International Journal of Community Medicine and Public Health
Paudel L et al. Int J Community Med Public Health. 2018 Jul;5(7):2714-2719
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20182604

Original Research Article

Prevalence of urinary tract infection and associated risk factors among women in Sindhupalchowk district, Nepal

Leela Paudel*, Naresh Manandhar, Saroj Sah, Sudesha Khadka, Samikshya Neupane, Sunil Kumar Joshi

Department of Community Medicine, Kathmandu Medical College, Sinamangal, Kathmandu, Nepal

Received: 05 April 2018
Accepted: 08 May 2018

***Correspondence:**
Dr. Leela Paudel,
E-mail: dr.leela1984@gmail.com

ABSTRACT

Background: 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 prevalence of UTI and its association with various risk factors.
Methods: An analytical cross-sectional study on prevalence of UTI was done among 260 women aged 15 years and above. Convenient sampling technique was used. Semi-structured questionnaire was designed to collect the data and urine sample was collected for routine and microscopic examination at the time of interview. Collected urine was sent, within 3 hours of collection.
Results: The mean age of the respondents was 36.43±16.17 years. The prevalence of UTI among women aged 15 years and above was 36.9%.The most common symptom was frequency of micturition (35%) followed by lower abdominal pain (38.46%). There was significant association between frequency of micturition**,** burning micturition and lower abdominal pain with occurrence of urinary tract infection. On urinalysis, 96 samples were positive for pus cell; one sample showed blood, 16 samples showed ca-oxalate and 57 samples showed protein which determines the type of UTI. Smoking [COR-2.15, C.I-(1.12, 4.09)] and unavailability of toilet facility [COR-0.27, C.I-(0.08, 0.93)] were the significant risk factors for occurrence of UTI.
Conclusions: There was high prevalence of UTI among women aged 15 years and above and association between smoking and unavailability of toilet facility and UTI was significant.

Keywords: Urinary tract infection, Urinalysis, Sindhupalchowk district, Risk factors

INTRODUCTION

Body waste and extra water are removed as ultra-filtrate of blood in the form of urine through the body's drainage system known as urinary tract. The urinary tract consists of two kidneys, two ureters, a bladder and a urethra. Infection of the tract by microbes including bacteria, virus and fungi are the causative agents for urinary tract infection.[1]

It is the result of an invasion of bacteria or other microorganisms into the urinary tract. The infection is named after the part that gets infected and is referred to as cystitis (bladder infection) and pyelonephritis (kidney infection).[2]

Urinary tract infection is defined as a combination of clinical features or symptoms and the presence of bacteria in urine or presence of more than 100,000 CFU/ml after urine culture. Clinical symptoms of UTI include frequency of micturition, dysuria, abdominal pain, back

pain, urgency and fever. Risk factors of urinary tract infections are pregnancy, use of contraceptive, lack of personal hygiene, genital prolapse, sexual activity, chronic disease like diabetes and renal stone.[3]

UTI is the most common bacterial infection accounting for 25% of all infections and occurs in all ages in both men and women.[4] However; infection is more common in women, especially reproductive age women due to shorter length of urethra and its close proximity to anus and vagina, allowing bacteria quicker access to the bladder[1]. The lifetime risk of having a urinary tract infection is almost 50% in women. UTIs in men are not as common as in women but can be serious when they occur.[5] It is predicted that about 50% of women will experience a UTI in their lifetime, and one in three women will receive antimicrobial therapy for UTI.[6]

The commonest micro-organism responsible for causing UTI is coliform bacteria. It accounts to 80% of the infection whereas *S. saprophyticus* constitutes to 5% to 10% followed by the other gram negative rods which causes sporadic infection.[7]

In Nepal total reported cases of urinary tract infection in year 2015-16 were 2539 out of which 1637 were female and 902 male. Out of 1637 women, 491 were between 20-29 years of age. The total number of death due to urinary tract infection is 9 in one year 2015-16 in Nepal.[8]

METHODS

An analytical cross-sectional study was conducted in Sindhupalchowk district from November to December 2016 to find the prevalence of UTI among women aged 15 years and above. Before conducting the study, ethical approval was taken from the Institutional Review Committee of Kathmandu Medical College. Convenient sampling technique was used to select the study population. Sample size was calculated as:

Sample size (n) $=Z^2 (p)*(1-p)/d^2$

$= (1.96)^2*0.20*0.80/ (0.05)^2$

$= 245.76$

Where, Z= degree of confidence level at 95%=1.96
p=prevalence=20%[9]
d = allowable error=5%

Considering 5% non-response rate, the final sample size was 260.

