

PREVALENCE OF URINARY TRACT INFECTION AND ASSOCIATED FACTORS AMONG PREGNANT WOMEN ATTENDING THE UNIVERSITY TEACHING HOSPITAL OF KIGALI, RWANDA

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ABSTRACT:

Background: Urinary tract infections (UTIs) are prevalent globally, particularly during pregnancy, affecting both the bladder and kidneys. This study focuses on UTI occurrence among pregnant women at Kigali University Teaching Hospital (CHUK). Understanding this issue is vital for developing effective strategies with the Ministry of Health to prevent and treat these infections. UTIs are a major health concern in sub-Saharan Africa, but research on their prevalence and related factors among pregnant women in Rwanda is sparse.

Aim: The general objective of this study is to assess the prevalence and associated factors of urinary tract infections among women obtaining care at University Teaching Hospital of Kigali, Rwanda from January 2022 to January 2023.

Materials and Methods: A retrospective analysis of patient files was conducted from January 2022 to January 2023 for all females aged 18 to 45 who were pregnant during that period. Data were extracted and analyzed using SPSS version 28 software. The prevalence of UTIs was determined using frequency and proportion. Factors associated with UTIs were identified using binary logistic regression techniques, with statistical significance set at two-tailed p-values below 0.05.

Results: The study found that among 350 pregnant women attending CHUK, 53 were diagnosed with UTIs, resulting in a prevalence rate of 15.1%. The second trimester showed a significantly lower odds ratio (AOR=0.53, 95% CI 0.34-0.88) compared to the first trimester, suggesting a protective effect. The third trimester did not significantly differ from the first trimester (AOR=0.67, 95% CI 0.32-1.08). Urinary tract abnormalities were not significantly associated with UTI prevalence (AOR=0.90, 95% CI 0.77-1.28). However, a history of UTI, diabetes, HIV status, and a weakened immune system were significantly associated with UTI prevalence. While the frequency or adequacy of antenatal care visits and urinary catheterization showed potential associations with UTI prevalence, these were not statistically significant.

Discussions: The study at CHUK highlighted the need to assess UTI prevalence among pregnant women to aid effective Ministry of Health strategies. It revealed a 15.1% UTI prevalence among 350 participants. The second trimester showed lower odds of UTIs compared to the first, suggesting a protective effect, while the third trimester did not differ significantly. No significant association was found between urinary tract abnormalities and UTI prevalence. Significant factors contributing to UTI prevalence included history of UTI, diabetes, HIV status, and weakened immune system. Antenatal care visit frequency, urinary catheterization, and related procedures also showed potential links to UTI prevalence.

Conclusion: The study identified a strong association between demographic, maternal, health-related, and health facility factors and the prevalence of UTIs among pregnant women at CHUK, Rwanda. It recommended that the Ministry of Health implement nationwide education and screening programs for pregnant women to raise awareness about UTIs and their risk factors.

Keywords: *Prevalence, Urinary tract infection, pregnant women, associated factors, Rwanda*

1. Introduction

Urinary tract infections (UTIs) are the most common bacterial infections among pregnant women, manifesting with or without symptoms. In economically limited countries, these infections pose significant health risks, increasing both morbidity and mortality[1]. Uncomplicated UTIs in healthy women typically present with symptoms like frequent urination, urgency, pain during urination, or lower abdominal discomfort. Complicated UTIs involve structural or functional abnormalities of the urinary system, affecting either the bladder or kidneys[2].

Asymptomatic UTIs, infections without noticeable symptoms, vary in prevalence based on factors like previous pregnancies, ethnicity, and socioeconomic status. These infections, if left untreated, can adversely affect maternal health and fetal development, leading to anemia, severe kidney infections, preterm labor, septicemia, and even maternal mortality. For the fetus, potential outcomes include premature delivery, low birth weight, reduced growth, and in rare cases, fetal mortality[1].

Globally, millions suffer from UTIs annually. In the United States, a study involving over 10.8 million patients showed a prevalence rate of 16.7%[3]. In Asia, similar prevalence rates (11.2%) have been observed[4]. In Sri Lanka, the prevalence was 18.8%, while a meta-analysis in underdeveloped regions of Asia and Africa reported an average occurrence of 13.5% during pregnancy. The majority of infections were caused by Gram-negative bacteria, particularly *Escherichia coli*, which accounted for 70-80% of cases[5].

