

# Prevalence of urinary tract infection and correlation with lifestyle in women at Hadakewa Health Center, Lembata, East Nusa Tenggara

Taufiq Nur Budaya, Astarin Ardiani\*

## ABSTRACT

**Background:** The prevalence of urinary tract infections (UTIs) is higher among women than among men; as many as, 50% of women under the age of 30 are reported to have had at least one UTI. Genetic, biologic, behavioral, and other factors play a role in UTIs among women. This study aimed to find out the prevalence of urinary tract in rural area of Indonesia, which is Hadakewa, Lembata, East Nusa Tenggara, and how lifestyle contributes to UTI prevalence. **Materials and Methods:** Ninety women residing in Hadakewa and Merdeka villages on Lembata Island who met the study’s inclusion criteria took their midstream urine specimens to be analyzed using dipstick urinalysis and were given questionnaires about their lifestyles. This research was an observational study with a cross-sectional approach. **Results:** Eighty-three (92.2%) of 90 respondents had a UTI. Age groups of 0–10, 11–20, and > 51 years old each accounted for 18.1%; the group aged 21–30 years accounted for 13.3%, and those aged 31–40 and 41–51 years each accounted for 14.4%. Correlation between the availability of water source and UTI was significant ( $P = 0.001$ ). **Conclusion:** The prevalence of UTI in women in Hadakewa and Merdeka villages is high. Lifestyle can contribute to UTI.

**KEY WORDS:** Lifestyle, Prevalence, Urinary tract infection

## BACKGROUND

Urinary tract infection (UTI) is a term used for a clinical condition ranging in severity from an absence of symptoms with the presence of bacteria in urine to severe infection of the kidney that can end as sepsis. UTIs are considered to be the most common bacterial infection. According to the 1997 National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, UTI accounted for nearly 7 million office visits and 1 million emergency department visits, resulting in 100,000 hospitalizations.<sup>[1]</sup> Acute uncomplicated UTIs are common, especially in premenopausal, sexually active women, of whom about 30% will have been affected by age 26.<sup>[2]</sup>

Recurrence of UTI is reported to be very high in women; 25% of women are reported to experience

UTI recurrence within 6 months after their first infection. UTI incidence is higher in women than in men. Important risk factors for acute cystitis in women are a history of previous cystitis, sexual intercourse, and usage of spermicide components.<sup>[2]</sup>

The incidence of UTI varies according to the age group and gender, and causes of UTI vary among each group. Located on the east side of Indonesia, East Nusa Tenggara has a hot climate and little rainfall. Most of the people residing in East Nusa Tenggara Province live in poverty and are poorly educated; these conditions are spread throughout East Nusa Tenggara, causing a high number of infectious diseases. According to the Government of East Nusa Tenggara in 2016, overall educational status of East Nusa Tenggara, there were 33.30% of the population, does not own education certificate; 35.7% completed elementary school; 9.06% completed junior high school; 13.75% completed senior high school; and 1.81% completed vocational high school. In terms of poverty, there was an increase in September 2017 of 0.97% to 346,737 IDR per capita per month, compared

### Access this article online

Website: [jprsolutions.info](http://jprsolutions.info)

ISSN: 0975-7619

Department of Urology, Faculty of Medicine, Brawijaya University, Saiful Anwar Hospital Malang, Malang, East Java, Indonesia

\*Corresponding author: Astarin Ardiani, Department of Urology, Faculty of Medicine, Brawijaya University, Saiful Anwar Hospital, Jalan Jaksa Agung Suprpto No. 2, Malang, East Java, Indonesia, 65112. E-mail: [taufiq\\_fkub03@yahoo.com](mailto:taufiq_fkub03@yahoo.com)

Received on: 16-06-2019; Revised on: 19-07-2019; Accepted on: 25-08-2019

to March 2017 which was 343,396 IDR per capita per month. The increase in the poverty accompanied by a decrease in the number of poverty indicates an improvement in people's purchasing power in Nusa Tenggara Timur (NTT) in September 2017.<sup>[3-5]</sup>