Semi-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".[10] For this purpose urine container and urine tag was used to collect the sample and labeling was done. All the respondents were asked to collect mid-stream sample of urine. Collected urine was sent for examination within 3 hours in the Indrawati Community Health Center, Sindhupalchowk and the results was filled in the questionnaire. All the collected data were entered and analyzed using SPSS 20.0 version. At the end of the study the participants who were found to have risk factor for UTI were counselled about preventive measures and those who had UTI full course of antibiotics along with health education was given.

RESULTS

The mean age of the respondents with standard deviation was 36.43±16.173 years (minimum 15 years and maximum 80 years). Most of them were Janajati (43.5%) by ethnicity followed by Dalit (30.4%). Majority of them were Hindu by religion (99.6%). Almost 42% of the respondents were illiterate. Out of 260 women 219 (84.2%) were married and rest were unmarried (Table 1).

Table 1: Demographic characteristics of the respondents (n=260).

Variables	Frequency	Percentage (%)
Age (in years)		
15-30	114	43.8
30-45	79	30.4
45-60	40	15.4
>60	27	10.4
Religion		
Hindu	259	99.6
Christian	1	.4
Ethnicity/caste		
Brahmin	49	18.8
Chhetri	19	7.3
Dalit	79	30.4
Janjati	113	43.5
Level of education		
Illiterate	108	41.5
Primary	88	33.8
Secondary and above	64	24.6
Marital status		
Never married	41	15.8
Married	219	84.2

The prevalence of urinary tract infection among women aged 15 years and above was 36.9%.

The various symptoms of urinary tract infection experienced by the participants was lower abdominal pain (38.6%) followed by frequency of micturition (35%), incomplete emptying of urine (20%), dribbling of urine (16.9%) and urinary incontinence (7.3%). haematuria (1.5%) was the least common symptoms (Figure 1).

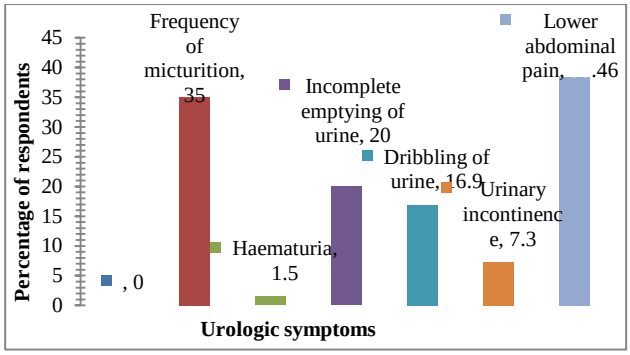

Figure 1: Frequency of urologic symptoms among the study population.

There was significant association between frequency of micturition [COR-3.51, C.I-(2.05, 6.01)], burning micturition [COR-8.83, C.I-(4.87, 16.00)] and lower abdominal pain [COR-17.18, C.I-(7.80, 37.82)] with occurrence of urinary tract infection. Presence of blood in urine, sense of incomplete voiding of urine, unknowingly passes of urine and something coming out per vaginum was not significantly associated with occurrence of UTI (Table 2).

The routine tests on urine samples showed that 260 samples had normal p^H (4.5-8.0). The multistrip dipped in urine showed the presence of protein and sugar in urine in the suspected cases of UTI (Figure 2).

Table 2: Urinary tract Infection according to various symptoms (n=260).

