Original Article

Urinary Tract Infection a Preventable Cause of Pregnancy Complications - An Update

Ghazala Sadiq[1], Hajra Khan[2]

[1]Consultant Gynaecologist, Quaid e Azam International Hospital Islamabad, [2]Medical Officer, Al Sadiq Saad Shaheed Hospital Peshawar Road, Rawalpindi.

Correspondence: *Dr. Ghazala Sadiq*
Consultant Gynaecologist, Quaid e Azam International Hospital Islamabad
ghadiq@gmail.com

Abstract

Objectives: To determine the prevalence, Risk factors associated with and pathogens involved in causing urinary tract infection during pregnancy in women of Islamabad and Rawalpindi.

Study design: Prospective cross sectional study

Place & duration: Quaid e Azam International Hospital and Al Sadiq Saad Shaheed Hospital for a period of three months from 1stFeb 2018 -30th April 2018.

Methodology: A total number of 345 women at different gestational period and from all walks of life were included in the study. A pre designed and structured questionnaire and hospital record were used as tools for data collection. A detailed gynaecological history was taken and Physical examination was carried out on all patients. Complete blood count and a clean catch mid stream urine was taken.

Results: UTI prevailed among 22.7% of pregnant women; the condition is less common in primigravida than in subsequent pregnancies. Associated risk factors were studied, Level of education and socioeconomic status were seen to contribute significantly; a history of pelvic inflammatory disease and previous history of UTI were responsible for 43.00% and 63.30% of cases respectively. About 43.0% of patients suffered from moderate and 11.4% from severe anemia. Another 27.8% of women had been previously catheterized for some reason.

Conclusion: Prevalence of UTI is high in our part of the world. Risk factors including parity, the period of gestation, education, previous history of UTI and PID and catheterization contribute significantly towards causing Urinary tract infection among pregnant women.

Keywords: UTI, Perinatal morbidity, Millennium goals MGD4 and MGD 5.

Cite this article as: Sadiq G, Khan H. Urinary Tract Infection a Preventable Cause of Pregnancy Complications - An Update. J Soc Obstet Gynaecol Pak 2019; Vol 9(1):30-35.

Introduction

Urinary tract infection is a leading cause of preventable adverse pregnancy outcomes. These are most frequently encountered bacterial infections and the second most common disorder of pregnancy specially in developing countries[1] ; anemia being the first. The incidence is reported to be 5%-15% in different countries and is a common cause of hospital admission. During pregnancy, UTI contributes significantly to maternal morbidity and increased perinatal morbidity and mortality. Maternal anemia, hypertension, phlebitis. thrombosis and chronic pyelonephritis are significant whereas Preterm rupture of membranes, Preterm labour, Prematurity, chorioamnionitis, Intra uterine growth retardation, low birth weight and abortion are possible fetal complications.[2] Many countries with

Authorship Contribution: [1]Conception and design, Critical revision of the article for important intellectual content, Final approval and guarantor of the article, [2]Collection and assembly of data.

Funding Source: none

Conflict of Interest: none

Received: Nov 7, 2018

Accepted: April 13, 2019

high rates of preterm birth and neo- natal mortality also have rates of UTI in pregnancy that exceed rates seen in more developed countries. By mapping available rates of UTI in pregnancy across different populations, it is emphasized that this is a problem of global significance and needs to be addressed amicably. In response to Millenium Development Goals MGD4 and MGD 5-to reduce childhood mortality and improve maternal health a variety of global efforts have arisen to improve birth outcomes.[3] According to WHO Pakistan is among the 11 countries where the preterm birth rate is more than 15 %.[4] Screening and treatment of UTI have improved birth outcomes in several more developed countries and would likely improve maternal and neonatal health worldwide and specially our part of the world.