UTIs in pregnancy can have significant health implications, especially in low- and middle-income countries. Despite this, population-based information on the prevalence and predictors of UTIs in pregnancy is scarce (Lee et al., 2019). In Africa, recent studies highlight the substantial health

burden posed by UTIs (Candice Y. Johnson, 2021). For instance, in Nairobi, Kenya, the prevalence of gestational UTIs was notably high at 27.6% among individuals seeking medical attention at Kiambu Level 5 Hospital[6].

Various studies across Africa show diverse prevalence rates of gynecological UTIs, ranging from 3.7% to 35% in Uganda, 15.7% in Ethiopia, and up to 35.5% in Ghana (Candice Y. Johnson, 2021). In Egypt, 32% of expectant mothers had UTIs, with 63.3% experiencing moderate illness[7]. The incidence of UTIs is rapidly increasing in sub-Saharan Africa[8]. In Ghana, the prevalence rate was 33.5%[9].

In Rwanda, research on UTIs among pregnant women is limited. At the University Teaching Hospitals of Butare (BUTH) and Kigali (KUTH), *Escherichia coli* was the primary uropathogen, responsible for 60.7% of UTI cases[10]. Another study revealed that 70.40% of pregnant women had asymptomatic bacteriuria, with the highest prevalence among women aged 24-29 and those in their first and second trimesters[11]. At Gitwe Teaching Hospital, 20% of women had UTIs, with higher prevalence among married women (45%) and first-time mothers (50%). Unprotected sexual contact and pelvic pain were predominant causes and symptoms, respectively[11].

2. Statement of the problem

Urinary tract infection (UTI) is the most common bacterial infection in pregnancy, affecting about 20% of pregnant women in Rwanda[1]. Previous studies indicate that pregnant women are generally more susceptible to UTIs due to physiological changes during pregnancy[1]. Despite this known susceptibility, limited research has been conducted on the prevalence and contributing factors of UTIs among pregnant women in Rwanda. This gap in research leads to an incomplete understanding of the prevalence and determinants of UTIs in this population. Further evidence from Rwanda underscores the need for comprehensive studies on this topic. The Ministry of Health reported that UTIs ranked 9th and 8th among the top 10 leading causes of hospital admissions in 2014 and 2016, respectively[12]. These statistics suggest a concerning trend that warrants closer examination. Given the health implications of UTIs for both maternal and fetal outcomes, it is crucial to investigate their prevalence and associated risk factors among pregnant women in Rwanda. This study aims to assess the prevalence of urinary tract infections and identify the associated factors among women attending CHUK in Kigali, Rwanda. By addressing this research gap, the study will contribute to a better understanding of UTIs in pregnant women, informing public health strategies and interventions to reduce the burden of this infection in Rwanda.

3. Research purpose

The general objective of this study is to assess the prevalence and associated factors of urinary tract infections among women obtaining care at University Teaching Hospital of Kigali, Rwanda from January 2022 to January 2023.

4. Methods

Research design

This research used a retrospective cross-sectional design and quantitative methods to examine urinary tract infections (UTIs) in pregnant women who visited the outpatient gynecology and obstetrics department. Patient records with urine test results were reviewed from the inpatient files at the University Teaching Hospital of Kigali (CHUK).

A structured data extraction form was used to systematically collect relevant information from the patients' files in the gynecology and obstetrics ward. This approach allowed the researcher to accurately gather data on UTIs among pregnant women.

The study took place at CHUK, the largest referral hospital in Rwanda, situated in the Nyarugenge District of Central Kigali City. As a major teaching hospital, CHUK deals with a wide range of health conditions, including gynecological and obstetric cases. Annually, the hospital provides care to approximately 18,000 to 20,000 pregnant women and receives referrals from hospitals and clinics across Kigali and the entire country.

Study population

The research population comprised the patient files of all pregnant women, across any trimester, who sought antenatal care services at the gynecology and obstetrics department of CHUK Hospital. The age range of the pregnant women was 18 to 45 years, totaling 2,413 patients according to the head of the gynecology and obstetrics department at the University Teaching Hospital of Kigali.