Lembata is located to the east of Flores Island, East Nusa Tenggara; according to the data from Lembata Regional Hospital, infections always sit in the top 10 diseases in the hospital. This is the case not only at Lembata Regional Hospital; in Lebatukan, a subdistrict of Lembata where Hadakewa Health Center is located, many infectious diseases also sit within the top 10 diseases in the health center, with UTI being ninth on the list in 2014.<sup>[4]</sup>

The life of the people of Lembata, which includes Hadakewa subdistrict, is very underprivileged, with income per capita of IDR 497,685 and economic growth of 0.31% per year; the majority of people (74%) work as farmers and did not participate in higher education. In addition, the tough geographic terrain and hot climate make it hard to get clean water, especially in the subdistrict area; these conditions cause improper personal hygiene, making infectious diseases, especially UTI, easily transmitted. The aims of this study are to find out the prevalence of UTI from January to March 2015 at Hadakewa Health Center in women from Hadakewa and Merdeka villages from different age groups and to determine the factors that cause UTI in women in Hadakewa and Merdeka villages.<sup>[4]</sup> Because there were still limited data on UTI in Hadakewa, East Nusa Tenggara, this study was conducted to collect the data for the purpose of future prevention of UTI and to reduced health burden due to infectious disease.<sup>[4]</sup>

## MATERIALS AND METHODS

Sampling and examinations for this study were done at Hadakewa Health Center laboratories from January to March 2015. This study was an observational study with a cross-sectional approach. The population for this study was all women residing in Hadakewa and Merdeka villages from January to March 2015. Patients included in this study were female and willing to participate in this study. Pregnant, menstruation, and ill patients are excluded from this study. Midstream urine was taken randomly from 90 women from different age groups who reside at Hadakewa and Merdeka villages which were randomly selected based on inclusion criteria for this study, with 15 women in each group to look for asymptomatic bacteriuria. All 90 women were divided into groups based on age: 0–10 years, 11–20 years, 21–30 years, 31–40 years, 41–50 years, and >51 years. Before taking samples, informed consent was obtained from the patients; the next step was a short interview as well as filling in the

questionnaire form about how to clean their genital area, drink lots of water, and how many time changing their underwear daily and then patients received an explanation on how to obtain a midstream urine specimen. After the specimens were obtained, a test using dipstick urinalysis was implemented. Parameter of dipstick urinalysis used to determine whether there was UTI or not was leukocyte esterase, nitrate, and blood. The results of questionnaire and dipstick urinalysis were analyzed using Chi-square test with the help of SPSS software, with significance value of  $P < 0.05$ .

## RESULTS

The results showed that 83 (92.2%) of 90 women had a UTI and 7 women (7.8%) did not. The age groups of 0–10 years, 11–20 years, and > 50 years each had 15 (16.7%) participants with a UTI; in other words, 100% or all participants within each of those age groups had a UTI. In the age group of 21–30 years, 12 participants (13.3%) had a UTI and 3 (3.3%) did not. The age groups of 31–40 years and 41–50 years had 13 (14.4%) participants with a UTI and 2 (2.2%) without UTI, respectively [Table 1].

The questionnaire about lifestyle showed that 63 (70%) of 90 participants have no trouble finding clean water, with the other 27 (30%) having trouble finding clean water. The second question was about changing underwear; 86 (95.5%) participants answered that they change their underwear every day while the other 4 (4.4%) do not. For the question about methods of cleaning the vagina after urinating, 65 (72.2%) participants answered that they clean their vagina from front to back, while 12 (13.3%) clean it from back to front, and the remaining 6 (6.7%) participants clean it from right to left. Answers to the question about cleaning the vagina with running water straight after urination showed that 73 participants (81.1%) clean their vagina straight after urinating, 7 (7.8%) participants do not clean their vagina straight away and the remaining 3 (3.3%) participants seldom clean their vagina straight after urinating. The question about drying the vagina after urinating revealed that 52 (57.8%) participants dry their vagina after urinating while 31 (34.4%) participants do not [Table 2].

