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# Factors associated with urinary tract infection among pregnant women attending Kampala International University teaching hospital, Ishaka-Bushenyi

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## ABSTRACT

Urinary tract infections (UTIs) are one of the most prevalent bacterial infections in humans. The burden of UTIs amongst pregnant women is well documented in literature. A cross-sectional descriptive study was done in which 294 pregnant women attending ANC at Kampala International University teaching hospital (KIU-TH) were recruited for the study. A guided interview was conducted using a structured questionnaire to obtain socio-demographic characteristics, obstetrical and medical factors associated with UTI in pregnancy. The prevalence of UTI among pregnant mothers was high at 42.9%. Age of 25 to 35yeas, (at P-value of 0.037), being prime gravid, (at P-value of 0.018), and previous UTI history (at P-value 0.001), were significantly associated with UTI in pregnancy, while a tertiary level of education was a protective factor, (P-value 0.018). Maternal occupation, (P-value of 0.441), and diabetes mellitus, (P-value of 0.492), were not significant factors. There was a higher prevalence of UTI in pregnancy, and therefore the study recommends that mothers should be encouraged to attend early ANC so that they can be screened and treated for UTI if necessary. Mothers should be health educated on measures to prevent UTI in pregnancy.

**Keywords:** Urinary tract infections (UTIs), Pregnancy, Prevalence, Risk factors, Antenatal care (ANC)

## INTRODUCTION

According to the International Classification of Diseases (ICD-10), urinary tract infections (UTIs) are infections affecting structures involved in the secretion and elimination of urine, including the kidneys, ureters, urinary bladder, and urethra [1,2]. Globally, it is estimated that about 150 million individuals are affected by UTIs annually, with a significant number being pregnant women [3]. UTIs are a serious health problem impacting millions of people each year. In the USA, surveys of office practices, hospital-based clinics, and emergency departments estimate over 10 million cases of UTIs among pregnant women annually [4]. Women are at greater risk of UTIs due to their specific anatomy. The close proximity of the vulvar opening to the anal orifice facilitates the transfer of fecal pathogens into the urogenital tract [5]. Additionally, the shorter female urethra makes it easier for pathogens to ascend into the urinary system. UTIs during pregnancy are among the most common health problems worldwide, affecting many women in their reproductive years, particularly in developing countries [6]. Pregnant women are more susceptible to UTIs due to anatomical disadvantages compounded by hormonal changes associated with pregnancy [7]. The risk of lower UTIs progressing to pyelonephritis increases by up to 40% during pregnancy. The greatest risk factor for pyelonephritis is asymptomatic bacteriuria [8]. Structural and functional changes in the urinary tract during pregnancy contribute to this risk. In 80% of pregnant women, urinary tract dilation and slight hydronephrosis are observed Oli et al., [9]. These changes result from reduced smooth muscle tone in the ureters, slowed peristaltic movement, impaired urine propulsion, and relaxation of the urethral sphincter, all influenced by elevated progesterone levels. UTIs in pregnancy have been associated with several adverse outcomes for both the mother and fetus [10]. UTIs, even in childhood, predispose individuals to renal damage, hypertension, and preeclampsia in the mother while increasing the risk of low-birth-weight deliveries. In Uganda, studies at Mulago National Referral Hospital reported a 12.2%

prevalence of UTIs among pregnant women attending antenatal care [11]. Beyond anatomical and hormonal predispositions, other risk factors include socio-economic status, diabetes mellitus, recurrent UTIs, higher parity, sickle cell disease, and younger maternal age [12]. Given the burden of UTIs in pregnancy and the adverse outcomes for both mother and child, this study aims to assess the factors associated with UTIs among pregnant women attending antenatal care at Kampala International University Teaching Hospital (KIUTH), Ishaka. A study in Uganda found that symptomatic bacterial infections in pregnant women accounted for 23.6% of cases, while asymptomatic infections were 14.5% [10]. UTIs in pregnancy pose a significant global reproductive health challenge with severe consequences for both mother and child [13]. Considering these complications, early screening and prompt antibiotic treatment should be mandatory for all pregnant women attending antenatal care [3]. In diabetic patients, both symptomatic and asymptomatic UTIs contribute to the disease burden. While symptomatic cases receive treatment, asymptomatic infections often go unnoticed, leading to increased morbidity [14]. UTIs are a major contributor to the disease burden in developing countries, especially in Africa. Antimicrobial resistance among UTI-causing pathogens is rising, worsening the situation [15]. Studies on UTI prevalence have been conducted in some locations in Uganda [16], but these were multi-centered studies involving various healthcare facilities. Beyond anatomical and hormonal predispositions, studies on socio-economic and comorbid risk factors for UTIs in pregnancy have not been conducted in Ishaka and Greater Bushenyi. A significant information gap remains regarding UTI prevalence and associated factors. Therefore, this study aims to contribute to closing this gap by assessing the factors associated with UTIs among pregnant women attending antenatal care at KIUTH.