UTI is defined as, a positive urine culture and 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/HPF) in a symptomatic patient. the spectrum of these infections ranges from lower urinary tract disease (asymptomatic bacteriuria, acute cystitis) to upper urinary tract disease (acute pyelonephritis).[5] The frequency of asymptomatic bacteriuria is 2-7% of pregnancies, similar to the nonpregnant population. However, recurrent bacteriuria is more common during pregnancy.[6] Up to 40% of the cases may progress to symptomatic upper tract UTI or pyelonephritis, significantly more than in nonpregnant women. Treatment of asymptomatic bacteriuria reduces the risk of asymptomatic infection. E.Coli remains the predominant organism implicated in urinary tract infection in pregnancy, Recent studies in Nigeria show an increasing involvement of Klebsiella Spp. Staphylococcus aureus, Proteus spp., and Pseudomonas spp. in urinary tract infection in pregnancy.[7]

This perspective cross sectional study was aimed to determine the prevalence, risk factors associated with and pathogens involved in causing UTI during pregnancy in women of Islamabad and Rawalpindi and to evolve strategies of prevention. It was carried out at Quaid e Azam International Hospital and Al Sadiq Saad Shaheed Hospital for a period of three months from 1stFeb 2018 -30th April 2018. Approval was obtained from the Ethical committee of Quaid e Azam International Hospital.

Methodology

Pregnant women coming for an antenatal checkup of age groups varying from 20 to 50 years; at different periods of gestation and having different obstetric histories were included in the study. Patients taking antibiotics for the last seven days and those who were diabetic were excluded. A total number of 400 patients were approached and informed consent was obtained from them. Some of the patients n=18 were excluded for not giving consent; another 40 women did not meet inclusion criteria. So, a number of 342 pregnant women were enrolled. A pre-designed and structured questionnaire and hospital record were used as tools for collection of basic data and associated risk factors. A detailed gynaecological history including signs and symptoms of UTI and physical examination was done on each patient. Complete blood picture was carried out to detect Hemoglobin levels, below 11gm/dl was taken as moderate anemia and below 9.0gm/dl was labeled severe anemia.

A clean catch mid stream urine sample was taken in a sterile bottle in the laboratory, the specimen was processed within 12 hrs. if not was refrigerated at 4^0C. Culture and sensitivity was done as per the laboratory routine.to ensure a clean catch sample all patients were directed to clean their hands with sanitizer provided to them and genitalia with a swab soaked in saline. For quality control, the patients with vaginal discharge additionally used a cleansing solution for the intimal wash.

Results

All the data collected was analyzed through the program of Statistical Package for Social Sciences (SPSS) Version 22 including Microsoft Excel. The results of this study revealed that UTI prevailed among 22.7% of pregnant women (Fig No 1). Maximum age group with symptoms was between 31- and 40-years n=26 (32.9%) and the minimum age group ranged 45 -50 years n=79 making 10.1% of all. In this study age is found to be insignificant as risk factor p value =0.82. Parity is a significant risk factor for acquiring urinary tract infection as in primigravida the condition is seen to be less

common than in subsequent pregnancies n=6 (7.6%) p value is < 0.001. Period of gestation seems to be only of relative significance p=.007; highest prevalence in terms of gestational age was seen in second trimester n=42 i.e. 53.2%.

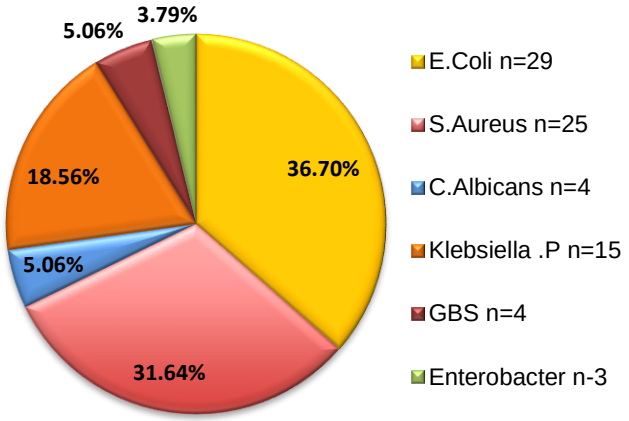

Figure 1. Prevalence of Pathogens causing UTI in pregnant women in Rawalpindi /Islamabad

