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Risk factors of UTI in pregnant women and the maternal and perinatal outcome in pregnant women.

Dr. Binoy Krishna Golder[1], Dr. Most. Zakia Sultana[2], Dr. Mahbubur Rahman

1. *DGO, Assistant Professor, Department of Gynae, Patuakhali Medical College, Patuakhali, Bangladesh*
2. *FCPS, Assistant Professor, Department of Gynae, Patuakhali Medical College, Patuakhali, Bangladesh*
3. *DGO, Associate Professor, Department of Gynae, Patuakhali Medical College, Patuakhali, Bangladesh*

Abstract
Objective*: In this study was designed to see the risk factors of UTI in pregnant women and the maternal and perinatal outcome in pregnant women.*
Methods: *In this case control study, women enrolled in antenatal OPD of tertiary medical college and hospital, Dhaka during July, 2018 to December 2019, were randomly allocated into case and control group. The inclusion criteria for pregnant women during the 13^{th} - 26^{th} weeks of pregnancy in the case group was the positive urine cultures of bacteria (more than 10^{5} colonies growth in a standard positive urine culture). The same with negative culture was control group. Then parameters such as parity, sexual activity, type of delivery, and infants' birth weight were recorded in questionnaire.*
Results: *Incidence of UTI in mid trimester pregnancy during study period was 26%. Risk factors like previous history of UTI, sexual activity and multipara were higher in case group. Highest age incidence was between 20-30 years. Predominantly patients were asymptomatic. Lower abdominal pain was a common symptom. Eshcherichia coli was commonest organism. Prevalence of bacteriuria was more in women with history of UTI earlier in pregnancy. Premature rupture of membrane was significantly higher in case group. Caesarean section was higher in the case group. According to this study, the average weight of newborns whose mothers had UTI was 2.83 kg and it was 0.44 kg lower than the newborns of healthy mothers.*
Conclusion: *According to the conducted study, UTI in mothers is the major reason for comparatively lower birth weight of infants. Routine urine checkup during pregnancy helps to diagnose this early and prompt treatment is beneficial for infant.*
Keyword: *Urinary tract infection (UTI), maternal outcome, perinatal outcome*

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I. Introduction

Urinary tract infections (UTIs) are among the most common bacterial infections in humans, both in the community and hospital. UTI has been reported among 20% of the pregnant women and it is the most common cause of admission in obstetrical wards[1]. It is defined as the presence of at least 100,000 organisms per milliliter of urine in an asymptomatic patient, or as more than 100 organisms/mL of urine with accompanying pyuria (>5 WBCs/mL) in a symptomatic patient [2].UTI is not only common but the range of clinical effect varies from asymptomatic bacteriurea (ABU) to acute pyelonephritis [3]. Three common clinical manifestations of UTIs in pregnancy are: asymptomatic bacteriuria, acute cystitis and acute pyelonephritis [4].

Women with ABU during pregnancy are more likely to deliver pre-mature or low-birth-weight infants and have a 20 to 30-fold increased risk of developing pyelonephritis during pregnancy compared with women without bacteriuria. Untreated ABU can also lead to the development of cystitis in approximately 30% of cases. In addition, acute pyelonephritis has been associated with anaemia [5]. ABU may also be associated with an increase in neonatal mortality and a source for Gram negative septicaemia [6].

Pregnancy is one of the factors which increase the risk of UTI partly due to the pressure of gravid uterus on the ureters causing stasis of urine flow and is also attributed to the humoral and immunological changes during normal pregnancy [7]. During pregnancy there are a number of conditions associated with an increased prevalence of UTI. UTI is common with varying prevalence by age, sexual activity and the presence of genitourinary abnormalities. In healthy women, the prevalence of bacteriuria increases with age from about one percent in females with 5 to 14 years of age to more than 20 percent in women at least 80 years of age [8]. Sickle cell traits, diabetes mellitus and grand multiparity have been reported; each is associated with two-fold increase in the rate of bacteriuria [9]. The prevalence is higher among individuals in lower socioeconomic classes

and those with a past history of UTI [10]. There is also increase in the risk of developing UTI due to catheterization, spermicidal contraceptive usage, kidney stones, tumors and urethral strictures [8,11].