## METHODOLOGY

### Study Design

A cross-sectional study design was employed for this study.

### Study Site

This study was conducted at Kampala International University Teaching Hospital (KIU-TH) in Ishaka-Bushenyi, Western Uganda, among pregnant women attending antenatal care (ANC) at the hospital facility. The institution operates under a public-private partnership with the government of Uganda. The hospital has specialist departments and clinics, including General Surgery, Orthopedics, Obstetrics and Gynecology, Medicine, Ophthalmology, ENT, Dental Surgery, Pediatrics, and Physiotherapy. The ANC unit at KIU-TH collaborates with the eMTCT clinic, ART clinic, and immunization clinic. The ANC operates five days a week and is staffed by four midwives, headed by a registered midwife. The clinic receives an average of 50 women daily and offers services such as health education, hypertension screening, obstetric examinations, and eMTCT. Baseline laboratory tests provided include HIV screening, syphilis screening, and urinalysis.

### Study Population

The study included all pregnant women attending ANC services at KIU-TH during the study period.

### Inclusion Criteria

Pregnant women attending ANC at KIU-TH during the study period who consented to participate were enrolled.

### Exclusion Criteria

Pregnant women attending ANC at KIU-TH who were already on antibacterial medication within two weeks prior to the study for any condition were excluded.

### Study Procedure

The study was conducted at the KIU-TH antenatal care clinic and included all pregnant women who met the inclusion criteria and provided consent. Diagnosis was made based on a history of lower abdominal pain and genitourinary symptoms. A physical examination, including an abdominal exam to confirm fundal height and lower abdominal tenderness, was performed. Diagnosis was confirmed through urinalysis.

### Sample Size Determination

A sample size of 294 was determined using the Kish Leslie formula:

$n = z^2p(1 - p)/d^2$

Where:

- z = Z score for a 95% confidence interval = 1.96
- p = prevalence
- d = acceptable error (5%)

The prevalence of UTIs among patients attending selected hospitals in Bushenyi district, Uganda, was 22.33% [16]. The actual calculated sample size was 267. With a 10% increment to account for non-responses, the final sample size was 294.

### Sampling Technique

Data were collected through face-to-face interviews conducted from September to November 2022 using a structured questionnaire. The questionnaire covered socio-demographic characteristics (age, education level, occupation, and family income), obstetrical history, health habits, medical history, and clinical symptoms.

### Urine Sample Collection

A clean-catch midstream urine specimen was collected from pregnant women who were given clear instructions on the procedure.

The urine sample was inoculated on blood agar plates and MacConkey agar. The plates were incubated under aerobic conditions at 37°C for 24 hours. After incubation, the urine culture plates were examined macroscopically to assess color, appearance, morphology, and colony size. Bacterial isolates were identified using Gram staining, biochemical tests, and microscopic examination. Antimicrobial susceptibility testing was performed to determine appropriate antibiotic use. The presence of leukocytes (LE) and nitrates in the urine was screened using a biochemical reagent strip test (dipstick test). A microscope was used to test for red blood cells (RBCs) and pus cells (pyuria) in urine.

**Data Collection Tools**

A guided interview was conducted using a structured questionnaire. Interviews were carried out in the most commonly spoken local language (Runyankore) and English for those who were proficient in the language, ensuring effective communication between the researcher and the respondents.

**Quality Control**

Patient demographic data were cross-checked with urinalysis results for accuracy. The questionnaire was pre-tested at the ANC clinic of Ishaka Adventist Hospital before the main study to ensure its reliability.