Socioeconomic status was noted to contribute significantly p<0.001, (n=57) i.e. 72.15% of cases were from the average or unsatisfactory background. In this study, it was seen that pelvic inflammatory disease and previous history of catheterization are major risk factors n=34 i.e. 43.0%(p<0.001) and n=22 i.e. 27.8%(p<0.001) respectively. Our study showed that women with a history of urinary tract infection before pregnancy were at a significantly higher risk (n=50) i.e. 63.3% (p<0.001). Anemia is seen to be a major contributor p<0.001; participants with moderate anemia were n=34 (43.0%) those with severe anemia were n=9 (11.40 %). Unexpectedly level of education turned out to be only relatively consequential p< 0.126 n=23 (29.1%) and n=30 (38.0%)of the participants were undergraduate and graduates respectively whereas n=9 (11.4%) were postgraduates The result of present study showed that Escherichia Coli remained dominant pathogen causing urinary tract infection in participants n=29 (36.70%), followed by Staphylococcus Aureus n=25 (31.64%). Contribution of Klebsiella Pneumonea was significant n=15 (18.50%) and that of Candida Albicans was n=4 (5.06%). GBS group B streptococcus were n=4 (5.06%) and enterobacter aurogenes n=3 (3.79%).

Discussion

It is beyond doubt that UTI in pregnancy (whether symptomatic or asymptomatic) is a risk factor for adverse outcomes that endanger the health of both mother and fetus. In this study the frequency of urinary tract infection among the participants was as high as 29.57% the result is similar to a previous local study[8] The prevalence rate is comparable to other third world countries 15.6 % in Turkey[9]; 9% in

Table No I: Sociodemographic characteristics and associated risk of UTI.

variable	response	With UTI		Without UTI		Total n(%)		p-value
		N	%	N	%	N	%	p=0.82
Total Maternal Age	20-25 yrs	9	11.39	33	12.5	42	12.3	
	26-30 yrs	22	27.8	83	31.8	105	30.7	
	31-40 yrs.	26	32.9	68	25.9	94	27.5	
	41-45yrs.	14	17.7	50	19	64	18.7	
	46-50 yrs.	8	10.1	29	11	37	10.8	
	Total	79	100	263	100	342		
parity	Primi	6	7.6	40	15.2	46	13.5	p<0.001
	Para 1	7	8.9	71	27	78	22.8	
	Para2	25	31.6	76	28.9	101	29.5	
	Para3	22	27.8	63	24	85	24.9	
	Multigravida	19	24.1	13	4.9	32	9.4	
	Total	79	100	263	100	342	100	
period of gestation	Trimester 1	20	25.3	108	41.1	128	37.4	
	Trimester 2	42	53.2	90	34.2	132	38.6	p=0.007
	Trimester 3	17	21.5	65	24.7	82	24	
	Total	79	100	263	100	342	100	

Table No II: Risk factors for UTI								
		N	%	N	%	Total n(%)		
Level of Education	Under Matric	6	7.6	20	7.6	26	7.6	p-0.126
	Matric	11	13.9	42	16	53	15.5	
	Under Graduate	23	29.1	53	20.2	76	22.2	
	Graduate	30	38	133	50.6	163	47.7	
	Post graduate	9	11.4	15	5.7	24	7	
	Total	**79**	**100**	**263**	**100**	**342**	**100**	
Socio economic status	Satisfactory	22	27.8	66	25.1	88	25.7	p<0.001
	Average	25	31.6	141	53.6	166	53.6	
	Unsatisfactory	32	40.6	56	21.3	88	25.7	
	Total	**79**	**100**	**283**	**100**	**342**	**100**	
previous History of UTI	Yes	50	63.3	30	11.4	80	23.4	
	No	29	36.7	233	88.6	262	76.6	
	Total	79	100	263	100	342	100	
History of PID	Yes	34	43	31	11.8	65	19.00%	p< 0.001
	No	45	57	232	88.2	277	81.00%	
	Total	**79**	**100**	**263**	**100**			
Anemia	Nil	36	45.60%	182	69.20%	218	63.70%	p<0.001
	Moderate	34	43.00%	71	27.00%	105	30.70%	
	Severe	9	11.40%	10	3.80%	19	5.60%	
	Total	**79**	**100**	**263**	**100**	**342**	**100**	
History of Catheterization	Yes	22	27.80%	12	4.60%	34	10.00%	p<0.001
	No	57	72.20%	250	95.40%	307	90.00%	
	Total	**79**	**100**	**262**	**100**			

North West[10] ;56% in India[11] and 44.61% in Bangladesh.[12] On the contrary, is much higher than the western world; it is only 8% in Unites States[13] and 2-7% in Brazil.[14] The variation in prevalence from one geographical location to another could be attributed to differences in UTI perception, mode of screening, and confounding risk factors such as age, parity, socioeconomic status and lack of personal and environmental hygiene.

