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Original Research Article

A Prospective Observational Study on Maternal and Perinatal Complications Associated with Urinary Tract Infections in Pregnancy at A Tertiary Care Hospital

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Abstract:

Background: Urinary tract infection is the most common bacterial infection during pregnancy and is associated with several maternal and perinatal complications.

Aim: To describe the maternal and perinatal complications in pregnant women with UTI.

Methods: A prospective observational study was undertaken at Hitech medical college and Hospital, Bhubaneswar from January 2021 to December 2022. The presence of risk factors, the causative organisms and the adverse maternal and perinatal outcomes like preterm labour, amnionitis, maternal anemia, low birth weight along with perinatal morbidity and mortality were tabulated. The results were analysed and was expressed in proportions and percentages.

Results: Majority of the pregnant women who had UTI were multiparous (54.66%) belonging to the low(46%) and medium SES(40%). 64.66% were between the age group of 21 to 30 years. The highest incidence of infection was seen during the first trimester that is 59.6%. 26% of the patients had preterm and 2.3% had anaemia. Most common organism isolated was E.coli (72.6%).

Conclusion: Our study concludes that routine screening for urinary tract infection in pregnant woman should be a part of routine antenatal care to reduce the associated adverse maternal and fetal outcomes.

Keywords: Urinary Tract Infections, Preterm Delivery, LBW, Pregnancy.

Introduction

Urinary tract infections are the most common bacterial infections during pregnancy. Approximately 90% of pregnant women develop ureteral dilatation which will persist until delivery [1]. This may cause increase urinary stasis and urethra vescicular reflux. In addition to this, physiological change in the plasma volume during pregnancy decreases the urine concentration which is considered to encourage bacterial growth in urine [1,2]. Thus among the pregnant woman approximately 4 to 10 % have asymptomatic bacteriuria, 1-4% develop acute cystitis and 1-2 % may develop acute pyelonephritis during the second half of pregnancy [3].

Antepartum UTI had been implicated as high risk factor for adverse maternal and perinatal outcomes in various studies. It has been found that there is an strong association between UTI and several maternal complications during pregnancy including hypertensive disease in pregnancy, anaemia, amnionitis and endometritis [4, 5, 6]. It is difficult to establish the sequence of events properly but a temporal relationship between UTI and hypertension was clearly established by Stuart et al [7] and that between UTI and anaemia was established by Brumfitt [8]. If the UTI is left untreated during pregnancy, it increases the risk of pyelonephritis, premature delivery, foetal mortality and asymptomatic bacteriuria doubles the risk of preterm labour and / or low birth weight. UTIs during third trimester increase the relative risk for the developmental delay and mental retardation and in some cases foetal death [9].

Among the organisms causing UTI during pregnancy E.coli accounts for 80-90% infection [10]. Klebsiella, proteus, Enterobactor are the other common organisms. Hence routine screening of pregnant women to detect bacteriuria which will mandate timely intervention and further prevent the adverse maternal and fetal outcomes. Thus the present study was undertaken to assess the role of

relevant risk factors, etiologies and their association with adverse maternal and perinatal outcomes.

Material and Methods

This was a prospective observational study in which 150 pregnant women attending the OPD of Hitech medical college and hospital, Bhubaneswar from January 2021 to December 2022. A structured questionnaires was designed and information was collected on sociodemographic profile and maternal risk factors. After explaining the aims and objectives of the study, informed consent was taken from each subject participating in the study. All antenatal women between the age group of 18-35 years with no medical disorders and no previous adverse pregnancy outcomes like abortion, preterm delivery, LBW, perinatal death were included. Pregnant women who had been diagnosed with superimposed hypertensive disorders or chronic hypertension or who had a history of renal, CVS, metabolic or liver disease were excluded from the study. Complication and adverse effect like maternal hypertension (preeclampsia), anaemia, amnionitis, preterm LBW, LBW and perinatal death during the period of study were observed and analysed. The data was compiled and expressed in proportions and percentages.

Results

Of 150 Pregnant women who had UTI, the most common age group who had the highest incidence (64.66%) were between 20-30 years of age as shown in table 1. Based on the parity multiparous had higher incidence of UTI (54.66%) in comparison to primiparous (45.34%). Regarding the educational level and socioeconomic status of pregnant women with UTI, it was found that highest percentage of UTI were in the lower educational group (67.4%) and in low and medium socioeconomic group i.e., 46% and 40% respectively. UTI by gestational age was lowest in third trimester (19.3%), while women in their first(38%) and second trimester(42.7%) had greater incidence of UTI.

Table 1: Socio-demographic profile

1. Age	**N**	**%**
18-20 yrs	21	14%
21-30 yrs	97	64.66%
>30yrs	32	21.30%
2. Parity		
Primi	68	45.34%
Multi	82	54.66%
3. Education(modified kuppuswamy)		
Low(score <6)	101	67.40%
High(score >6)	49	32.60%
4. SES(modified Kuppuswamy classification)		
Lower & upper lower	69	46%
Lower &upper middle	60	40%
Upper class	21	14%
5. Occupation		
Working	28	18.66%
Housewife	122	81.34%
6. Gestational age at diagnosis		
1st trimester	57	38%
2nd trimester	64	42.70%
3rd trimester	29	19.30%

Table 2: Maternal side effects

	N	**%**
Preterm Labour	39	50%
HTN(PE)	27	34.6%
Anaemia	11	14.1%
Amnionitis	01	1.3%

Table 2 shows the adverse side effects of UTI in pregnancy on the mothers. 50% of the cases had preterm labour. Preeclampsia was associated with UTI in 34.6% of the cases. Anaemia was noted in 11 cases (14.1%) and only 1 case in the study group had amnionitis that accounted for only 1.3%.

