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Original Article

Recurrent urinary tract infections among women of reproductive age (15–49 years) at Bombo health centre III, Luweero district. A cross-sectional study.

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Abstract
Background:
Globally, recurrent urinary tract infections account for a significant proportion of female morbidity, affecting many women at least in their lifetime. The increasing resistance of E.coli to first-line antibiotics has made management more challenging. The study aimed to determine the factors associated with recurrent urinary tract infections among women of reproductive age (15-49 years) at Bombo Health Centre III, Luwero district.

Methodology:
The study adopted a cross-sectional study design in which a quantitative data collection approach was applied. Respondents were sampled using a simple random sampling method. Questionnaires were used to collect data from 50 respondents. Data was manually analysed, and results were presented in the form of tables, charts, and graphs.

Results:
Most respondents (86%) were aged 18-30 years, 64% were single, and 52% had attained secondary education. Half (50%) earned between 100,000-200,000shs monthly. Socio-demographic, behavioral, and health-related factors-such as low income, poor genital hygiene, delayed urination, and limited fluid intake-were identified as major contributions to recurrence. While 60.0% of women reported receiving counseling on UTI prevention, 60.0% reported at least one UTI in the past year, highlighting a substantial burden of recurrence. Inadequate awareness and self-medication further increased susceptibility. Therefore, recurrent urinary tract infections remain a common problem among women of reproductive age in Bombo Health Centre III.

Conclusion:
Young, educated women face a high UTI recurrence rate driven by behavioral risks, such as self-medication, and structural resource constraints. Addressing this requires integrated interventions focusing on hygiene, education, and antibiotic stewardship.

Recommendations:
Health education on hygiene, increased awareness about risk behaviors, and timely medical consultation should be prioritized to reduce recurrent urinary tract infections. Outreach services should be emphasized, targeting women living farther from the facility to bridge access gaps and improve care-seeking behavior.

Keywords: *Recurrent Urinary Tract Infections, Escherichia coli, Bombo Health Centre III.*
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Background
Recurrent urinary tract infection (rUTI) among women aged 15–49 years is a clinically and public-health relevant problem characterized by repeated symptomatic episodes, often defined as two or more UTIs in six months or three or more in twelve months. Globally, UTIs remain among the most common bacterial infections in women, with over 400 million cases annually and many women experiencing relapse or reinfection within a month (Flavia, 2016). Although the majority of UTIs are uncomplicated, recurrent cases contribute disproportionately to morbidity, health-care utilization, and antibiotic use (Turcu et al., 2025). The drivers of recurrence include both individual behavioural and biological risk factors (such as sexual activity, voiding habits, and Comorbidities) and systemic health-care factors (such as diagnostic practices and antibiotic stewardship), making rUTI a multifaceted challenge to manage.

At a continental and regional level, particularly in East Africa, health-system challenges exacerbate the burden of rUTI. For instance, surveillance in Uganda, Kenya, and Tanzania has revealed alarmingly high rates of multidrug-resistant (MDR) uropathogens: in one large East African cohort over 50% of urinary isolates were MDR, including in outpatient settings (Dall, 2024) This resistance burden increases the risk of treatment failure and subsequent recurrence, especially in resource-limited settings where diagnostic capacity and antimicrobial stewardship are

weak. In Uganda, a cross-sectional study in Mbarara detected a confirmed UTI prevalence of roughly 24.8% before and during the COVID-19 pandemic, and among the isolates, more than half showed multidrug resistance, particularly in *Escherichia coli* and *Klebsiella* species (Silago et al., 2025). These findings highlight how systemic gaps—such as dependence on empiric therapy without culture, limited laboratory infrastructure, and poor follow-up—can contribute to persistent and recurrent infections.
Nationally, in Uganda, clinical and epidemiological data from recent studies underscore both the high prevalence of UTIs among women of reproductive age and the significant role of health-system weaknesses in recurrence. In Bushenyi District, a community- and hospital-based study found that 32.2% of patients (predominantly female) had significant bacteriuria, with *E. coli* and *Staphylococcus aureus* among the most common uropathogens (Odoki et al., 2019a). At the tertiary-care level, research at Mulago Hospital reported high rates of *E. coli* UTI and alarming resistance: *E. coli* isolates exhibited complete resistance to some commonly used antibiotics, such as nalidixic acid and Ciprofloxacin (Odongo et al., 2020).
Meanwhile, a retrospective analysis at Mbarara Regional Referral Hospital between 2019 and 2024 described rising antimicrobial resistance trends, including over 56% of isolates being multidrug resistant, underscoring the urgent need for routine culture, sensitivity testing, and updated treatment guidelines (Kawuma, 2025). Despite the considerable burden, there is a paucity of locally focused research on recurrent UTIs (as opposed to first-time infections), especially at primary-care facilities such as health centres. Investigating individual (behavioural and clinical) and health-system determinants of rUTI in a setting such as Bombo Health Centre III would therefore fill a vital evidence gap, support better management strategies, and contribute to antimicrobial stewardship and diagnostic improvements in Uganda's reproductive-age female population. The study aimed to determine the factors associated with recurrent urinary tract infections among women of reproductive age (15-49 years) at Bombo Health Centre III, Luwero District.