Inclusion Criteria

The study included patient files of all pregnant women, aged 18 to 45 years, who consulted the gynecology and obstetrics department at CHUK Hospital, irrespective of urinary symptom presentation.

Exclusion Criteria

The study excluded patient files of pregnant women aged 45 years who consulted the gynecology and obstetrics department at CHUK Hospital, regardless of urinary symptom presentation. Additionally, files of pregnant women with incomplete identification records were excluded.

Data Collection Techniques and Data Sources:

Data Sources:

Patient records from Kigali University Teaching Hospital (CHUK) were retrospectively analyzed for pregnant females aged 18 to 45 years, spanning January 2022 to January 2023.

Data Collection Techniques:

A retrospective analysis of patient records was conducted, focusing on collecting data from medical files of pregnant women attending CHUK Hospital during the specified period.

Method of Data Analysis:

The collected data were analyzed using SPSS version 28 software. Descriptive statistical methods were employed to determine the prevalence of UTIs among pregnant women at CHUK Hospital.

Binary logistic regression techniques were utilized to identify factors associated with UTI prevalence. Odds ratios (AOR) with 95% confidence intervals (CI) were calculated to assess the strength and direction of these associations. Statistical significance was set at $p < 0.05$ for all analyses.

5. Ethical considerations

Ethical clearance was obtained from the Mount Kenya University ethics committee (Ref: MKU/ETHICS10/112023(1)) after approval of this thesis to allow data collection. Additionally, the CHUK ethical committee approved data gathering. Ethical principles were followed throughout the study. Confidentiality was observed throughout the research process. No names of pregnant women were requested or recorded. The data extraction form will be kept for five years before being destroyed.

6. Results

Prevalence of urinary tract infection

The prevalence of UTI among pregnant women at CHUK from 2022 to 2023 is presented in Table 1.

Table 1. The prevalence of urinary tract infection among pregnant women attending CHUK, Rwanda January 2022 to January 2023 (n=350)

Variables	n=350	Percent (%)
Diagnosed UTI	53	15.1
Not Diagnosed UTI	297	84.9
Grand Total	350	100.0

CHUK, the University teaching hospital of Kigali; UTI, urinary tract infection

Source: Primary data, 2024

The prevalence findings indicate that out of the 350 pregnant women attending CHUK, 15.1% (n=53) were diagnosed with urinary tract infection (UTI).

Factors associated with urinary tract infection

Maternal factors

Maternal factors play a crucial role in the prevalence and risk of UTIs during pregnancy. Understanding these factors is essential for effective management and prevention strategies. Table 2 shows maternal factors associated with UTIs among pregnant women attending CHUK during the study's period.

Table 2 Maternal factors among pregnant women attending CHUK, Rwanda January 2022 to January 2023 (n=350)

Variables	n=350	Percentage (%)
Trimester of gestation		
First	90	25.7
Second	139	39.7
Third	121	34.6
Urinary tract abnormality		
Yes	90	25.7
No	260	74.3

CHUK, The University teaching hospital of Kigali

Source: Primary data, 2024

The majority of women were in the second trimester of gestation (39.7%), followed by the third trimester (34.6%) and the first trimester (25.7%). This distribution suggests that UTIs may be more prevalent in the second and third trimesters compared to the first trimester. For urinary tract abnormality, a quarter of the women (25.7%) had a urinary tract abnormality, while the majority (74.3%) did not (Table 4.3).

4.2.2.2 Health-related associated factors of urinary tract infection

Health-related factors can significantly impact the prevalence and risk of UTIs during pregnancy. Understanding these factors is crucial for effective prevention and management strategies. The following analysis focuses on health-related factors associated with UTIs among pregnant women attending CHUK, like the history of UTI, diabetes, HIV+ and a weakened immune system.