**Data Analysis**

Questionnaires were reviewed for accuracy and completeness before data entry. Data were coded and entered into Epi Info version 7, then exported to SPSS version 22.0 for analysis. The Smirnov test was used to assess data distribution. Univariate analyses, including the Mann-Whitney test and t-test, were used to evaluate the significance of quantitative variables. The Monte Carlo test, Chi-Square test, and Fisher's Exact test were used to assess the significance of qualitative variables.

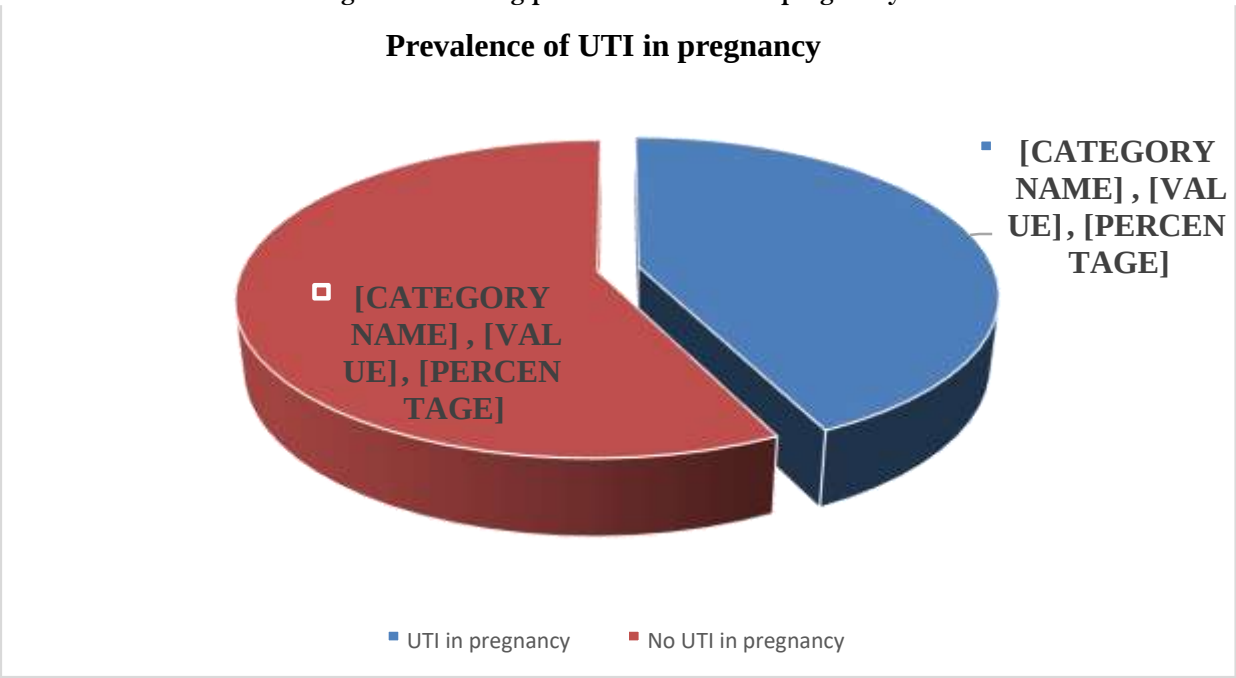
**Ethical Considerations**

Ethical approval was obtained from Kampala International University Western Campus, Faculty of Clinical Medicine and Dentistry. An introduction letter was provided to seek permission for data collection at the hospital. Written and verbal consent was obtained from all respondents before they were recruited into the study.

## RESULTS

**Prevalence of UTI in pregnancy**

**Figure 1: showing prevalence of UTI in pregnancy.**




From figure one above, a total of 294 who were recruited in the study, 126(42.9%), had UTI in pregnancy, while at least 168(57.1%) didn't have UTI.