Methodology

Study design

The study employed a descriptive design where a questionnaire was used to determine the Factors Associated with Recurrent Urinary Tract Infections among Women of Reproductive Age (15–49 Years) at Bombo Health Centre III, Luweero District. It employed a quantitative data approach to data collection. This design yielded results in a relatively short time period.

Study area

This study was conducted at Bombo Health Centre III, Luweero District, Central Uganda. Bombo Health Centre III is a public health facility headed by an in-charge and with many other health workers, such as laboratory technicians, nurses, midwives, clinicians, among others. It offered both inpatient and outpatient services, for example, treatment of common conditions, antenatal care, and ART, among others.

Study population

The study population comprised women of reproductive age (15–49 Years) at Bombo Health Centre III, Luweero District.

Sample size determination

A sample of 50 respondents was determined using Barton's formula. n=QR/O where;
Q = Total number of days that were spent on data collection,
R = Maximum number of respondents to be worked on per day, O = maximum time that was spent on each respondent.
n = (10x5)/1 n=50
Therefore, the sample size was 50 participants.

Sampling technique

A simple random sampling method was used to obtain the respondents. This ensured that each woman of reproductive age (15–49 Years) attending Bombo Health Centre III, Luweero District, who met the inclusion criteria had a chance of participating or not participating in the study.

Sampling procedure

The sample size in the medical ward, maternity ward, and outpatient department was assessed, and the respondents were randomly interviewed each time until the required number of 50 respondents was achieved.

Data collection method

A questionnaire was provided, which contained closed-ended and semi-structured questions that were self-administered for literate respondents. This tool was chosen because it was cost-friendly and reduced the chances of acquiring biased data, as the questions were standard. The purpose of the study was explained to the respondents, and consent was sought. A research assistant helped in filling out the questionnaire for respondents who were not able to read or write.

Pretesting of the data collection tool

The pretesting of the questionnaire was done among 10 respondents at Bombo Health Centre III, Luweero District, and they were asked to fill out the questionnaires.

Data collection procedure

The person in charge of Bombo Health Centre III, Luweero District, was approached, and permission to conduct the study was sought. The in-charge introduced the in-charges of the medical ward, the outpatient department, and the maternity ward. On obtaining consent from the respondents,

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sampling was done, and questionnaires were given to the selected sample of respondents.

Data analysis and presentation

Data processing was done manually through coding, editing, and tallying. The raw data was entered into the computer program Microsoft Excel. Data was analyzed based on the response from the correspondents. Tables and figures were then used to present findings according to the research questions.

Independent variables

Factors associated with recurrent UTIs.

Dependent v ariables

Recurrent Urinary Tract Infections (UTIs)

Quality Control

The quality of the study was ensured after conducting a pretest and double-checking the study instrument and responses. Pretesting enabled the determination of the validity and reliability of the study tool and permitted adjustments to be made.

Inclusion criteria

The study involved all Women of Reproductive Age (15–49 Years) attending Bombo Health Centre III, Luweero District, who consented to participate in the study.

Ethical considerations

After approval of the research proposal by the research and ethics committee of Mildmay Institute of Health Sciences, a letter of introduction was issued, permission was obtained from the person in charge of Bombo Health Centre III, Luweero District, and interaction with the respondents was then started after informed consent. Confidentiality of the respondents was ensured, and possible solutions were provided.

Results

The socio-demographic factors associated with recurrent urinary tract infections among women of reproductive age (15–49 years) at Bombo Health Centre III, Luweero District.

Table 1: Showing the social demographic data of the participants.

