Original Article

Association of Maternal Lower Urinary Tract Infection with Adverse Fetal Outcome in Terms of Preterm Labor and Low Birth Weight

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Abstract

Objective: Urinary tract infection (UTI) is a common clinical problem, often seen in late pregnancy. The infection and its management may have adverse effects on the pregnancy outcome. This study is design to determine the effects of lower urinary tract infection in late pregnancy on fetal outcome in terms of birth weight and gestational age.

Methods: A total of 155 women with lower UTI in late pregnancy were included in this study. Basic demographics, physical examination, and clinical history were taken. Patients were followed up further, in their index pregnancy to identify the prevalence of fetal complications like reduced fetal weight or chances of going into preterm delivery. At the time of delivery, birth weight and gestational age were recorded.

Results: The mean age of the patients was 28.55±3.86 years. The frequency of preterm birth and low birth were 30.3% (47/155) and 24.5% (38/155) respectively. The frequency of preterm babies and low birth weight were not significant statistically among different age groups (P>0.05). Prevalence of preterm deliveries and low birth weight were not significant with a number of UTI episodes (P>0.05).

Conclusion: It is concluded that UTI during pregnancy has a significant impact on pregnancy outcome, mainly premature labor and low birth weight. The unwanted sufferings of the pregnant mothers and their offspring could easily be prevented by early screening and prompt treatment of UTI in pregnancy.

Key Words: Urinary tract infection, Birthweight, Preterm delivery.

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Introduction

Urinary tract infection (UTI) is a common clinical problem, which can involve urethra, bladder, and kidney.[1] UTI effects all age groups, but women are more susceptible than men, due to short urethra, absence of prostatic secretions, pregnancy and easy contamination of the urinary tract with fecal flora.[2] Pregnant women may develop urinary tract infection (UTI) during pregnancy.

The infection and its management may have adverse effects on the pregnancy outcome. Maternal UTI is independently associated with preterm delivery, preeclampsia, intrauterine growth retardation, and cesarean delivery.[3]Pregnant women with asymptomatic bacteriuria are also more likely to

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deliver preterm. Symptomatic and asymptomatic bacteriurias have been reported among 17.9 % and 13.0% pregnant women, respectively.[4]

Screening of pregnant women for UTI can minimize these UTI associated complications.[5] Recently various risk factors of UTI during pregnancy have been reported; perhaps these are varied according to the geographical, social and biological settings.[6]Some studies conducted revealed 4.3% and 28.8% UTI in pregnant women.[1,3]

Some studies in Egypt denoted that prevalence of UTI during pregnancy ranged between 22-35%. [7,8] Pregnant women are at increased risk for UTI, beginning in week 6 and peaking during weeks 22 to 24.[9] Several physiological, anatomical and personal factors contribute to this problem during pregnancy.[10] Various contributory factors include urethral dilatation, increased bladder volume and decreased bladder tone with increased urinary stasis. Also physiologically increased plasma volume decreases urine concentration and pathologically up to 70% of pregnant women develop glycosuria which encourages bacterial growth.[10] Poor personal hygiene may further augment the risk of infection.

Presence of bacteruria is not always associated with symptoms, as the picture ranges from asymptomatic, cystitis, and pyelonephritis which have several complications.[11,12]

Antepartum UTI has been implicated as a risk factor for adverse perinatal outcomes, premature birth (birth prior to 37 weeks) and low birth weight (weight below 2500grams) and perinatal death.[13,14] Premature and low birthweight neonates have increased rates of morbidity and mortality in the first year of life and suffer from a plethora of lifelong health conditions including: neurological, respiratory, gastrointestinal, cardiovascular, and immunological.[15-17]

UTI affect almost 50% of all women (10% of pregnant women) and manifest in a variety of clinical presentations. [18] UTIs generally have a mild clinical course with few sequelae in the general population, but in even asymptomatic bacteriuria in the gestating female placed them at a risk for various complications. [19] The importance of UTI is also high light by the fact that it is the commonest cause of preterm labour.

Aim of our study is to find out urinary tract infection effect on birth weight and gestational age at delivery. So our study will be helpful to recommend that health education about personal hygiene, repeated urine cultures early in pregnancy and during the third trimesters especially for low socioeconomic pregnant women must be considered in routine clinical practice.