Based on the results of this research, the highest rate of UTI among pregnant women in Islamabad is in the ages over than 30years and the lowest rate of infection is between the range of 20 – 25 years.

As far as parity is concerned the results of this study have shown significantly high incidence of UTI among pregnant women of the city in their second pregnancy n=25 (31.6%)and the lowest rate of infections was in primigravida's n=6 (7.6%); however, in a study conducted by Mobbasheri and et al. in Gorgan, the highest rate of infections was after the third pregnancies (4.73%)[15] Education level seems to be a major contributor to the cause. Despite the fact that a previous national study carried out by Sheikh *et al.*[16] found no significant effect of education on the incidence of UTI this study shows that the highest percentage of pregnant women with UTI were in the middle educational level (undergraduate and graduate) n=23 (29.1%) and n=30 (38.0%). This in consistence with a study conducted in Turkey by Gunes et al[17] who found that UTI was significantly high among women who had less than secondary level education in their study conducted in Turkey ($P < 0.05$) and Dimetry *et al.* found that the highest percentage of UTI among pregnant women was among those who were illiterate or of low education level (61.5%).[18] Previous history of catheterization was one of the factors that were significantly associated with increased rates of UTI. Pregnant women who had history of the previous catheterization had an infection rate of 27.8% (n-22) whereas in another study carried out in Turkey they were only 2.28 times more likely to develop ASB compared with those without any history of catheterization.[9] Anaemia showed significant effect those who had hemoglobin levels <11 mg/dL was 4.98 times more likely to develop UTI compared to those with hemoglobin levels > 11 mg/dL. Similar findings were also reported in Northwest Ethiopia[10] and in Iran.[19]

The reports of urine culture showed that Escherichia Coli remained the most predominant etiological

pathogen causing urinary tract infection among participants with the highest occurrence n=29 and percentage (36.79%). Staphylococcus Aureus followed n=25 (31.64%); Klebseilla Pneumonea n=15(18.50%); Candida albicans was n=4 (5.06%);GBS group B streptococcus n=4 (5.06%), enterobacter aurogenes n=3 (3.79%). The results are similar to findings of other international studies.[20,21]

Keeping in view all international recommendations it is strongly suggested that in third world countries more importance should be given to educating women with special stress on health education. Multiple sources of evidence strongly support the screening and treatment of UTI as a valuable approach for improving birth outcomes. In accordance with Developmental Millennium Goals to reduce childhood mortality and improve maternal health screening and treatment of UTI, it is further recommended that public educational programs on the importance of personal hygiene and good environmental sanitation habits should be carried out more frequently. They should be started at all levels including educational institutions, workplaces, social services, and antenatal centers.

Conclusion

Prevalence of UTI is high in our part of the world. Risk factors including parity, period of gestation, education, previous history of UTI and PID and catheterization contribute significantly towards causing Urinary tract infection among pregnant women.