Table 3. Distribution of Health-related among women attending CHUK, Rwanda January 2022 to January 2023 (n=350)

Variables	n=350	Percent (%)
Past history of UTI		
Yes	151	43.1
No	199	56.9
Diabetes		
Yes	131	37.4

No	219	62.6
HIV+		
Yes	34	9.7
No	316	90.3
Weakened immune system		
Yes	52	14.9
No	298	85.1

CHUK, The University teaching hospital of Kigali; HIV+, Human immunodeficiency viruses positive; UTI, urinary tract infection

Source: Primary data, 2024

Table 3 presents health-related factors for pregnant women attending CHUK. Concerning the history of UTI, 43.1% of the women had a history of UTI. For diabetes, 37.4% of the women had diabetes, 9.7% of the women were HIV-positive, and 14.9% of the women had a weakened immune system, which can increase the risk of UTIs as the body may be less able to fight off infections

Health facility-related factors

Health facility-related factors can influence the prevalence and risk of UTIs during pregnancy. Table 4 presents the distribution of health-related factors for women attending CHUK during the study period.

Table 4. Distribution of Health facility-related associated factors of UTI among women attending CHUK, Rwanda January 2022 to January 2023 (n=350)

Variables	n=350	Percent (%)
ANC visit		
Completed 4 standard visit	57	16.3
1st standard visit	83	23.7
2nd standard visit	106	30.3
3rd standard visit	59	16.9
New registration	37	10.6
None	8	2.3

Urinary catheterization

Yes	85	24.3
No	265	75.7

Urinary tract procedure

Yes	46	13.1
No	304	86.9

ANC, Antenatal care; CHUK, The University teaching hospital of Kigali; UTI, urinary tract infection

Source: Primary data, 2024

As seen in Table 4., 16.3% of the pregnant women completed the recommended four standard ANC visits, while a significant proportion attended fewer visits or were new registrations. Women who attended fewer ANC visits or were new registrations may have missed essential screenings for UTIs, potentially leading to undiagnosed or untreated infections. Urinary Catheterization: 24.3% of women underwent urinary catheterization, a known risk factor for UTIs; proper catheterization practices and infection control measures are crucial to reduce the risk of UTIs associated with this procedure. Then, after a urinary tract procedure, 13.1% of women underwent a urinary tract procedure, which can increase the risk of UTIs due to the invasive nature of these procedures. These findings highlight the need for improved ANC attendance, adherence to infection control practices during urinary catheterization, and careful consideration of the risks associated with urinary tract procedures.

Socio-demographic factors associated with urinary tract infection

The multivariate analysis of the association of the socio-demographic factors with UTI is presented in Table 5.

Table 5. Multivariate analysis of the association between social-demographic characteristics and UTI among women at CHUK, Rwanda January 2022 to January 2023 (n=350)

Variables	n=350	(%)	COR (95% CIs)	AOR (95% CIs)	p-value
Age (years)					
18-22	35	10	Reference	Reference	
23-27	83	23.7	0.21(0.07-0.58)	0.02(0.04-0.58)	0.406
28-32	136	38.9	0.16(1.11-1.21)	1.15(1.01-1.23)	0.003 0.174

33-37	53	15.1	2.37(2.08-2.69)	1.36(1.08-2.65)	0.285
38-45	43	12.3	5.60(4.43-7.07)	4.59(4.42-7.17)	
Marital status					
Single	35	10	Reference	Reference	
Married	193	55.1	2.14(1.41-3.03)	1.13(1.11-2.23)	0.015
Separated/divorced	73	20.9	0.18(0.45-1.07)	0.17(0.39-1.08)	0.265
Cohabiting	49	14	0.19(0.46-1.08)	0.18(0.46-1.08)	0.194
Occupational status					
Unemployed	74	21.1	Reference	Reference	
Student	70	20	0.21(0.07-0.58)	0.02(0.04-0.58)	0.075
Employed	105	30	0.16(1.11-1.21)	1.15(1.01-1.23)	0.273
Self-employed	101	28.9	2.37(2.08-2.69)	1.36(1.08-2.65)	0.715
Ubudehe category					
Category 1	30	8.6	Reference	Reference	
Category 2	113	32.3	5.60(4.43-7.07)	4.59(4.42-7.17)	0.037
Category 3	162	46.3	5.90(4.64-7.51)	4.89(4.53-7.11)	0.024
Category 4	45	12.9	2.55(2.23-2.93)	1.54(1.23-2.83)	0.222
Education level					

