Determinants of Anemia, Diabetes and Hypertension among Urinary Tract Infected Pregnant Women Attending in a Selected Hospital, Kathmandu

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Authors' contributions

This work was carried out in collaboration between both authors. Author ST carried out the study and participated in the statistical analysis and procedures. Moreover, coordinated and participated in the design of the study, statistical analysis and the drafting of the manuscript. Both authors read and approved the final version.

Original Research Article

ABSTRACT

Aims: Urinary tract infection (UTI) occurs in all age groups, more common in women due to short urethra and its close proximity to anus and vagina. UTI is defined as "microscopic finding of >10 pus cells/high power field (40x) in urine". The purpose of the study is to find the risk factor associated with pregnancy and the different non-communicable diseases (Anemia, Diabetes and hypertension) of UTI.
Study Design: A cross-sectional comparative study.
Place and Duration of Study: The study was carried out under the supervision of OPJS University and field study was carried out in Kathmandu, Nepal from March 2019 to October 2019.
Methodology: An analytical cross-sectional study was done among UTI pregnant 510 women aged 18 years to 45 years. A convenient sampling technique was used. A structured questionnaire was designed to collect the data. Descriptive statistics along with unadjusted Odds Ratio (95% CI) and a P < 0.05 was considered significant for data analysis.
Results: Anemia, diabetes and hypertension among UTI infected pregnant women was 62.7, 32.9

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and 30.2 respectively. There were significant associations between educational status, ethnicity, age and occupation of UTI infected pregnant women with anemia, diabetes and hypertension. Similarly, there was a significant association between gestational period, gestational age at the beginning of prenatal care, the gender of the infant, history of delivery and Anemia, diabetes and hypertension.

Conclusions: Based on the findings the study concluded that, anemia, diabetes and hypertension remain a prevalent problem of UTI infected pregnant women.

1. INTRODUCTION

In women, urinary tract infections account for around 25% of all infections thus being one of the most recurrent clinical bacterial infections [1]. Pregnancy increases the risk of recurrent bacteriuria and acute pyelonephritis due to the compression of ureters by gravid uterus causing stasis of urine flow [2]. During pregnancy, a number of risk factors of UTI are stated depending on the biological, social, and geographical settings [3]. Women with UTI during pregnancy may be more likely to deliver pre-mature or low-birth-weight infants leading to increase neonatal mortality and morbidity [4]. Urinary tract infections (UTIs) are the most prevalent bacterial infections encountered during pregnancy [5]. It includes two groups: Asymptomatic (ASB) and symptomatic bacteriuria. Asymptomatic bacteriuria is defined as the persistent presence of bacteriuria within the urinary tract of women who have no symptoms [6].

Prevalence of bacteruria during pregnancy rises with parity, sexual activity, lower socioeconomic status, diabetes mellitus, anemia, hypertension, chronic urinary retention and sickle-cell trait and disease [7,8,9]. Also, pregnant women that were bacteruric as schoolgirls carry a remarkably greater risk of UTI during pregnancy [10]. Other risk factors include previous urinary tract infections history, young age, and neuromuscular dysfunction bladder, structural disorders of the urinary tract, renal stones, and catheterization [5,11]. Similarly, consequences of UTI can be significant including elevated risk of pyelonephritis, premature labor, fetal death, and pregnancy-induced hypertension [12,13]. The evidence shows that the UTI constitutes a serious maternal and fetal risk, thus their prevention or early treatment is essential [14]. Similarly, anemia is a common problem in pregnancy, particularly in developing countries like Nepal which causes low birth weight [15]. So, this study was conducted to determine the potential UTI related risk factors among pregnant women in Kathmandu city.

2. METHODOLOGY

An analytical comparative cross-sectional study was conducted in a selected hospital of Kathmandu from March to October 2019 to find the prevalence of UTI among pregnant women aged 15 to 45 years. A convenient sampling technique was used to select the study population. We considered the sample size around 510.

Structured questionnaire was designed in order to collect the necessary information by interview method. Urinary tract infection was defined as "microscopic finding of >10 pus cells/high power field (40x) in urine" [3]. All the collected data were entered in Ms. Excel and analyzed using SPSS 16.0 version. In addition, 10% of questionnaires were double-checked by a co-investigator, different from the original data entry person. Prior to analysis proper, the frequencies and ranges of every variable were verified for consistency with the study population. Descriptive statistics for qualitative variables use frequencies and percentages were used. Inferential statistics were done by unadjusted Odds Ratio (95% CI) and a $P < 0.05$ was considered significant. Unadjusted odds ratio was calculated to measure the net effect of anemia, diabetes and hypertension on UTI.

The research was approved by a committee of research ethics OPJS University. Written consents were obtained from pregnant women after a concise explanation of the study with her right to withdraw at any time. The confidentiality of the pregnant women's data was maintained. Women under study were not exposed to any increased risk as a result of the study. The result from the study helped the patient in receiving appropriate treatment, hence beneficial. At the end of the study, the UTI infected participants were counseled about preventive measures and

those who had UTI full course of antibiotics along with health awareness were given.