Methodology

This was a descriptive, cross-sectional study carried out in the Department of Obstetrics & Gynecology, Liaquat National Hospital & Medical College Karachi, from April 2013 to September 2013. Over the 6 months, 155 patients were enrolled by non-probability consecutive technique. The sample size was calculated using WHO software for sample size estimation. Sample size of 155 patients calculated by taking prevalence 11.3%[4] confidence level 95% and absolute precision was 5%.

All primigravida pregnant women of age between 20-35 years, with lower urinary tract symptoms presenting after 24 weeks with one or more episodes of UTI were included after taking informed consent. Multigravida or pregnant women with other causes of acute abdomen includes acute appendicitis, ruptured abdominal aneurysm, peritonitis, pancreatitis, cholecystitis, ruptured spleen or ruptured ovarian cyst were excluded. Pregnancy with any renal disorder, with renal or ureteric stones, having history of pyelonephritis, cystitis and urethritis in past were also excluded.

In primigravida, booked patient presenting with LUTS in OPD, a mid stream urine sample was sent for culture and sensitivity. Patients were included in study if positive report of urine C/S due to any pathogen was found. The test was performed in the well equipped laboratory of Liaquat National Hospital having skilled expertise of more than 50 years. These patients were followed up further, in their index pregnancy to identify the prevalence of fetal complications like reduced fetal weight or chances of going in preterm delivery. At the time of delivery, birth weight and gestational age was recorded. Preterm labour was considered if delivery was done at < 37wks and low birth weight was considered if weight is<2500gms. Confounding variables and

biasnesswas controlled by strictly following the inclusion and exclusion criteria.

An approval from ethical and review committee was taken before commencement of the study.

Statistical analysis:

Data compilation and analysis was done through SPSS version 20. The quantitative variables includes age was presented in terms of mean ± standard deviation. The qualitative variables as number of episode of UTI, preterm delivery and low birth weight were presented in frequency and percentages. The effect modifiers were controlled by the stratification of age, number of episodes of UTI to see the effect of these on outcome by using chi-square test and p-value <0.05 was considered as significant.

Results

A total of 155 primigravada women with at least one or more episodes of urinary tract infection were included in this study. The mean age of the patients was 28.55±3.86 years with the median age of 29 years.

Age categorization of patients showed that majority of patients were of age between 26-30 years [n=67, 43.2%], 24.8% (n=38) patients were in age category of ≤25 years; while 32.2% (n=50) patients were in age category of 31-35 years.

Single episode of UTI was in83.2% (n=129) and twice episodes of UTI were observed in 16.7% (n=26) cases.

Fetal complication in term of preterm and low birth weight secondary to lower urinary tract infections are in 30.3% (47/155) and 24.5% (38/155) as shown in figure-1.

Fetal complications with respect to age groups and number of episode were also calculated. Frequency of preterm babies and low birth weight were not significant statistically among different age groups as shown in table I and II respectively (*P*>0.05).

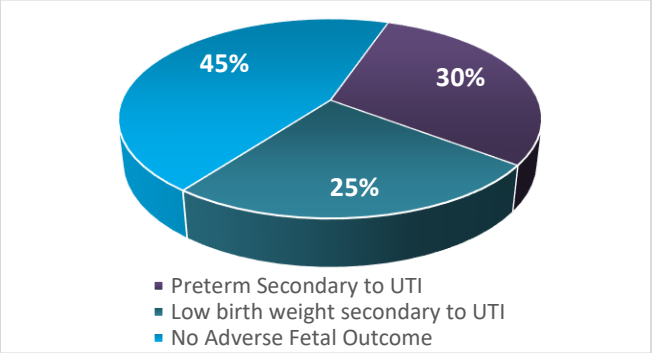


Figure 1. Association of Maternal lower urinary tract infections with adverse fetal outcome in terms of preterm labor and low birth weight

Table I: Fetal Complication in Term Of Pretem Birth Secondary to Lower Urinary Tract Infections With Respect To Age Groups

Age Groups	Preterm Labor		Total
	Yes	No	
≤ 25 Years	10(26.3%)	28(73.7%)	38
26 to 30 Years	25(37.3%)	42(62.7%)	67
31 to 35 Years	12(24%)	38(76%)	50

P=0.24

Table II: Fetal Complication in Term of Low Birth Weight of Secondary to Lower Urinary Tract Infections with Respect to Age Groups

Age Groups	Low birth weight		Total
	Yes	No	
≤ 25 Years	11(28.9%)	27(71.1%)	38
26 to 30 Years	18(26.9%)	49(73.1%)	67
31 to 35 Years	9(18%)	41(82%)	50

P=0.41

Similarly, prevalence of preterm deliveries and low birth weight were not significant with number of UTI episodes as shown in table III and IV (*P*>0.05).