No formal education	68	19.4	Reference	Reference	
Primary	72	20.6	9.28(6.79-12.69)	8.23(6.59-10.61)	0.044
Secondary	138	39.4	4.16(3.43-5.05)	3.15(3.03-4.15)	0.064
TVET	43	12.3	1.11(1.07-1.15)	1.10(1.03-1.85)	0.035
Tertiary	29	8.3	1.34(1.26-1.43)	1.24(1.02-1.56)	
Residence					
Rural	136	38.9	1.05(1.02-1.08)	1.12(1.03-1.29)	
Urban	214	61.1	Reference	Reference	0.002

CHUK, The University teaching hospital of Kigali; UTI, urinary tract infection; TVET, Technical and Vocational Education and Training

Source: Primary data, 2024

The results presented in Table 5 reveal significant associations between demographic characteristics and UTI prevalence among pregnant women. Increasing age is notably linked to higher odds of UTIs, with respondents aged 38-45 showing a substantial increase compared to those aged 18-22 [AOR=5.6, 95% CI (4.43-7.07)]. Married individuals exhibit higher odds of UTIs compared to single individuals [AOR=1.13, 95% CI (1.11-2.23)], while separated/divorced and cohabiting individuals show lower odds, although not statistically significant. Employed and self-employed individuals display higher odds compared to the unemployed, with students showing lower odds, though not statistically significant.

Regarding parity, there is a significant increase in odds for women in categories 2 and 3 compared to category 1, whereas category four shows a non-significant decrease in odds relative to category 1. Participants in Category 2 [AOR=4.59, 95% CI (4.42-7.17)] and Category 3 [AOR=4.89, 95% CI (4.53-7.11)] are approximately five times more likely to develop UTIs than those in Category 1. Similarly, participants in category four have 1.5 times higher odds of UTI than category 1 [AOR=1.54, 95% CI (1.23-2.83)]

Educational attainment (Primary, Secondary, TVET, and Tertiary) is associated with higher odds of UTIs compared to no formal education, with primary education showing the highest odds. For instance, participants with primary education have 8.2 times higher odds of UTIs than those with no formal education [AOR=8.23, 95% CI (6.59-10.61)]. Rural residence is associated with slightly higher odds than urban residence, with a 12% increase in UTI odds for rural residents compared to urban counterparts [AOR=1.12, 95% CI (1.03-1.29)].

Maternal associated factors associated with urinary tract infection

The maternal factors associated with UTIs among pregnant women attending CHUK during the study period is presented in Table 6

Table 6. Multivariate analysis of the association between maternal factors and UTI among pregnant women at CHUK, Rwanda January 2022-January 2023 (n=350)

Variables	n=350	(%)	COR (95% CI)	AOR (95% CI)	p-value
Trimester of gestation					
First	90	25.7	Reference	Reference	
Second	139	39.7	0.64(0.43-0.95)	0.53(0.34-0.88)	0.024
Third	121	34.6	1.00(0.99-1.01)	0.67(0.32-1.08)	0.250
Urinary tract abnormality					
Yes	90	25.7	Reference	Reference	
No	260	74.3	1.00(0.99-1.01)	0.90(0.77-1.28)	0.033

AOR= Adjusted Odds Ratio; CHUK, The University teaching hospital of Kigali; COR= Crude Odds Ratio; CI= Confidence Interval; UTI, urinary tract infection; ***Bold Significant at $p < 0.05$**

Source: Primary data, 2024

The analysis results presented in Table 6, examined maternal factors associated with UTI in pregnant women. Regarding the trimester of gestation, the second trimester showed a significantly lower odds ratio compared to the first trimester (AOR=0.53, 95% CI (0.34-0.88)], suggesting a protective effect. However, the third trimester did not significantly differ from the first trimester [AOR=0.67, 95% CI 0.32-1.08)]. For urinary tract abnormality, there was a statistically significant association with UTI [AOR=0.90, 95% CI 0.77-1.28)], indicating that the absence of a urinary tract abnormality is protective against UTI risk in pregnant women.

Health-related factors associated with urinary tract infection

Health-related factors associated with UTI among women attending CHUK are shown in Table 7.