Table 3: Fetal complications

	N	%
LBW	24	63.1%
Preterm LBW	13	34.3%
Prenatal death	1	2.6%

Table 4: Bacteria

	N	%
E.coli	109	72.6%
Klebsiella species	23	15.3%
Pseudomonas	11	7.3%
Proteus	6	4.2%
Enterobactor	1	0.6%

Table 3 mentions about the fetal complications where the occurrence of Low Birth Weight was found to be 63.1% and preterm LBW was 34.3%.
Amongst the bacterial isolates obtained from the 150 urine samples, majority of the isolates were gram negative bacteria which included E.coli(72.6%), Klebsiella species accounting for15.3%, Pseudomonas (7.3%), Proteus (4.2%) and enterobactor (0.6%) respectively as shown in Table 4.

Discussion

The prevalence of UTI is a common medical condition during pregnancy accounting for 20% of the cases (22(1)). UTI is more common in female population than in males. The female urethra is short and is in close proximity to the vaginal canal and anus. The vagina is richly colonised with organism from the lower genitourinary tract such as E .coli, klebsiella, enterobactor and proteus, all of which are common pathogen isolated from the women with UTI. In pregnancy the incidence of pregnancy is still increased because of many factors, the most important of them being relative obstruction of the urinary tract as well as stasis. Obstruction may be secondary to hormonal or mechanical changes. Hydroureter and hydronephrosis may occur by mechanical compression due to the enlarging uterus and also by smooth muscle relaxation induced by progesterone. Pregnancy induced glycosuria and aminoaciduria also encourages bacterial proliferation. Physiological increase in plasma volume decrease the concentration of urine and hence favours bacterial growth in urine [11].

Socioeconomic status plays a role as due to poor personal and environmental hygiene. Patient belonging to Low SES suffer more from bacteriuria. Lack of awareness and health education add to this factor [12]. In our study there was a higher incidence of UTI amongst the lower and upper lower SES (46%) and middle and upper middle SES group (40%) in comparison to the upper class group which accounts for only 14%. 67.4% of patient with UTI belonged to the lower education group i.e. score <6 and 32.6% belonged to the higher education group with score >6 according to modified kuppu swamy classification.

Most of our cases, 64.66% belongs to the age group 21-30 years as maximum no of patients in our study belong to this age group. In a study Manjula N. et al, it is found that the incidence of UTI increases with age [12]. Most patients were in their first trimester (38%) & second trimester of pregnancy (42.7%) when UTI was first diagnosed during our study. Many other study revealed similar result like in a study conducted by Aazam Taghavi Zahedkalaei et al & Mahidiye Kazemi et al [20] and by Lekshmi Balachandran et al &Leena Jacob et al [22], but in a study of Chetna A Gopachade et al show a different result where maximum no of cases were in their early stage of pregnancy up to 20 weeks [13]. There is a strong association between UTI in pregnancy and premature labour. Hence pregnant females are having frequent bacteriuria and are at increased risk of delivering preterm and LBW infants. Our study shows a significant 26% of cases who delivered before term. According to Indu Verma et al, urogenital infection is significantly associated with preterm delivery [14]. Recognising and treating the infection at an early stage will decrease the % of women going into preterm labour and will improve the prenatal outcome [14, 18]. 18% of our cases had pregnancy induced hypertension which indicate association between UTI and maternal Hypertension. Many studies have found a positive association as supported by subsequent meta-analysis [15, 16]. Only 11 cases had anaemia in our study. Though there is a known association between UTI or pyelonephritis with anaemia in pregnancy, the exact aetiology till date is unknown. The theories regarding endotoxin mediated haemolysis, renal erythropoietin suppression and anaemia of chronic disease have been taken into consideration by many authors [17]. Chorioamnitis or intraamniotic infection is usually caused by bacteria ascending into the uterus from the urinary tract and from the vagina. Hence UTI and bacterial vaginitis are mostly implicated in such cases. it is more likely to occur after rupture of membrane. Our studies show only 2 cases having amnionitis. It was found that these 2 cases had premature rupture of membranes and

subsequently developed amnionitis. While studying the foetal outcome we found that 16% of babies were LBW. There was only one perinatal death where mother had PROM along with the chorioamnionitis. The baby was diagnosed with septicaemia. Urine sample from each cases sent for culture and sensitivity and Gram negative bacteria belonging to enterobacteriace were isolated in many cases. The predominant uro pathogen was E.coli (72.6%). Many other studies also show E.coli as the most frequently associated organism as in the study by Manjula N et al [12,19,22].

Conclusion

Bacteriuria in pregnancy has a significant adverse effect on the health of the mother and the foetus. From our study we concluded that UTI during pregnancy causes different complications like preterm labour, hypertensive disorder, anaemia and amnionitis etc. All of which are leading cause of maternal morbidity and mortality. Hence screening for bacteriuria during pregnancy should be an essential part of the antenatal care for effective and timely intervention and prevention of further complication caused by these infection.

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