**Social demographic factors associated with UTI in pregnancy.**

**Table1: showing maternal social demographic factors and its association with UTI in pregnancy**

| | No UTI in pregnancy (n=168) | | UTI in pregnancy (n=126) | | |
|---|---|---|---|---|---|
| **Characteristics** | **No.** | **%** | **No.** | **%** | **Significance** |
| | | | 34 | 27.0 | |
| | | | 78 | 61.9 | p=0.037 |
| | | | 14 | 11.1 | |

From the table 1 above, the mothers were asses for age in relation to UTI in which majority of mothers with UTI 78(61.9%) were aged 25 to 35 years, this also correlated with a positive significance with a P-value of 0.037.

The study also showed that tertiary education level was a protective factor against UTI in pregnancy as majority with no UTI 79 (47.0), had a tertiary level of education, at P-value of 0.018.

The study however showed that maternal occupation p-value 0.441and income level p-value 0.301 were not significantly associated with UTI in pregnancy.

**Medical factors and occurrence of UTI in pregnancy**

**Table 2: Showing association between maternal factors and UTI in pregnancy**

| | No UTI in pregnancy (n=168) | | UTI in pregnancy (n=126) | | |
|---|---|---|---|---|---|
| **Characteristics** | **No.** | **%** | **No.** | **%** | **Significance** |
| **Diabetes mothers** | | | | | |
| Diabetic mothers | 04 | 2.4 | 07 | 5.6 | |
| Non diabetic mother | 164 | 97.6 | 119 | 94.4 | p=0.492 |
| **Number of deliveries** | | | | | |
| None (1st pregnancy). | 29 | 17.3 | | | |
| 1-2 | 81 | 48.2 | 62 | 49.2 | p=0.018 |
| 3-4 | 44 | 26.2 | 40 | 31.7 | |
| 5 or more | 14 | 8.3 | 22 | 17.5 | |
| **Previous treatment for UTI during current pregnancy** | | | 2 | 1.6 | |
| Yes | 32 | 19.1 | | | |
| No | 136 | 80.9 | 88 | 69.8 | P<0.001 |
| | | | 38 | 30.2 | |

From table two above, about maternal factors UTI in pregnancy, it was showed that diabetes was not significantly associated with UTI in pregnancy, p=0.492. The study also showed that majority 62(49.2%) were prime gravida mothers, the study also showed that being prime gravida was significantly associated with UTI in pregnancy at p-value of 0.018. The study also showed that a previous history of UTI in pregnancy was associated with occurrence of UTI in pregnancy again, P<0.001.

## DISCUSSION

Out of the 294 participants recruited for the study, 126 (42.9%) had UTIs during pregnancy, while 168 (57.1%) did not. This study's results show a slightly higher prevalence compared to studies conducted by Johnson et al. [11] at Mulago ANC, which found a UTI prevalence of 12.2% among pregnant women. Similarly, research by Wingert et al., [17] at Jomo Kenyatta University of Science and Technology in Kenya reported a UTI prevalence of 14.2% among pregnant women, regardless of age, parity, and gestational age. Factors Associated with UTI in Pregnancy.

The study assessed maternal age in relation to UTIs and found that the majority of mothers with UTIs (78, 61.9%) were aged 25 to 35 years, with a statistically significant correlation (P-value = 0.037). This study indicates a lower age range for UTI prevalence compared to studies by Onwuezobe et al., [18] in Uyo, which reported higher prevalence among women over 35 years (45, 56.6%). A similar study in Sudan found that among 300 diabetic pregnant women, 20.9% of those affected were above 30 years [19]. The study also found that tertiary education was a protective factor against UTI in pregnancy, as most women without UTIs (79, 47.0%) had attained tertiary education (P-value = 0.018). This contrasts with findings by Wingert et al., [17] in Kenya, which indicated that primary education was more strongly associated with UTIs in pregnancy (AOR: 0.24, 3.5) compared to secondary education. Michelim and Bosi [10] also examined lifestyle factors but found no significant contribution to UTI occurrence. Factors such as multiple sexual partners, frequency of sexual intercourse, post-coital bathing, vaginal douching, and family planning methods were not significantly associated with UTIs [10] However, maternal occupation (P-value = 0.441) and income level (P-value = 0.301) were not significantly associated with UTIs in pregnancy. This differs from Michelim and Bosi [10], who reported that the lowest UTI prevalence (10%) was among housewives. Additionally, they found higher UTI rates among women in their second trimester (80%) and among peasant farmers (57 out of 100). A separate study on socio-demographic factors linked to asymptomatic diabetes mellitus among pregnant women in Kenya found that UTI prevalence was 25% among office workers, 30% among businesswomen, and 45% among peasant women [17].