Various microorganisms are able to invade urinary tracts and bacterial organisms, which cause this disease, include Escherichiacoli, Klebsiella pneumonia, Proteus, Acinetobacter, Saprophyticus Staphylococcus, Streptococcus Group B and Pseudomonas aeruginosa[12].

In this study our main purpose was to search out the risk factors of UTI in pregnant women and the maternal and perinatal outcome in pregnant women.

II. Objective

General objective:

- To identify the risk factors of UTI in pregnant women and the maternal and perinatal outcome in pregnant women.

Specific objective:

- To evaluate causes of UTI
- To detect organism responsible for UTI

III. Methodology

Type of study	Case control study
Place of study	Tertiary medical college and Hospital, Dhaka
Study period	July, 2018 to December 2019
Study population	Pregnant women during the 13^{th} - 26^{th} weeks of pregnancy in the case group was the positive urine cultures of bacteria and pregnant women during the 13^{th} - 26^{th} weeks of pregnancy in the control group was the negative urine culture.
Sampling technique	Purposive

Exclusion criteria:

- Pregnant women having diabetes
- Pregnant women taking immunosuppressive drugs and with renal disease or on antibiotic therapy within 72 hours

Method:

- During the study, we had 62 culture positive women within study period. Age matched control group also selected. Informed verbal consent was taken. Socio-demographic data such as age, occupation, parity and duration of gestation were collected from the pregnant women using standard questionnaires and kept confidential during the research. In the study, wo hundred and fifty (250) urine samples were collected and analyzed during the study period. Sixty-two (62) samples showed significant growth,

Data analysis:

- Statistical analysis was performed using the Statistical package for social science SPSS version 15.0. A descriptive analysis was performed for clinical features and results were presented as mean ± standard deviation for quantitative variables and numbers (percentages) for qualitative variables.

IV. Result

In figure-1 showsdistribution of age of participants where UTI was found more in age group of 20-30 years and it was 41.1%. The following figure is given below in detail:

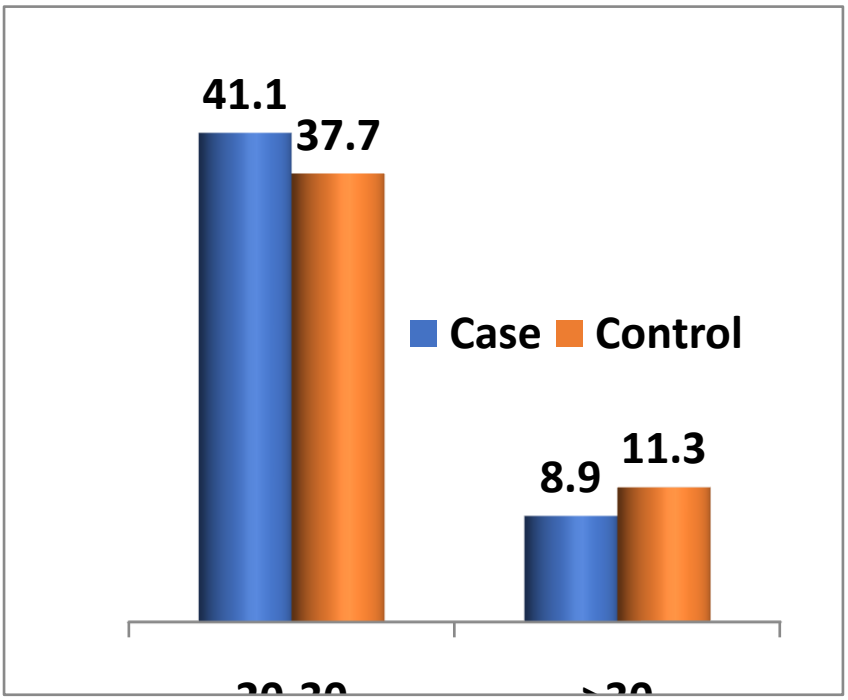

Fig-1: Distribution of age of participants

In figure-2 shows educational status of participants where most of the study population was literate that is 78.8%. And illiterate group was 41.1%. the following figure is given below in detail:

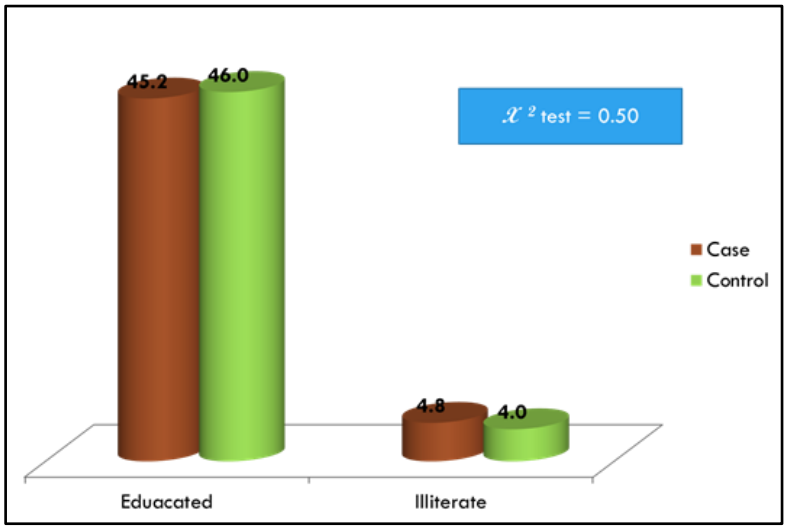

Figure-2: Educational status of participants.

In figure-3 shows parity the participants where UTI was more prevalent among birth order second and third irrespective of previous obstetric history and it was almost equal in both case and control (28 % and 29.2 %). In primi patient it was 16.1%. From three and more birth order UTI showed reduced preponderance. the following figure is given below in detail:

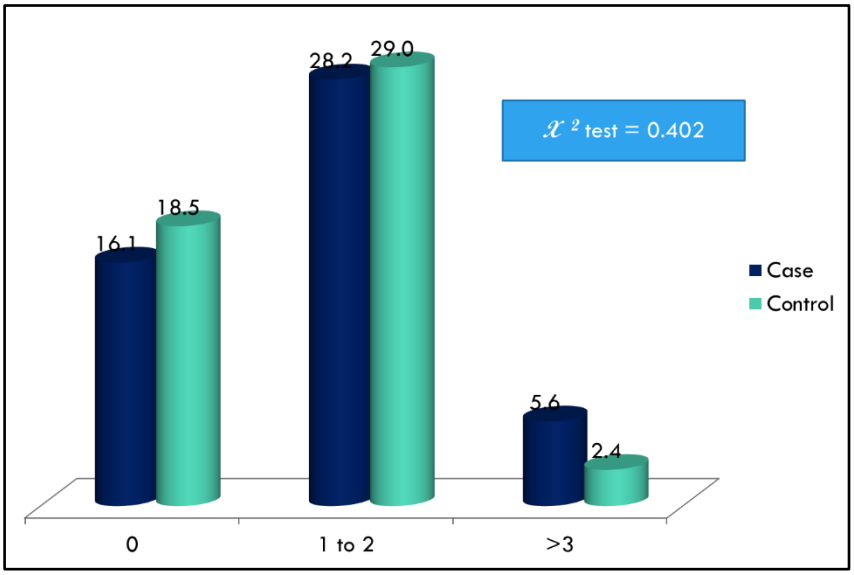

Figure-3: Parity the participants.

