases, the result here was significant at hemoglobin level lower than 9. (P value = 0.01). So low HB (anaemia) is one of bacteriuria complication during pregnancy. In this study total number of cases who developed pyelonephritis was only 12 cases, 9 of them from symptomatic bacteriuric group and 3 only from non-symptomatic group, so incidence of pyelonephritis in asymptomatic bacteriuric group was of 78 cases (11.5%) while only 3 of 130 cases 2.3% (in non-bacteriuric cases). The Canadian National Task Force on Preventive Health Care and the American College of Obstetricians and Gynecologists recommend screening urine cultures to detect asymptomatic bacteriuria during pregnancy as a routine basis (15,16). But some authors (17,18) differ with it, they suggested to consider the existing prevalence of the asymptomatic bacteriuria of a particular population. They opined that it was worthwhile or cost-effective where the prevalence of asymptomatic bacteriuria was >9%. The estimated high prevalence of asymptomatic bacteriuria among the pregnant mothers of LAMIS & ELSAID hospital suggested that it will be very much worthwhile and cost-effective to screen the pregnant mothers for asymptomatic bacteriuria.

Conclusions:

Routine urine culture should be performed in all pregnant patients to detect asymptomatic bacteriuria. It may provide the physician or the follow-up physician with valuable information and it is the most cost-effective approach to decrease UTI complication during pregnancy. So, pregnant patients should be treated for all episodes of pyuria or bacteriuria, regardless of whether they have symptoms. Successful outpatient treatment of pregnant asymptomatic patients has been reported. They must be hemodynamically stable, and able to tolerate oral fluids and medications.

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