Answers to the question about delaying urination showed that 49 (54.4%) participants delay urination while the other 34 (37.8%) always urinate when they feel the need. The last question about drinking plenty of water every day showed that 39 (43.3%) drank about eight glasses of water every day while 44 (48.9%) drank fewer than eight glasses of water every day. Answers to the questions about lifestyle and age groups and their correlation with UTI were analyzed using a Chi-square test, with  $P < 0.05$  considered

statistically significant. Only the water source question had a significant  $P$ -value (0.001);  $P$ -values for other questions such as changing underwear ( $P = 0.552$ ), method of cleaning the vagina ( $P = 0.378$ ), cleaning the vagina straight after urinating ( $P = 0.325$ ), drying the vagina after urinating ( $P = 0.773$ ), delaying urination ( $P = 0.164$ ), and drinking plenty of water ( $P = 0.605$ ) indicated that they have no significance; in other words, water source is the only one that correlates with the prevalence of UTI [Table 2].

## DISCUSSION

The results showed that 83 (92.2%) women had UTI, the high prevalence of UTI in this study is high, compared to the study conducted by Paudel *et al.*;<sup>[6]</sup> in their study, there were 36.9% prevalence of UTI among women age 15 years old and above. The high prevalence of UTI in our study might be due to the availability of water source in Hadakewa and Merdeka villages ( $P = 0.001$ ). Meanwhile, among all age groups, the most common age to get UTI

were 0–10 years, 11–20 years, and >50 years; each had 15 (16.7%). In postmenopausal age, most of the patients experience recurrent episodes depending on underlying microbial agent properties or certain host factors.<sup>[7]</sup> A study by Mohanty *et al.*<sup>[8]</sup> reported samples which include individuals from a different age, castes, class, and socioeconomic status with a range of wash practices and cleanliness. The main finding of this study is the age group of non-pregnant women between 20 and 65 years showed the highest percentage (64.09%). According to the study by Yilmaz *et al.*,<sup>[9]</sup> significant bacteriuria was detected among the positive cases, 884 (64.4%) were female and 489 (35.6%) were male. The ages of the positive cases were between 0 and 18 years.

The questionnaire about lifestyle showed that 27 (30%) having trouble finding clean water, 86 (95.5%) participants changed their underwear daily, methods of cleaning the vagina after urinating, 65 (72.2%) participants answered that they clean their vagina from front to back, while 12 (13.3%) clean

**Table 1: Prevalence of UTI and non-UTI within age groups**

Age group (years)	UTI		Non-UTI	
	<i>n</i> (%)	% UTI within age group	<i>n</i> (%)	% UTI within age group
0–10	15 (16.7)	100	0 (0)	0
11–20	15 (16.7)	100	0 (0)	0
21–30	12 (13.3)	80	3 (3.3)	20
31–40	13 (14.4)	86.7	2 (2.2)	13.3
41–50	13 (14.4)	86.7	2 (2.2)	13.3
>51	15 (16.7)	100	0 (0)	0
Total	83 (92.2)		7 (7.8)	

UTI: Urinary tract infection

**Table 2: UTI and correlation with women's lifestyle**

Lifestyle	UTI	Non-UTI	<i>P</i> value
	<i>n</i> (%)	<i>n</i> (%)	
Age	83 (92.2)	7 (7.8)	0.145
Water source			0.001*
Yes	62 (68.9)	1 (1.1)	
No	21 (23.3)	6 (6.7)	
Changing underwear			0.552
Yes	79 (87.8)	7 (7.8)	
No	4 (4.4)	0 (0)	
Method of cleaning vagina			0.387
Front to back	65 (72.2)	7 (7.8)	
Back to front	12 (13.3)	0 (0)	
Left to right	6 (6.7)	0 (0)	
Washing the vagina straight after urinating			0.325
Yes	73 (81.1)	6 (6.7)	
No	7 (7.8)	0 (0)	
Sometimes	3 (3.3)	1 (1.1)	
Drying the vagina after urinating			0.773
Yes	52 (57.8)	4 (4.4)	
No	31 (34.4)	3 (3.3)	
Delayed urination			0.164
Yes	49 (54.4)	6 (6.7)	
No	34 (37.8)	1 (1.1)	
Drinking water			0.605
Yes	39 (43.3)	4 (4.4)	
No	44 (48.9)	3 (3.3)	