Table III: Fetal Complication in Term of Pretem Birth Secondary to Lower Urinary Tract Infections with Respect to Number of Episode

Episode	Preterm Labor		Total
	Yes	No	
One Episode	39(30.2%)	90(68.8%)	129
Two Episode	8(30.8%)	18(69.2%)	26

P=0.95

Table IV: Fetal Complication in Term of Low Birth Weight Secondary to Lower Urinary Tract Infections with Respect to Number of Episode

Episode	Low birth weight		Total
	Yes	No	
One Episode	31(24%)	98(76%)	129
Two Episode	7(26.9%)	19(73.1%)	26
P=0.75			

Discussion

Urinary tract infection is the common of all bacterial infections, affecting human beings throughout their life span especially in women [20]. Around 20% women in the age range 20-65 years suffer from at least one episode per year, while 50% develop urinary tract infections within their lifetime.[21] Not surprisingly infections of the urinary tract are the most common bacterial infections encountered during pregnancy.

Plausible explanation of increasing risk of UTI and peaking during weeks 22 to 24, was due to uretheral dilatation, decreased tone, decreased urine concentration and increased stasis, plus hormonal changes, all these factors contribute to the increased risk with increased pregnancy duration.[22]

In a study patient with diagnosed UTI have shown 15.3% premature births and 11.3% births were with low birth weight. [4] These findings are in concurrence with our findings. Savage et al. 30 [23] found that the prevalence of UTI increases with age by 1% to 1.5% per decade and that the frequency of UTI is directly proportional to gravidity. The numbers of patients were not sufficiently large to determine which effect that of age or that of gravidity was greater. In other population-based study, on non-pregnant women, however, age was found to have a greater effect than gravidity on the prevalence of bacteriuria.[24]

In the current study, fetal complications in term of preterm delivery and low birth weight of secondary to lower urinary tract infections are 30.32% (47/155) and 24.52% (38/155) respectively. Several studies supported these results, John and Michael (2000)[22], indicated that odds ratio for occurrence of premature labor among pregnant women exposed to UTI was (1.6) and for low-birth weight it was (1.4). AlsoLaura et al, (1994) [25], documented that women exposed to antepartum UTI were found to be at greater risk of delivering infants with low birth weight (OR= 1.6) and they were likely to experience premature labor (OR= 1.8) even after adjusting for potentially confounding variables. The same result was obtained by Remez (1994)[26] (OR= 1.7).

The significant association between the preterm labour and UTI are well defined, includes several theories as; uterine contractions may be induced by cytokines and prostaglandins which are released by microorganisms. Urinary tract infection affects premature labor directly through the development of amnionitis. Furthermore, bacterial enzymes such as collagenase may weaken the fetal membrane.[22] It was also postulated that bacterial products such as phospholipase A and C or endotoxins may stimulate prostaglandin biosynthesis by fetal membrane which initiates labor.

The relationship between asymptomatic bacteriuria and preterm birth has been well documented and Schultz et al, reported that UTIs are associated with ~27% of premature births.[27] Romero et al showed that non bacteriuric patients had two-thirds the risk of low birth weight infants and half the risk of preterm delivery compared to patients with untreated asymptomatic bacteriuria.[28]

Our study furthermore strengthens the association between urinary tract infections with adverse fetal outcomes. Health education about personal hygiene, urine cultures early in pregnancy and during the third trimesters especially for low socioeconomic pregnant women must be considered in routine clinical practice.

Conclusion

We conclude that UTI during pregnancy has a significant impact on pregnancy outcome. The unwanted sufferings of the pregnant mothers and their offspring could easily be prevented by early screening and treatment of UTI in pregnancy. In light of our results we recommend that, health education about personal hygiene should be emphasized by the antenatal care physician to all pregnant females. Urine culture must be done at the first antenatal visit; follow-up cultures of urine should be performed frequently. According to the reports of culture pregnant women should be treated with appropriate antibiotic therapy so as to avoid maternal-fetal complications.

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