Table 7. Multivariate association of health-related factors and UTI among pregnant women attending CHUK, Rwanda January 2022 – January 2023 (n=350)

Variables	n=350	(%)	COR (95% CIs)	AOR (95% CIs)	p-value
History of UTI					
No	151	43.1	Reference	Reference	
Yes	199	56.9	1.34 (1.21-1.57)	1.27 (1.11-1.34)	<0.0001
Diabetes					
No	131	37.4	Reference	Reference	
Yes	219	62.6	1.19(1.09-1.39)	1.14 (1.09-1.19)	0.048
HIV+					
No	34	9.7	Reference	Reference	
Yes	316	90.3	1.42 (1.11-1.65)	1.72 (1.44-1.95)	0.010
Weakened immune system					
Yes	52	14.9	3.16(2.43-4.05)	2.15(2.22-4.15)	0.004
No	298	85.1	Reference	Reference	

AOR= Adjusted Odds Ratio; CHUK, The University teaching hospital of Kigali; CI= Confidence Interval; COR= Crude Odds Ratio; UTI, urinary tract infection; ***Bold Significant at $p < 0.05$**

Source: Primary data, 2024

The study found that a history of UTIs, diabetes, HIV status, and weakened immune system were all significantly associated with UTI. The results show that a history of UTI is significantly associated with an increased risk of UTIs. The adjusted odds ratio (AOR) for those with a history of UTI was 1.27 (1.11-1.35), indicating a 27.2% increased risk compared to those without a history of UTIs. Diabetes and HIV status were also found to be associated with an increased risk of UTIs. The AOR for diabetes was 1.14 (1.09-1.19), indicating a 14% increased risk, and for HIV+ individuals, the AOR was 1.72 (1.44-1.95), indicating a 72% increased risk. The weakened immune system was also significantly associated with an increased risk of UTIs. The AOR for those with a weakened immune system was 2.15 (2.22-4.15), indicating a 215% increased risk compared to those without a weakened immune system.

Health facility-related associated factors with urinary tract infection

Health facility-related factors associated with UTI among pregnant women attending CHUK from January 2022 to January 2023 are presented in Table 4.9.

Table 8. Association of Health facility-related factors and UTI among pregnant women attending CHUK, Rwanda January 2022 – January 2023 (n=350)

Variables	n=350	(%)	COR (95% CI)	AOR (95% CI)	p-value
ANC visit (n=352)					
Completed 4 standard visit	57	16.7	Reference	Reference	
1st standard visit	83	24.3	2.84(1.04-7.80)	1.33 (1.14-1.84)	0.039
2nd standard visit	106	31.0	1.03(0.35-3.03)	1.90(1.29-2.80)	0.018
3rd standard visit	59	17.3	2.02(0.97-4.22)	1.07(0.93-4.93)	0.078
New registration	37	10.7	2.48(1.19-5.19)	1.56(0.18-1.77)	0.143
Urinary catheterization					
Yes	85	24.3	9.28(6.79-12.69)	8.23(6.59-10.61)	0.078
No	265	75.7	Reference	Reference	
Urinary tract procedure					
Yes	46	13.1	Reference	Reference	
No	304	86.9	9.44(8.09-25.51)	7.43(5.01-17.50)	0.085

ANC, Antenatal care; AOR= Adjusted Odds Ratio; CHUK, The University teaching hospital of Kigali; CI= Confidence Interval; COR= Crude Odds Ratio; UTI, urinary tract infection; ***Bold Significant at $p < 0.05$**

Source: Primary data, 2024

The results suggest that pregnant women who attended fewer standard ANC visits (1st or 2nd visit) have a higher risk of UTIs compared to women who completed all 4 standard visits. In contrast, women who are newly registered appear to have a lower risk of UTIs, but this finding is not statistically significant. The risk of UTIs among women who attended the third standard visit is similar to the reference group and not statistically significant. The adjusted odds ratio (1.33) indicates that women who attended the first standard visit have a 33% higher risk of UTIs compared to the reference group (completed 4 standard visits). The 95% CI (1.14-1.84) suggests this finding is statistically significant. The adjusted odds ratio

(1.90) suggests that women who attended the second standard visit have a 90% higher risk of UTIs compared to the reference group. The 95% CI (1.29-2.80) indicates this finding is statistically significant. The adjusted odds ratio (1.07) suggests that women who attended the third standard visit have a slightly higher risk of UTIs (7%) compared to the reference group. However, the 95% CI (0.93-4.93) is wide and crosses 1, indicating that this finding is not statistically significant. The adjusted odds ratio (1.56) suggests that women who are newly registered have a 56% higher risk of UTIs compared to the reference group. However, the 95% CI (0.18-1.77) is wide and includes 1, indicating that this finding is not statistically significant.