The study revealed that diabetes was not significantly associated with UTIs in pregnancy (P = 0.492). However, it showed that most women with UTIs (62, 49.2%) were primigravida, with a significant association (P-value = 0.018). This contrasts with Kamel et al., [19], who found that multiparity and multigravidity were significant factors in a Benin study, where the prevalence was 55%. Similarly, in Libya, UTI prevalence was

associated with multiple sexual partners and low socioeconomic status [19]. A study in East Africa found that avoiding multigravidity contributed to a 10% increase in UTI prevalence during pregnancy [20]. Furthermore, a history of UTIs in previous pregnancies was significantly associated with UTI recurrence ($P < 0.001$). This finding aligns with Michelim and Bosi [10], who reported that 55.7% of UTI cases were due to frequent examinations, with 30% linked to previous UTIs. However, Oli et al., [9] found no statistical significance between age, occupation, gestational age, parity, and frequency of UTIs during pregnancy, but they did report a significant association between UTIs and factors such as sexual activity, poor personal hygiene, loin pain, previous contraceptive use, and catheterization.

## CONCLUSION

The study concluded that prevalence of UTIs among pregnant women was high at 42.9%, the age range (25 to 35 years), being primigravida, and a history of previous UTIs were significantly associated with UTI occurrence, while tertiary education was a protective factor.

## REFERENCES


1. Bono MJ, Leslie SW, Reygaert WC. Uncomplicated Urinary Tract Infections. [Updated 2023 Nov 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470195/
2. Flores-mireles, A. L., Walker, J. N., Caparon, M., & Hultgren, S. J. (2016). Urinary tract infections: epidemiology, mechanisms of infection and treatment options. *Nat Rev* Microbiol, *13*(5), 269–284. https://doi.org/10.1038/nrmicro3432.Urinary
3. WHO, W. H. O. (2019). Draft: Global strategy towards eliminating cervical cancer as a public health problem. *World Health Organisation*, *December*, 1–33.
4. Abu Aleinein I, Salem Sokhn E. Knowledge and prevalence of urinary tract infection among pregnant women in Lebanon. Heliyon. 2024 Sep 1;10(17):e37277. doi: 10.1016/j.heliyon.2024.e37277. PMID: 39296194; PMCID: PMC11408011.
5. Magistro, G., Marcon, J., Schubert, S., Gratzke, C., & Stief, C. G. (2017). Pathogenesis of urinary tract infections: An update. *Urology*, *56*(6), 720–727. https://doi.org/10.1007/s00120-017-0391-7
6. Al-Kashif, M. M. L. (2019). Urinary tract infection among pregnant women and its associated risk factors: A cross-sectional study. *Biomedical and Pharmacology Journal*, *12*(4),2003–2010. https://doi.org/10.13005/bpj/1832
7. Lee, A. C. C., Mullany, L. C., Koffi, A. K., Rafiqullah, I., Khanam, R., Folger, L. V., Rahman, M., Mitra, D. K., Labrique, A., Christian, P., Uddin, J., Ahmed, P., Ahmed, S., Mahmud, A., Dasgupta, S. K., Begum, N., Quaiyum, M. A., Saha, S. K., & Baqui, A. H. (2019). Urinary tract infections in pregnancy in a rural population of Bangladesh: Population-based prevalence, risk factors, etiology, and antibiotic resistance. *BMC Pregnancy and Childbirth*, *20*(1), 1–11. https://doi.org/10.1186/s12884-019-2665-0
8. Almushait, M. A., Mohammed, H. A., Al-Harthy, D. A., & Abdullah, A. M. (2013). Prevalence and Predisposing Factors of Urinary Tract Infections among Pregnant Women in Abha General Hospital. *International Journal of Sciences: Basic and Applied Research (IJSBAR)*,
9. Oli, A. N., Akabueze, V. B., Ezeudu, C. E., Eleje, G. U., Ejiofor, O. S., Ezebialu, I. U., Oguejiofor, C. B., Ekejindu, I. M., Emechebe, G. O., & Okeke, K. N. Bacteriology and Antibiogram of Urinary Tract Infection Among Female Patients in a Tertiary Health Facility in South Eastern Nigeria. *The Open Microbiology Journal*, 2017; *11*(1), 292–300. https://doi.org/10.2174/1874285801711010292
10. Michelim, L., & Bosi GR, C. E. Urinary Tract Infection in Pregnancy: Review of Clinical Management. *J Clin Nephrol Res*, 2016; *3*(1), 1030.
11. Johnson, B., Stephen, B. M., Joseph, N., Asiphas, O., Musa, K., & Taseera, K. Prevalence and bacteriology of culture-positive urinary tract infection among pregnant women with suspected urinary tract infection at Mbarara regional referral hospital, South-Western Uganda. *BMC Pregnancy and Childbirth*, 2021; *21*(1), 1–9. https://doi.org/10.1186/s12884-021-03641-8
12. Onuoha, S. (2014). Prevalence and Antimicrobial Susceptibility Pattern of Urinary Tract Infection (UTI) among Pregnant Women in Afikpo, Ebonyi State, Nigeria. American Journal of Life Sciences, 2014;2(2),46.