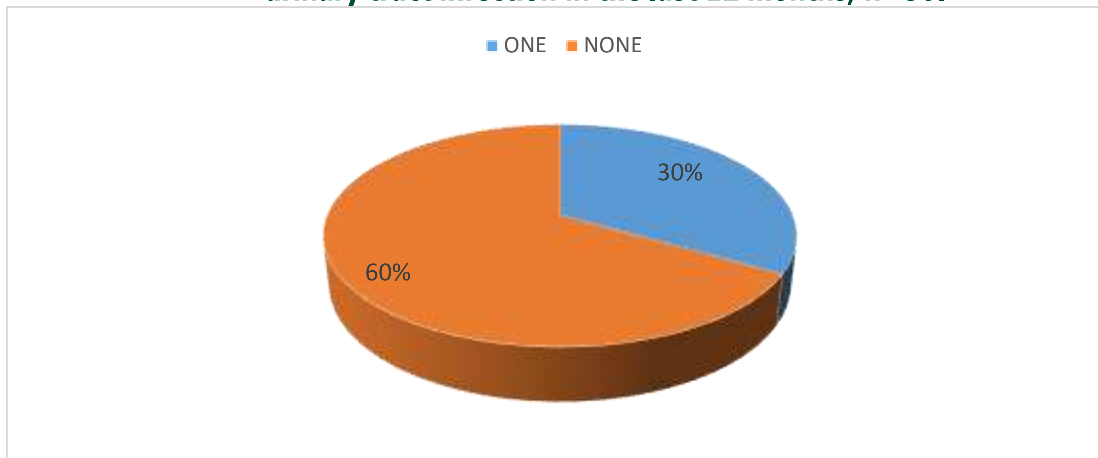
Description	Variables	Frequency (n=50)	Percentage (%)
Age (years)	Below 18	5	10.0
	18-30	43	86.0
	Above 30	2	4.0
	Total	50	100
Marital status	Single	32	64.0
	Married	13	26.0
	Divorced	3	6.0
	Widowed	2	4.0
	Total	50	100
Education	None	2	4.0
	Primary	10	20.0
	Secondary	26	52.0
	Tertiary	12	24.0
	Total	50	100
Religion	Christians	20	40.0
	Moslems	18	36.0
	Anglican	10	20.0
	Others (specify)	2	4.0
	Total	50	100
Occupation	Housewife	5	10.0
	Self-employed	18	36.0
	Skilled work	22	44.0
	Others, specify	5	10.0
	Total	50	100
Income level	100,000 - 200,000 UGX	25	50.0
	Above 200,000 UGX	10	20.0
	Total	50	100

From Table 1, in terms of age, the majority of participants, 43(86.0%), fell within the 18 to 30 years' category, while the minority, 2(4.0%), were aged above 30, indicating a predominantly young sample. Additionally, on marital

status, most respondents were single, accounting for 32(64.0%), while the least number of participants were widowed, making up only 2(4.0%), demonstrating a predominantly unmarried population. Furthermore, when examining education levels, the highest proportion of participants had completed secondary education, comprising 26(52.0%), whereas the lowest percentage, at 2(4.0%), had no formal education, reflecting a generally educated group. In terms of religion, Christians represented the largest segment of the sample at 20(40.0%), while the least represented were those identifying with other religions, accounting for just 2(4.0%). In the occupational distribution, the highest number of participants were engaged in skilled work, representing 22(44.0%), while the lowest percentages, both at 5(10.0%), were housewives and those in other unspecified occupations, illustrating a diverse workforce. Finally, concerning income status, the highest proportion of respondents, at 25(50.0%), fell within the income range of 100,000 to 200,000 UGX, whereas the lowest income group, earning less than 100,000 UGX, comprised 15(30.0%).