Symptoms		UTI (+)	UTI (-)	*COR (95%CI)	P value
Frequency of micturition	Yes	51	40	3.51 (2.05-6.01)	0.000
	No	45	124		
Burning micturition	Yes	65	28	8.83 (4.87-16.00)	0.000
	No	31	118		
Presence of blood in urine	Yes	0	4	-	-
	No	96	160		
Sense of incomplete voiding of urine	Yes	30	22	0.63 (0.34-1.18)	0.149
	No	142	66		
Unknowingly passes of urine	Yes	11	8	2.52 (0.98-6.51)	0.049
	No	85	156		
Something coming out per vaginum	Yes	9	15	1.02 (0.43-2.44)	0.95
	No	87	149		
Lower abdominal pain	Yes	88	64	17.18 (7.80-37.82)	0.000
	No	8	100		

*COR- Crude odds ratio, C.I- Confidence interval.

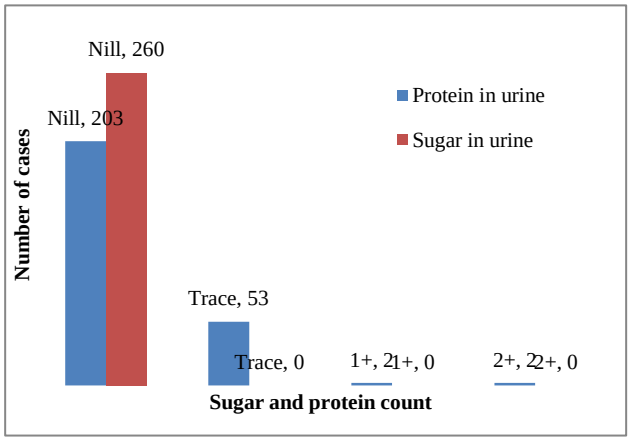

Figure 2: Presence of sugar and protein in urine.

Microscopic examination for WBCs, RBCs, Epithelial cells and presence of casts and crystals helps in determination of pyuria and the type of urinary tract infection in suspected females. Out of these samples, 96 were positive for pyuria, and the rest 164 samples were negative for pyuria (Table 3).

Table 3: Cell count in microscopy of urine.

		Frequency
WBC count	<10	164
	≥10	96
RBC count	nil	259
	>2	1
Epithelial cell count	<15	248
	≥15	12

The microscopic study also found co-oxalate crystal in 16 samples. There was no presence of any other crystals and casts in any of the urine samples.

Smoking [COR-2.15, C.I-(1.12, 4.09)] and unavailability of toilet facility [COR-0.27, C.I-(0.08, 0.93)] were significantly associated with the development of urinary tract infection. There was no significant association with the other risk factors. There was higher chance of getting UTI among those who consumed less amount of water in a day but the association was not statistically significant. Similarly, smokers had 2 times higher chance of getting

urinary tract infection as compared to non-smoker and the association was also statistically significant (Table 4).

Similarly those having toilet facility had less chance of getting urinary tract infection and the association was also statistically significant.

Age, education, marital status, time of urination, use of family planning methods, sexual activity, pregnancy, diabetes, recent gynecological examination were the common risk factors but there was no significant association with occurrence of urinary tract infection (Table 5).

Table 4: Association between various risk factors and UTI (n=260).

Variables		UTI (+)	UTI (-)	*COR (95%CI)	P value
Age in years	15-45	71	122	0.98 (0.55,1.73)	0.939
	>45	25	42		
Education status	Uneducated	41	67	1.07 (0.64,1.79)	0.769
	Educated	55	97		
Marital status	Married	80	139	1.11 (0.56,2.20)	0.761
	Unmarried	16	25		
Smoking habits	Yes	24	22	2.15 (1.12,4.09)	0.018
	No	72	142		
Alcohol consumption	Yes	32	57	0.93 (0.55,1.59)	0.815
	No	64	107		
Amount of water consume per day	<1 liter	64	78	4.92 (0.57,41.95)	0.108
	2-3 liters	31	80	2.32 (0.26,20.10)	0.431
	>4 liters	1	6		

*COR- Crude odds ratio, C.I- Confidence interval.