https://doi.org/10.11648/j.ajls.20140202.12

13. Matuszkiewicz-Rowińska, J., Małyszko, J., & Wieliczko, M. Urinary tract infections in pregnancy: Old and new unresolved diagnostic and therapeutic problems. *Archives of Medical Science*, 2015; *11*(1), 67–77. https://doi.org/10.5114/aoms.2013.39202
14. Kabugo D, Kizito S, Ashok DD, Graham KA, Nabimba R, Namunana S, Kabaka MR, Achan B, Najjuka FC. Factors associated with community-acquired urinary tract infections among adults attending assessment centre, Mulago Hospital Uganda. Afr Health Sci. 2016 Dec;16(4):1131-1142.doi: 10.4314/ahs.v16i4.31. PMID: 28479906; PMCID: PMC5398460.
15. Odoki, M., Aliero, A. A., Tibyangye, J., Nyabayo Maniga, J., Wampande, E., Kato, C. D., Agwu, E., & Bazira, J. Prevalence of Bacterial Urinary Tract Infections and Associated Factors among Patients Attending Hospitals in Bushenyi District, Uganda. *International Journal of Microbiology, 2019;* (February). https://doi.org/10.1155/2019/4246780
16. Tibyangye, J., Okech, M., Nyabayo, J., & Nakavuma, J. In vitro Antibacterial Activity of Ocimum suave Essential Oils against Uropathogens Isolated from Patients in Selected Hospitals in Bushenyi District, Uganda. *British Microbiology Research Journal*, 2015; *8*(3), 489-498. https://doi.org/10.9734/bmrj/2015/17526
17. Wingert, A., Pillay, J., Sebastianski, M., Gates, M., Featherstone, R., Shave, K., Vandermeer, B., & Hartling, L. Asymptomatic bacteriuria in pregnancy: Systematic reviews of screening and treatment effectiveness and patient preferences. *BMJ Open*, 2019; *9*(3), 1–10. https://doi.org/10.1136/bmjopen-2017-021347
18. Getaneh T, Negesse A, Dessie G, Desta M, Tigabu A. Prevalence of Urinary Tract Infection and Its Associated Factors among Pregnant Women in Ethiopia: A Systematic Review and Meta-Analysis. Biomed Res Int., 2021, 6551526. doi: 10.1155/2021/6551526. PMID: 34901276; PMCID: PMC8654570.
19. Kamel, H. A. H., Hegab, M. H. M., Al-sehrawey, A. A., & Hassan, H. M. Prevalence of Asymptomatic Bacteriuria in Patients with Preterm Labor. *The Egyptian Journal of Hospital Medicine*, 2018; *73*(9), 7444–7447.
20. Getaneh, T., Negesse, A., Dessie, G, Desta M, Tigabu A. Prevalence of Urinary Tract Infection and Its Associated Factors among Pregnant Women in Ethiopia: A Systematic Review and Meta-Analysis. Biomed Res Int., 2021, 6551526. doi: 10.1155/2021/6551526. PMID: 34901276; PMCID: PMC8654570.

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