3. RESULTS AND DISCUSSION

The study reveals the association of socio-demographic characteristics: Educational status, ethnicity, age and occupation of UTI infected pregnant women and anemia. There was a significant association between educational status, ethnicity, age and occupation of UTI infected pregnant women and anemia (Table 1).

It also shows that educational status was significantly associated with anemia in pregnancy (p=0.005). Those UTI infected pregnant women who have higher education were 1.69 times less likely to have anemia than women of primary education (OR= 1.687, 95%CI= (1.174-2.423) (Table 1).

The occurrence of anemia, diabetes and hypertension during pregnancy are well known [16,17]. This study provides more evidence of the impact of well- established underlying factors on anemia, diabetes and hypertension among those who are pregnant and affected by UTI.

The study shows that association of pregnancy related factor among UTI women: gestational period, gender of infant, history of delivery and anemia (Table 2). It also shows that gestational period was significantly associated with anemia in pregnancy (p=0.000). Those UTI infected pregnant women whose gestational period more than 6 months were 2.182 times less likely to

Table 1. Association of socio demographic characteristics with anemia (N=510)

Characteristics	Anemia		p-value	Unadjusted Odds Ratio (95% CI)
	Yes (N=320) 62.7%	No (N=190) 37.3%		
Educational status				
Primary education	178(34.9)	81(15.9)	0.005	1.687(1.174-2.423)
Higher education	142(27.8)	109(21.4)		
Religion				
Hindu	282(55.3)	176(34.5)	0.104	1.694(0.892-3.216)
Others	38(7.5)	14(2.7)		
Ethnicity				
Upper caste	141(27.6)	31(6.1)	0.000	0.248(0.159-0.386)
Other	179(35.1)	159(31.2)		
Age				
Less than 30 years	177(34.7)	73(14.3)	0.000	0.504(0.350-0.727)
Above 30 years	143(28.0)	117(22.9)		
Occupation				
Unskilled or farmer	187(36.7)	33(6.5)	0.000	0.149(0.097-0.231)
Skilled/Business and professional	133(26.1)	157(30.8)		

Table 2. Association between pregnancy related factor among UTI women and anemia

Characteristics	Anemia		p- value	Unadjusted odds ratio (95% CI)
	Yes (N=320) 62.7%	No (N=190) 37.3%		
Gestational period				
Less than 6 months	182(35.7)	141(27.6)	0.000	2.182(1.473-3.233)
Above 6 months	138(27.1)	49(9.6)		
Gravida				
Primigravida	313(61.4)	189(37.1)	0.144	4.227(0.516-34.623)
Multigravida	7(1.4)	1(0.2)		
Gender of infant				
Male	178(34.9)	136(26.7)	0.000	2.009(1.367-2.952)
Female	142(27.8)	54(10.6)		
History of delivery				
NVD	173(33.9)	33(6.5)	0.000	0.179(0.116-0.276)
Cesarean section	147(28.8)	157(30.8)		

occur anemia than UTI infected pregnant women gestational period less than 6 months (OR= 2.18, 95%CI= (1.473-3.233) (Table 2).

Gender of infant was significantly associated with anemia in pregnancy (p=0.000). Those UTI infected pregnant women who have male infant were 2.00 times more likely to occur anemia than UTI infected pregnant women having female infant (OR=2.009, 95%CI=(1.367-2.952)(Table2).

The study reveals that the association of socio-demographic characteristics: Educational status, religion, ethnicity, age and occupation of UTI infected pregnant women and diabetes. There was a significant association between educational status, ethnicity, age and occupation of UTI infected pregnant women and anemia (Table 3).

It also shows that age was significantly associated with diabetes in pregnancy (p=0.000). Those UTI infected pregnant women who have less than 30 years were 3.34 times less likely to occur diabetes than women who have above 30 years (OR= 3.344, 95%CI= (2.204-5.074) (Table 3).

The study shows that association of pregnancy related factor among UTI women: gestational period, history of delivery, history of prematurity and diabetes (Table 4).

Table 3. Association of socio demographic characteristics with diabetes (N=510)

Characteristics	Diabetes		p-value	Unadjusted Odds Ratio (95% CI)
	Yes (N=144) 32.9%	No (N=366) 71.8%		
Educational status				
Primary education	83(16.3)	168(32.9)	0.017	0.624 (0.423-0.920)
Higher education	61(12.0)	198(38.8)		
Religion				
Hindu	137(26.9)	321(62.9)	0.013	0.364(0.160-0.828)
Others	7(1.4)	45(8.8)		
Ethnicity				
Upper caste	86(16.9)	86(16.9)	0.000	0.207(0.137-0.313)
Other	58(11.4)	280(54.9)		
Occupation				
Unskilled or farmer	111(21.8)	109(21.4)	0.000	0.126(0.081-0.197)
Skilled/Business and professional	33(6.5)	257(50.4)		
Age				
Less than 30 years	41(8.0)	209(41.0)	0.000	3.344(2.204-5.074)
Above 30 years	103(28.2)	157(30.8)		