Table 5: Association between various risk factors and development of UTI.

Variables		UTI (+)	UTI (-)	*COR (95% CI)	P value
Toilet facility	Yes	88	160	0.27 (0.08,0.93)	0.028
	No	8	4	1	
Time of urination	After urge arises	40	56	1.37 (0.82,2.31	0.225
	Immediately after sense of full bladder	56	108	1	
Use any family planning method	Yes	35	59	1.02 (0.60,1.72)	0.937
	No	61	105	1	
Risk factors for UTI	Pregnancy	4	3	2.61 (0.56,11.98)	0.200
	Diabetes	9	9	1.95 (0.74,5.14)	0.165
	Recent gynaecological procedure	8	7	2.23 (0.78,6.41)	0.124
	None	74	145	1	
Sexual activity	Yes	34	55	1.08 (0.64,1.84)	0.757
	No	62	109	1	

*COR- Crude odds ratio, C.I- Confidence interval.

DISCUSSION

The prevalence of urinary tract infection in our study was 36.9%. Study done by Phidelis et al found the prevalence of 14.2% regardless of the women's age, parity and the gestational age.[11] It shows that the prevalence of UTI was comparatively higher in our study. The relatively high prevalence of UTI among the women in this study could be due to illiteracy (41.5%), unavailability of toilet facility which was found to be strongly associated with UTI, less consumption of water and higher age range (15 -80 years).

The most common symptoms in our study was lower abdominal pain (38.46%) followed by frequency of micturition (35%) and the least common symptom was haematuria (1.5%). The study done by Phidelis showed the commonest urological symptoms to be urgency (43.1%) and least common symptoms hematuria (4.2%).[11] Similar study done by Khatri et al showed burning sensation during micturition (62.40%) as the most common symptoms and nocturnal incontinence (4.1%) the least common symptoms.[12] This variation in the presenting symptoms could be due to environmental and socio-economic condition, age group and other underlying health conditions.

This study showed significant association between frequency of micturition**,** burning micturition and lower abdominal pain and occurrence of urinary tract infection.

Increased age, gender, underlying pathological conditions, lack of personnel hygiene might be the common risk factors for the occurrence of various symptoms of UTI.

In this study smoking [COR-2.15, C.I-(1.12, 4.09)] and unavailability of toilet facility [COR-0.27, C.I-(0.08, 0.93)] were the significant risk factors for the occurrence of UTI. Age, education, marital status, time of urination, use of family planning methods, sexual activity, pregnancy, diabetes, recent gynaecological examination were the common risk factors but were not statistically significant**.** Emiru et al conducted a study among 367 pregnant women to investigate for the presence of risk factors associated with urinary tract infections which showed that the chance of UTI was higher among pregnant women with associated risk factors such as anaemia, low income level, past history of UTI and sexual activity. Multiparity, history of catherization, genitourinary abnormality, maternal age, gestational age and education status were not statistically significant.[13] Similar study done by Haider et al in 2010 found that illiteracy, history of sexual activity, low socio-economic group, past history of UTI and multiparty as a risk factors for UTI.[14] Krcmery et al also demonstrated that sexual activity was risk factor for UTI in women.[15] From above studies done in different countries, sexual activity was found to be a common risk factor for UTI. It may be due to the lack of knowledge regarding personal hygiene.

On urinalysis our study showed that 96 samples were positive for pus cell, 16 sample showed presence of ca-oxalate in urine. Similar cross-sectional study done by Gupta et al. on a group of 300 females in the age from 18 to 30 years suspected for UTI showed that 172 were positive for pus cell and 10 showed presence of co-oxalate crystal.[3] Pus cell and ca-oxalate in the urine can determine the pyuria and type of urinary tract infection.