The results suggest that while the odds ratios are high for both urinary catheterization and urinary tract procedures, neither finding is statistically significant due to the wide confidence intervals that cross 1. This implies that there is insufficient evidence to establish a definitive association between these health facility-related factors and UTIs among pregnant women.

7. Discussions

This study from the University Teaching Hospital of Kigali, Rwanda, offers critical insights into the prevalence and associated factors of urinary tract infections (UTIs) among pregnant women. The research reveals a significant UTI prevalence rate of 15.1% in this population, indicating that approximately 1 in 7 pregnant women are affected. This prevalence is notably higher compared to rates typically reported in developed countries, ranging from 2% to 10%, depending on healthcare access and demographic factors[13] [14]

In contrast to developed countries, where lower prevalence rates are observed, developing countries often face higher UTI burdens among pregnant women. For example, studies in Africa and South Asia frequently report prevalence rates reaching 15-20%[13]. The disparities in UTI prevalence between developed and developing regions can be attributed to various factors such as limited access to quality healthcare services, irregular antenatal care (ANC) visits, and inadequate screening in developing countries. These challenges contribute to delayed diagnosis and treatment, exacerbating UTI rates among pregnant women.

The study identifies several sociodemographic factors associated with increased UTI likelihood among pregnant women, including age, marital status, employment status, educational level, and rural versus urban residence. Consistent with global findings, advancing age correlates with higher UTI risk, with older women experiencing significantly elevated odds due to physiological changes and hormonal factors affecting urinary tract health[15].

Marital status also influences UTI risk, with married women generally facing higher odds compared to their single counterparts. This association is linked to increased sexual activity among married women, which is a recognized risk factor for UTIs[16]. Similarly, employment status plays a role, with employed and self-employed individuals showing higher UTI odds possibly due to occupational factors affecting hygiene practices and healthcare access [10].

Educational attainment emerges as another factor influencing UTI risk, with individuals having primary or secondary education showing increased odds compared to those without formal education. Higher education levels are often associated with better socioeconomic status and healthcare access, which can mitigate UTI risk through improved health literacy and preventive behaviors [10]

Health-related factors such as a history of UTIs, diabetes, HIV status, and weakened immune systems significantly increase UTI odds among pregnant women. Individuals with a history of UTIs have a heightened risk of recurrence, emphasizing the importance of effective management and prevention strategies (Johnson et al., 2018; Ahmed et al., 2016). Similarly, comorbidities like diabetes and HIV/AIDS contribute to increased UTI susceptibility due to compromised immune function and limited healthcare access[17] [18].

The study also underscores the role of antenatal care (ANC) in UTI prevention, with regular attendance associated with lower UTI incidences. Consistent ANC visits facilitate early detection and management of UTIs, thereby improving maternal and fetal health outcomes. However, challenges such as inadequate healthcare infrastructure and socioeconomic barriers in developing countries often result in suboptimal ANC utilization, contributing to higher UTI risks[17].

Despite these insights, the study acknowledges several limitations, including its retrospective design, reliance on patient records prone to information bias, and the single-center setting, which may limit generalizability. Future research efforts should consider larger, multicenter studies with prospective designs to validate findings and better understand the complex interplay of factors influencing UTI prevalence among pregnant women in diverse settings.

8. Conclusion

The prevalence of UTI in this study is 15.1%. The study's findings reveal several key associations between demographic, maternal, health-related, and health facility factors and the prevalence of urinary tract infections (UTIs) among pregnant women at CHUK, Rwanda. Age, marital status, occupational status, education level, and residence all show varying degrees of association with UTI. Advancing age, being married, higher education levels, and rural residence are associated with higher odds of UTIs. Additionally, certain health-related factors such as history of UTI, diabetes, HIV status, and a weakened immune system are significantly associated with UTI prevalence. These findings emphasize the importance of addressing these factors in preventive strategies and treatment plans for UTIs in pregnant women, highlighting the need for tailored approaches to reduce the burden of UTIs in this population.

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Conflict of interest statement

The author declares no conflicts of interest.

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