\*The results is statistically significant if  $P < 0.05$ . UTI: Urinary tract infection

it from back to front, and the remaining 6 (6.7%) participants clean it from right to left. Cleaning the vagina with running water straight after urination showed that 73 participants (81.1%) clean their vagina straight after voiding. Drying the vagina after urinating revealed that 52 (57.8%) participants dry their vagina after urinating. Delaying urination showed that 49 (54.4%) participants delay urination and drinking plenty of water every day showed that 39 (43.3%) drank about eight glasses of water every day with  $P < 0.05$  considered significant. Only the water source question had a significant  $P$ -value (0.001);  $P$ -values for other questions such as changing underwear ( $P = 0.552$ ), method of cleaning the vagina ( $P = 0.378$ ), cleaning the vagina straight after urinating ( $P = 0.325$ ), drying the vagina after urinating ( $P = 0.773$ ), delaying urination ( $P = 0.164$ ), and drinking plenty of water ( $P = 0.605$ ) indicated that they have no significance; in other words, water source is the only one that correlates with the prevalence of UTI. Compared to the study by Mishra *et al.*<sup>[10]</sup> using univariate and multivariate regression models, independent risk factors for the first episode of cystitis when compared with healthy controls were (presented in odds ratios [ORs] with its 95% confidence interval [CI]): >250 ml of tea consumption per day (OR = 4.73, 95% CI = 2.67–8.38), presence of vaginal infection (OR = 3.23, 95% CI = 1.85–5.62), and wiping back to front (OR = 2.52, 95% CI = 1.45–4.38). Along with the latter three, history of UTI in a first-degree female relative (OR = 10.88, 95% CI = 2.41–49.07), constipation (OR = 4.85, 95% CI = 1.97–11.92), and stress incontinence (OR = 2.45, 95% CI = 1.18–5.06) were additional independent risk factors for recurrent cystitis in comparison to healthy controls.

The main risk factor associated with asymptomatic UTI was frequency of sexual activity and the quantity of water consumption with relative risk factors 1.39 and 1.053, respectively.<sup>[11]</sup> According to Vyas *et al.*,<sup>[12]</sup> socioeconomic condition did not have a significant association with UTI. The behavioral risk factors were found to have a significant association with UTI. Majority of the girls used synthetic innerwear (66.67%), of which majority had UTI in the previous 3 months. The present study did not demonstrate any relationship between the frequency of changing innerwear or bathing or exchanging clothes on the occurrence of urinary infections. A higher number of girls were not drying their innerwear in direct sunlight (71.75%), of which maximum had a symptomatic episode in the past 3 months (57.14%). Almost 64.4% of girls were using incorrect washing and wiping technique to wash genitals, of which most had a symptomatic UTI. Regarding the menstrual hygiene, although the proportion of girls using cloth was quite low (8.47%), the prevalence of UTI was quite common among them.

The results of this study differ from those from existing studies about the prevalence of UTI and lifestyle contribution may be caused by a limitation of this study: The gold standard for UTI diagnosis, urine culture, and sensitivity tests was not implemented in this study due to the limited laboratory facilities and unavailability of a facility in Lembata district to conduct urine culture and sensitivity tests. Diagnosis of UTI fully relied on dipstick testing which has a sensitivity of 75% and specificity of 75%. Urine analysis is a quick and inexpensive screening method requiring limited expertise. Physical, chemical, and microscopic examination constitutes a complete urine analysis. In some hospitals, urine culture is performed only in the presence of abnormalities in urine dipstick tests. Specific gravity, pH, urobilinogen, glucose, ketones, blood, leukocyte esterase, and nitrite are tested in dipstick analysis. Negative urine dipstick analysis was found to be valuable in ruling out UTI by few studies.<sup>[13]</sup> However, a meta-analysis has shown that a negative dipstick analysis is insufficient to rule out UTI.<sup>[14]</sup> Hence, there exists an on-going debate on the accuracy of urine analysis. There are different opinions regarding the need for urine analysis or urine culture as routine.<sup>[15]</sup>

## CONCLUSION

The prevalence of UTI among women in Hadakewa and Merdeka villages, East Nusa Tenggara, is very high, with 83 (92.2%) of 90 participants having a UTI. Age group did not significantly affect the prevalence of UTI; women in every age group have the same chance of getting a UTI. Water source is the only factor that correlates with the prevalence of UTI in this study.