In table-1 shows causes of UTi where while looking into etiological factors, past history of UTI before pregnancy did not play a strong role as a risk factor. On the other hand, previous history of UTI in current pregnancy was significantly higher in case group which was 22% .Sexual activity in early pregnancy also played a significant role in causing UTI. The following figure is given below in detail:

Table-1: Causes of UTi

Parameters	Total N (%)	Case N (%)	Control N(%)	X^2 Test
Past H/O UTI				
Present	76 (61.3)	38 (30.6)	38 (30.6)	0.574
Absent	48(38.7)	24 919.4)	24(19.4)	
Previous H/O UTI in current Pregnancy				
Present	22 (17.7)	22 (17.7)	-	<0.001
Absent	102 (82.3)	40(32.3)	62(50)	
Sexual activity				
Present	63 (50.8)	45 (34.7)	20(16.1)	<0.001
Absent	61 (49.2)	19 (15.3)	42 (33.1)	

In figure-4 shows organisms responsible for UTI where E. coli was the commonest organism causing UTI in our study followed by pseudomonas and klebsiella. Asymptomatic bacteruria was the most frequently encountered in case. It was followed by lower abdominal pain (22.6%) and burning micturition (19.5%). The following figure is given below in detail:

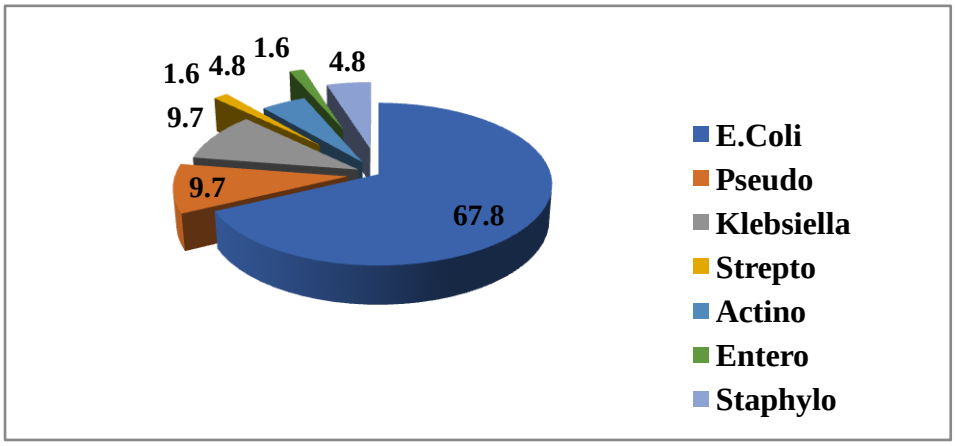

Fig-4: Organisms responsible for UTI

In figure-5 shows mode of delivery where caesarean section was higher in women with UTI than without caused mostly due to prematurity and fetal distress. The following is given below in detail:

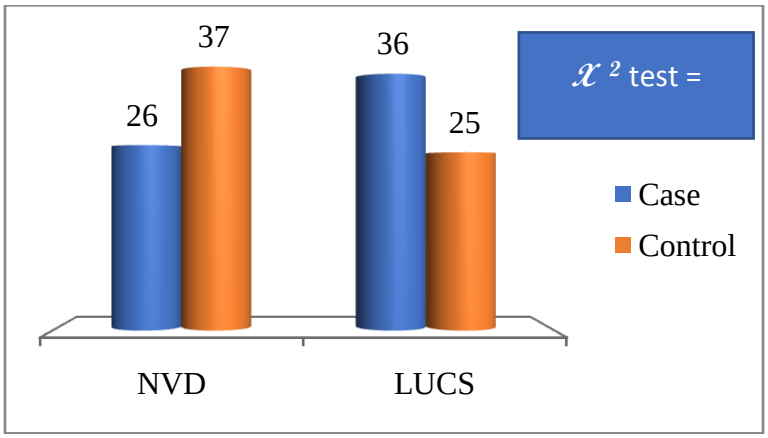

Fig-5: Mode of delivery

In figure-6 shows symptom of UTI most of the cases UTI was asymptomatic, 32.3%. the following figure is given below in detail:

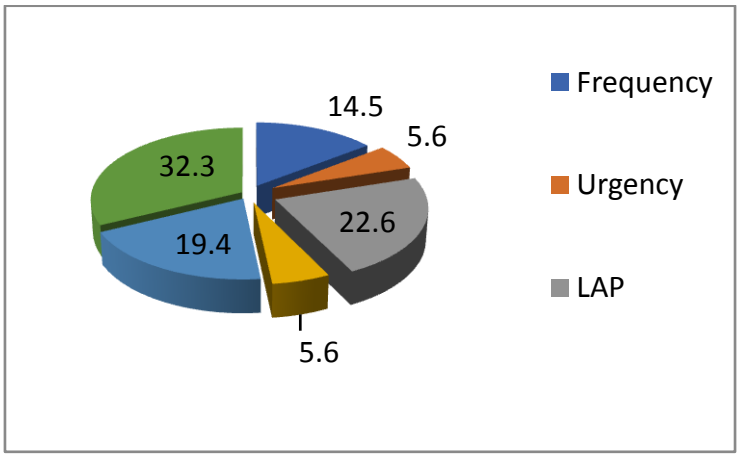

Fig-6: Symptoms of UTI

In table-2 shows fetal outcome where preterm labour was comparatively high in case group. Birth weight of babies born to UTI mother was significantly lower than their counterpart. The following table is given below in detail:

Table-2: Fetal outcome

Complications	Total n (%)	Case n (%)	Control n (5%)	X^2 test
Preterm labour	16(12.9)	11(8.9)	5(4.0)	0.091
Low birth weight	20(16.1)	19(15.3)	1(0.8)	<0.001
PROM	20(16.1)	14(11.3)	6(4.8)	0.045
Fetal distress	57(45.9)	35(28)	22(17.7)	0.018
Admission in NICU	38(30.6)	20(16.3)	18(14.52)	0.690

V. Discussion

According to our study, prevalence was 26% among 13-26 weeks pregnant women from July 2018 to December, 2019 attending hospital OPD. A study conducted in Dhaka National Medical College in 2011 showed incidence of midtrimester UTI was 12.30% which was less than third trimester pregnancy [13]. This variation is due to more anatomical changes of genitourinary system and urinary stasis.

In one study it was found that association of UTI during pregnancy with the risk of adverse perinatal and maternal outcomes such as low- birth-weight infants, premature delivery, and occasionally, hypertension/pre-eclampsia, stillbirth, Caesarean delivery and intra-uterine growth restriction.[13]However other studies did not find such associations. These inconsistent results could be due to selection bias, differences in settings, inadequate control of confounding factors and whether it was hospital-based or population-based study. [14]In our study, we found that,preterm labour was comparatively high in case group. Birth weight of babies born to UTI mother was significantly lower than their counterpart.

One study reported that, the increased incidence of preterm labour and delivery associated with UTI can result from inflammatory responses induced by cytokines and prostaglandins mediators triggered by the colonization of amniotic fluid by uropathogens. These bacteria produce collagenase and phospholipases A and C, which act as precursors of pro-contractile prostaglandins E2 and F2a, consequently triggering preterm labour. [15]

In one study said that, the challenge of Escherichia coli (E Coli) with its multidrug resistant strains found to be the most predominant causative organism in UTI among pregnant women in this study needs to be addressed in order to reduce the risk of adverse maternal and neonatal outcomes. [16]In our study we found that,E. coli was the commonest organism causing UTI followed by pseudomonas and klebsiella. Asymptomatic bacteriuria was the most frequently encountered in case. It was followed by lower abdominal pain (22.6%) and burning micturition (19.5%).

VI. Conclusion

From our study we can say that, UTI in mothers is the major reason for comparatively lower birth weight of infants. Routine urine checkup during pregnancy helps to diagnose this early and prompt treatment is beneficial for infant. Further study is needed for better outcome.

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