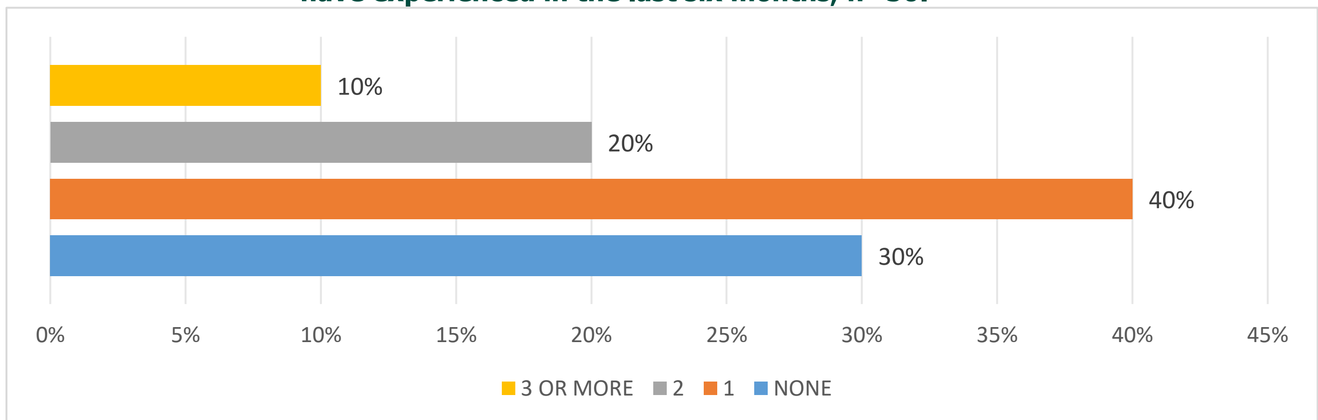
The individual factors associated with recurrent urinary tract infections among women of reproductive age (15–49 years) at Bombo Health Centre III, Luweero District.

Figure 1: Showing the distribution of respondents according to whether they had a urinary tract infection in the last 12 months, n=50.



From Figure 1, the majority of women 30(60.0%) reported at least one UTI in the past year, whereas a sizable minority 20(40.0%) had none.

Figure 2: Showing the distribution of respondents according to the number of UTS they have experienced in the last six months, n=50.



From the data in Figure 2, when examining recurrence over six months, the highest proportion, 20(40%), experienced exactly one infection, while the least, 5(10.0%), endured three or more episodes.

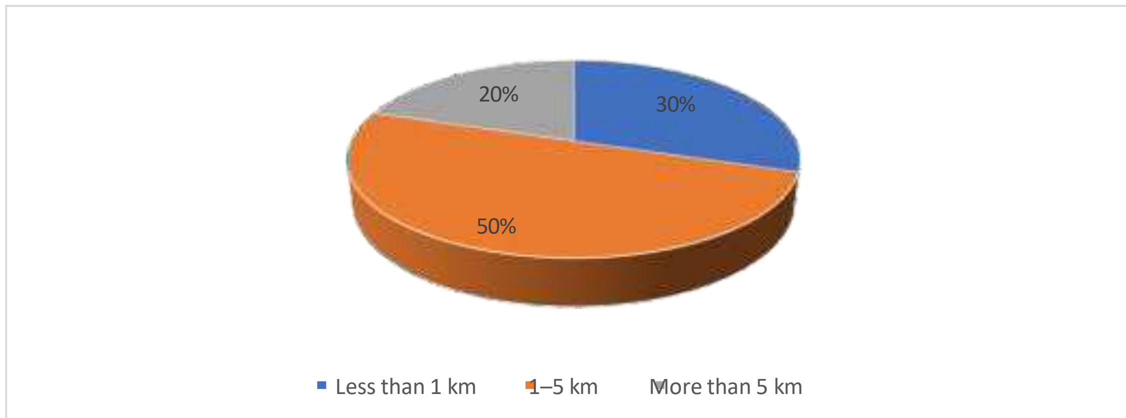
Table 2: Showing some individual factors associated with recurrent urinary tract infections among women of reproductive age (15-49 years).

Variable	Category	Frequency (n=50)	Percentage (%)
Do you practice daily genital hygiene?	Yes	45	90
	No	5	10
	Total	50	100
How often do you change your underwear?	Daily	25	50
	Every few days	15	30
	Weekly	10	20
	Total	50	100
How frequently do you engage in sexual intercourse	Never	10	20
	Occasionally	30	60
	Frequently	10	20
	Total	50	100
Have you been diagnosed with diabetes or any other chronic illness?	Yes	8	16
	No	42	84

From the information in Table 2, daily genital hygiene was near-universal—with 45 (90.0%) practicing it—leaving the lowest share 5(10.0%) without this habit. Similarly, half of the respondents changed underwear daily, which is notably higher than the 10(20.0%) who did so only weekly. Moreover, occasional sexual activity was most common, 30(60.0%), compared to 10(20.0%) who were frequently active, and another 20.0% who abstained entirely. Regarding chronic conditions, the majority of the respondents, 42(84%), never had any chronic conditions, and only a minority, 8(16.0%), had diabetes or another illness. Finally, while the majority, 38(76.0%), refrained from self-medicating, a non-negligible minority, 12(24.0%), admitted to using leftover antibiotics for UTIs.