References

1. Tamalli. M, Bioprabhu Sangar and Alghazal; Urinary tract infection during pregnancy at Al- khoms, Libya: Internatonal Journal of Medicine and Medical Sciences.2013;3 (5): 455-459.
2. Michael Esh, Wadhwani Rekha: Urinary tract infection and its effect on outcome of pregnancy; Indian Journal of Obstetrics and Gynecology Research. 2017;4(2):108-111.
3. Nicole M. Gilbert, Valerie P. O'Brien, Scott Hultgren, George Macones, Warren G. Lewis, Amanda L. Lewis;Urinary tract infection as a Preventable cause of Pregnancy complications: Opportunities, challenges, and a global call to Action: Global Adv Health Med. 2013;2(5):59-69. DOI: 10.7453/gahmj.2013.061
4. March of Dimes P, Save the Children, WHO Born too soon: the global action report on preterm birth Geneva: World Health Organization;2012
5. Tazebew Emiru, Getenet Beyene, Wondewosen Tsegaye,and Silabat Melaku; Associated risk factors of urinary tract infection among pregnant women at Felege Hiwot Referral Hospital, Bahir Dar, North West Ethiopia: BMC Res Notes. 2013; 6: 292.
6. Thomas M Hooton, MDKalpana Gupta, MD, MPH; Urinary tract infections and asymptomatic bacteriuria in pregnancy: Upto Date 2018 :8
7. Joanna Matuszkiewicz-Rowińska, Jolanta Małyszko,and Monika Wieliczko, Urinary tract infections in pregnancy: old and new unresolved diagnostic and therapeutic problems Arch Med Sci. 2015 Mar 16; 11(1): 67–77.
8. Jawad Ahmad, Akram Shah, Noor Shad Ali;Prevalence of Urinary tract infection in Pregnant women of Peshawar NWFP : A single center study JPMI.2003: 17(2):
9. Ismail Ebrie Ali, Teklay Gebrecherkos, Mucheye Gizachew, and Martha Alemayehu Menberu : Asymptomatic bacteriuria and antimicrobial susceptibility pattern of the isolates among pregnant women attending Dessie referral hospital, Northeast Ethiopia: A hospital-based cross-sectional study;Turk J Urol. 2018 May; 44(3): 251–260
10. Tazebew Emiru, Getenet Beyene, Wondewosen Tsegaye, and Silabat Melaku; Associated risk factors of urinary tract infection among pregnant women at Felege Hiwot Referral Hospital, Bahir Dar, North West Ethiopia- BMC Res Notes. 2013; 6: 292.
11. Vasudevan R :An Oveview of the Infectionsudevan R;Urinary Tract Infection Microbiol Exp 1 (2)and Associatwd Risk Factors:J (2):00008DOL:10.15406/jmen.2014.01.00008
12. Kawser Parveen, Afroza Momen, Arzumath Ara Begum, Monowara Begum;Prevalence Of Urinary Tract Infection During Pregnancy :Journal of Dhaka National Medical College&Hospital.2011: 17(2):8-12.
13. Ailes EC,Summers AD,Tran EL et al. Antibiotics Dispensed to Privately Insured Pregnant Women with Urinary Tract Infections- United States ,2014 MMWR Morb Mortal Wkly Rep 2018;67:18-22
14. Michelim L, Bosi GR, Comparsi E.Urinary Tract Infection in Pregnancy: Review of Clinical Management. J Clin Nephrol Res.2016; 3(1): 1030.
15. Sheikh MA, Khan MS, Khatoon A, Arain GM. Incidence of urinary tract infection during pregnancy. East Mediterr Health J 2000; 6:265–271.
16. Gunes G, Gunes A, Tekiner S, Karaoglu L, Kaya M, Pehlivan E. Bacteriuria and socioeconomic associations among pregnant women in Malatya, Turkey. Public Health. 2005 19:1039–1041.
17. Shaheen HM, Farhat TM, El-Hakeem Hammad NA. Prevalence of urinary tract infection among pregnant women and possible risk factors. Menoufia Med J. 2016;29:1055-1059.
18. Chunchaiah Sarojamma, Nagothi NagendraPrasad, Roopakal a B, Rangaiah Nagarathnamma; A prospective study of prevalence, risk factors, isolates & antimicrobial sensitivity pattern in Asymptomatic Bacteriuria among Antenatal women in Rajarajeswari Medical College & Hospital: Indian Journal of Obstetrics and Gynecology Research.2016;3(3):229- 233.
19. Marziyeh Amiri, Zohreh Lavasani, Reza Norouzirad Najibpour, Masoomeh Mohammadpour, Amin Reza Nikpoor et al ; Prevalence of Urinary Tract Infection Among Pregnant Women

and its Complications in Their Newborns During the Birth in the Hospitals of Dezful City, Iran, 2012 – 2013:Iran Red Crescent Med J. 2015; 17(8): e26946.
20. Nwachukwu E, Onyebuchi O, Michael O. Prevalence of urinary tract infections in pregnant women in Onitsha, Nigeria. J Bacteriol Mycol Open Access. 2018;6(5):284–285.
21. Bankole H Oladeinde, Richard Omoregie, a Asymptomatic Urinary Tract Infection among Pregnant Women Receiving Ante-Natal Care in a Traditional Birth Home in Benin City, Nigeria :Ethiop J Health Sci. 2015; 25(1): 3–8.