Periodic health examination and awareness programs can help to improve the health status as well as quality of life in women. This study highlights the need of toilet facility to each and every house which was one of the significant risk factors for urinary tract infection. Similarly, they should be aware of other risk factors. There is need to raise awareness of UTI and to expand services for prevention of UTI by maintaining hygienic conditions, changing behavior and regular health examination**.**

ACKNOWLEDGEMENTS

We would like to thank the Department of Community Medicine, Kathmandu Medical College for providing the opportunity to conduct this study. We would also like to thank Dr. Komal Thapa for the local guidance and lab technicians at Indrawatee Community Service Center for helping in routine urine examination test. At last, we would like to thank all the participants for their active participation and showing keen interest in the study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee of Kathmandu Medical College

REFERENCES

1. The National Institute of Diabetes and Digestive and Kidney diseases. Bladder infection (Urinary Tract Infection-UTI) in Adults, 2017. Available at: https://www.niddk.nih.gov/health-information/health-topics/urologic-disease/urinary-tract-infections-in-adults/Pages/facts.aspx. Accessed on 3 March 2018.
2. Vasudevan R. Urinary Tract Infection : An Overview of the Infection and the Associated Risk Factors. J Microbiol Exp Urin. 2014;1(2):1–15.
3. Gupta U, Jaiswal S, Thapa L, Parajuli N, Nepali S. Prevalance of Urinary tract Infection among Suspected Female patients Attending Manipal Hospital, Pokhara, Nepal. J Microbiol Virol. 2013;3(2):1-13
4. Karki A, Tiwari BR, Pradhan SB. Study of bacteria Isolated from Urinary Tract Infections and Their Sensitivity Pattern. J Nepal Med Association. 2004;43:200–3.
5. Griebling TL. Urinary tract infection in women. In: Litwin MS, Saigal CS, eds. Urologic Diseases in America. Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. Washington, D.C. NIH publication; 2007: 587–619.
6. Foxman B. Epidemiology of urinary tract infections: Incidence, morbidity, economic Costs. Disease a Month. 2003;49:53–70.
7. Zalmanovici Trestioreanu A, Green H, Paul M, Yaphe J, Leibovici L. Antimicrobial agents for treating uncomplicated urinary tract infection in women. Cochrane Database Syst Rev. 2010;10:CD007182.
8. Department of health services (DOHS). Annual Report 2071-72. Nepal. Ministry of health. 2016. Available at: http://dohs.gov.np/wp-content/uploads/Annual_Report_2071_72.Pdf. Accessed on 3 March 2018.
9. Das RN, Chandrashekar TS. Joshi HS, Gurung M, Shrestha N, Shivananda PG. Frequency and susceptibility profile of pathogens causing urinary tract infections at a tertiary care hospital in western Nepal. Singapore Med J. 2006;47(4):281.
10. Manjula NG, Math GC, Patil A, Gaddad SM, Shivannavar CT. Incidence of urinary tract infections and its aetiological agents among pregnant women in Karnataka region. Advances Microbiol. 2013;3(06):473.
11. Wamalwa P, Omolo J, Makokha A. Prevalence and risk factors for Urinary Tract Infections among

pregnant women. Prime J Social Sci. 2013;2(12):525-31.
12. Khatri B, Basnyat S, karki A, Poudel A, Shrestha B. Etiology and antimicrobial susceptibility pattern of bacterial pathogens from urinary tract infection. Nepal Med Col J. 2012;14(2):129-32.
13. Emiru T, Beyene G, Tsegaye W, Melaku S. Associated risk factors of urinary tract infection among pregnant women at Felege Hiwot Referral Hospital, Bahia Dar, North West Ethiopia. Bio Med Cent. 2013;6:292.
14. Haider G, Zehra N, Munir A, Haider A. Risk factors of urinary tract infection in pregnancy. J Pak Med Assoc. 2010;60(3):213-16.
15. Krcmery S, Hromec J, Demesova D. Treatment of lower urinary tract infection in pregnancy. Int J Antimicrob Agents. 2001;17:279-82.

Cite this article as: Paudel L, Manandhar N, Sah S, Khadka S, Neupane S, Joshi SK. Prevalence of urinary tract infection and associated risk factors among women in Sindhupalchowk district, Nepal. Int J Community Med Public Health 2018;5:2714-9.