Table 4. Association between pregnancy related factors and diabetes

Characteristics	Diabetes		p-value	Unadjusted Odds Ratio (95% CI)
	Yes (N=144) 32.9%	No (N=366) 71.8%		
Gestational period				
Less than 6 months	131(25.7)	210(30.6)	0.000	0.134(0.073-0.245)
Above 6 months	13(2.5)	156(30.6)		
Gravida				
Primigravida	119(23.4)	313(61.4)	0.144	4.227(0.516-14.623)
Multigravida	25(4.9)	53(10.3)		
Gender of infant				
Male	95(18.6)	219(42.9)	0.200	0.768(0.513-1.150)
Female	49(9.6)	147(28.8)		
History of delivery				
NVD	102(20.0)	104(20.5)	0.000	0.1639(0.107-0.250)
Cesarean section	42(8.2)	262(51.4)		
History of prematurity				
Yes	98(19.2)	350(68.6)	0.000	10.268(5.571-18.923)
No	46(9.0)	16(3.1)		

It also shows that history of prematurity was significantly associated with diabetes in pregnancy (p=0.000). Those UTI infected pregnant women whose history of prematurity was 10.26 times more likely to occur diabetes than UTI infected pregnant women with no prematurity. OR= 10.268, 95%CI= (5.571-18.923) (Table 4).

The study reveals that the association of socio-demographic characteristics: educational status, ethnicity, age and occupation of UTI infected pregnant women and hypertension. There was a significant association between educational status, ethnicity, age and occupation of UTI infected pregnant women and hypertension (Table 5).

It also shows that age was significantly associated with hypertension in pregnancy (p=0.000). Those UTI infected pregnant women who have less than 30 years were 2.26 times less likely to occur hypertension than women who have above 30 years (OR= 2.269, 95%CI= (1.534-3.355) (Table 5).

The study shows that association of pregnancy related factor among UTI women: Gestational

Table 5. Association of socio demographic characteristics with hypertension (N=510)

Characteristics	Hypertension		p-value	Unadjusted Odds Ratio (95% CI)
	Yes (N=154) 30.2%	No (N=356) 69.8%		
Educational status				
Less than SEE/SLC	79(15.5)	184(32.9)	0.017	0.887 (0.608-0.920)
Above SEE/SLC	75(14.7)	172(33.7))		
Religion				
Hindu	130(25.5)	328(64.3)	0.536	2.163(1.209-1.295)
Others	24(4.7)	28(5.5)		
Ethnicity				
Upper caste	80(15.7)	264(51.8)	0.000	0.322(0.217-0.479)
Other	74(14.5)	92(18.0)		
Occupation				
Unskilled or farmer	41(8.0)	249(48.8)	0.000	0.156(0.102-0.238)
Skilled/Business and professional	113(22.2)	107(21.0)		
Age				
Less than 30 years	54(10.6)	196(38.1)	0.000	2.269(1.534-3.355)
Above 30 years	100(19.6)	160(31.4)		

Table 6. Association between pregnancy related factors and hypertension

Characteristics	Hypertension		p- value	Unadjusted Odds Ratio (95% CI)
	Yes (N=154) 30.2%	No (N=356) 69.8%		
Gestational period				
Less than 6 months	105(20.6)	236(46.3)	0.000	0.918(0.613-1.375)
Above 6 months	49(9.6)	120(23.5)		
Gravida				
Primigravida	81(15.9)	242(47.5)	0.001	1.913(1.299-2.817)
Multigravida	73(14.3)	114(22.4)		
Gender of infant				
Male	81(15.9)	123(24.1)	0.006	1.707(1.162-2.507)
Female	73(14.3)	233(45.7)		
History of delivery				
NVD	255(50.0)	101(19.8)	0.000	0.185(0.123-0.279)
Cesarean section	49(9.6)	105(20.6)		
History of prematurity				
Yes	116(22.7)	332(65.1)	0.000	4.532(2.607-7.878)
No	38(7.5)	24(4.7)		

period, gravida, gender of infant, history of delivery, history of prematurity and hypertension (Table 6).

It also reveals that history of prematurity was significantly associated with hypertension in pregnancy (p=0.000). Those UTI infected pregnant women whose history of prematurity was 4.532 times more likely to occur hypertension than UTI infected pregnant women with no prematurity. OR= 4.532, 95%CI= (2.607-7.878) (Table 6).

4. CONCLUSION

Based on the findings the study concluded that, anemia, diabetes and hypertension remain a prevalent problem of UTI infected pregnant women. There were significant associations between educational status, ethnicity, age and occupation of UTI infected pregnant women and anemia, diabetes and hypertension. Similarly, there was a significant association between gestational period, gestational age at the beginning of prenatal care, the gender of the infant, history of delivery and Anemia, diabetes and hypertension. Therefore, assessment of associated risk factors should be conducted during regular antenatal care follow up.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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