## ACKNOWLEDGMENTS

All authors would like to thank 10<sup>th</sup> Malang Continuing Urology Education and Saiful Anwar Hospital for facilitating this article.

## AUTHORS' CONTRIBUTIONS

All the authors contributed equally to the data collection and the drafting of the manuscript. All the authors read and agreed to the final manuscript.

## REFERENCES

1. Foxman B. Epidemiology of urinary tract infections: Incidence, morbidity, and economic costs. *Am J Med* 2002;113 Suppl 1A:5S-13S.
2. Knox K. Women should be able to get antibiotics for urinary tract infection without a prescription. *BMJ* 2015;351:h3441.
3. Ministry of Health Indonesia. Basic Health Research Riset Kesehatan Dasar. Jakarta: Balitbang; 2013.
4. East Nusa Tenggara. Medical Record. Hadakewa Health Center. District of Lembata. Indonesia: East Nusa Tenggara; 2012.

5. The Government of East Nusa Tenggara Province. Education: General Condition Pendidikan: Kondisi Umum. East Nusa Tenggara: BPS; 2015. Available from: <http://www.nttprov.go.id>. [Last cited on 2015 Feb 05].
6. Paudel L, Manandhar N, Sah S, Khadka S, Neupane S, Joshi SK. Prevalence of urinary tract infection and associated risk factors among women in Sindhupalchok district, Nepal. *Int J Community Med Public Health* 2018;5:2714-9.
7. Jameel S, Mahmud SN. Frequency of different risk factors associated with recurrent urinary tract infection among postmenopausal women. *J Ayub Med Coll Abbottabad* 2016;28:353-6.
8. Mohanty JR, Pradhan A, Jena S, Misra PR, Padhi B, Soren D. Hygiene and wash practices associated with urinary tract infection among non-pregnant women at capital hospital, Bhubaneswar, Odisha, India. *Int J Curr Microbiol Appl Sci* 2018;7:1743-53.
9. Yilmaz Y, Tekkanat Tazegun Z, Aydin E, Dulger M. Bacterial uropathogens causing urinary tract infection and their resistance patterns among children in Turkey. *Iran Red Crescent Med J* 2016;18:e26610.
10. Mishra B, Srivastava R, Agarwal J, Srivastava S, Pandey A. Behavioral and psychosocial risk factors associated with first and recurrent cystitis in Indian women: A case-control study. *Indian J Community Med* 2016;41:27-33.
11. Gajamer VR, Singh AK, Pradhan N, Kapil J, Sarkar A, Tiwari HK. Prevalence and antibiogram profile of uropathogens isolated from symptomatic and asymptomatic female patients with urinary tract infections and its associated risk factors: Focus on cephalosporin. *Res Rev* 2018;7:32-41.
12. Vyas S, Sharma P, Srivastava K, Nautiyal V, Shrotriya VP. Role of behavioural risk factors in symptoms related to UTI among nursing students. *J Clin Diagn Res* 2015;9:LC15-8.
13. Mambatta AK, Jayarajan J, Rashme VL, Harini S, Menon S, Kuppusamy J, *et al.* Reliability of dipstick assay in predicting urinary tract infection. *J Family Med Prim Care* 2015;4:265-8.
14. Ohly N, Teece S. Accuracy of negative dipstick urine analysis in ruling out urinary tract infection in adults. *Emerg Med J* 2003;20:362-3.
15. Patel HD, Livsey SA, Swann RA, Bukhari SS. Can urine dipstick testing for urinary tract infection at point of care reduce laboratory workload? *J Clin Pathol* 2005;58:951-4.

Source of support: Nil; Conflict of interest: None Declared