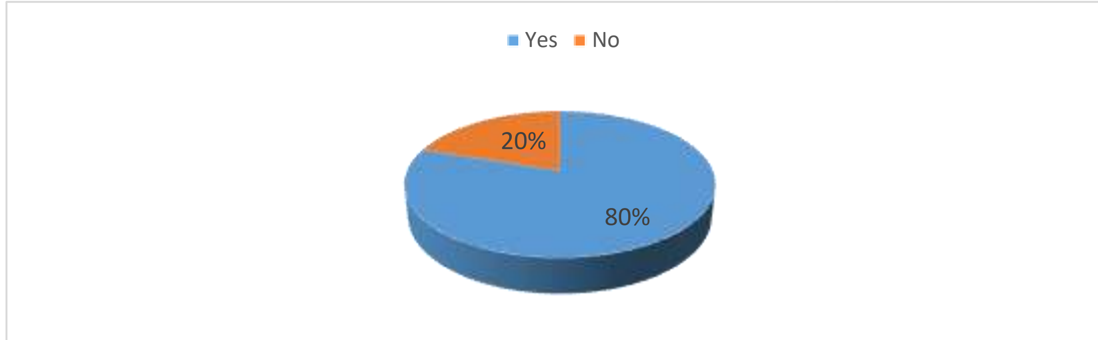
The health system factors associated with recurrent urinary tract infections among women of reproductive age (15–49 years) at Bombo Health Centre III, Luweero District.

Figure 3: Showing the distribution of respondents according to how far their home was from the health center, n=50.



From figure 3, in terms of distance, the majority, 25(50.0%) lived 1–5 km away, significantly more than the 10(20.0%) residing beyond 5 km and the 15(30.0%) living within 1 km.

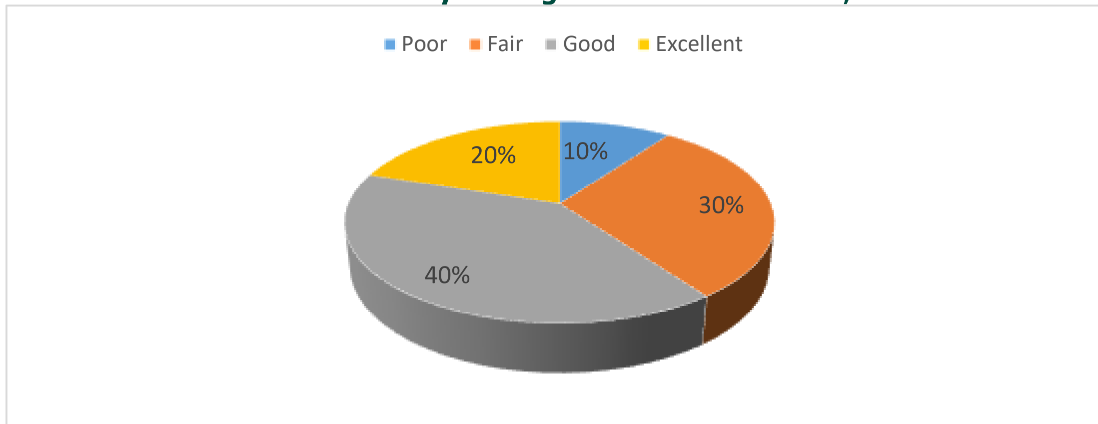
Figure 4: Showing the distribution of respondents according to whether they have ever visited Bombo HC III for UTI treatment, n=50.



From figure 4**,** most participants, 40(80.0%), had previously sought UTI care at Bombo HC III, while the least, only 10(20.0%), had not.

Yes

Figure 5: Showing the distribution of respondents according to how they rated the availability of drugs at the health centre, n=50.



From Figure 5, the majority of the respondents, 20(40%), rated the availability of drugs at the health facility as good, while the minority, 5(10%), rated it poor.

Table 3: Shows the distribution of respondents according to some Individual factors associated with recurrent urinary tract infections among women of reproductive age (15–49 years).

Question	**Response**	**Frequency (n)**	**Percentage (%)**
Were you given full medication during your last UTI visit?	Yes	35	70.0
	No	15	30.0
	Total	50	100
Were you counseled or educated about UTI prevention during your visit?	Yes	30	60.0
	No	20	40.0
	Total	50	100
How long do you usually wait before Receiving treatment at the facility?	Less than 30min	10	20.0
	Over 1 hour	15	30.0
	Total	50	100

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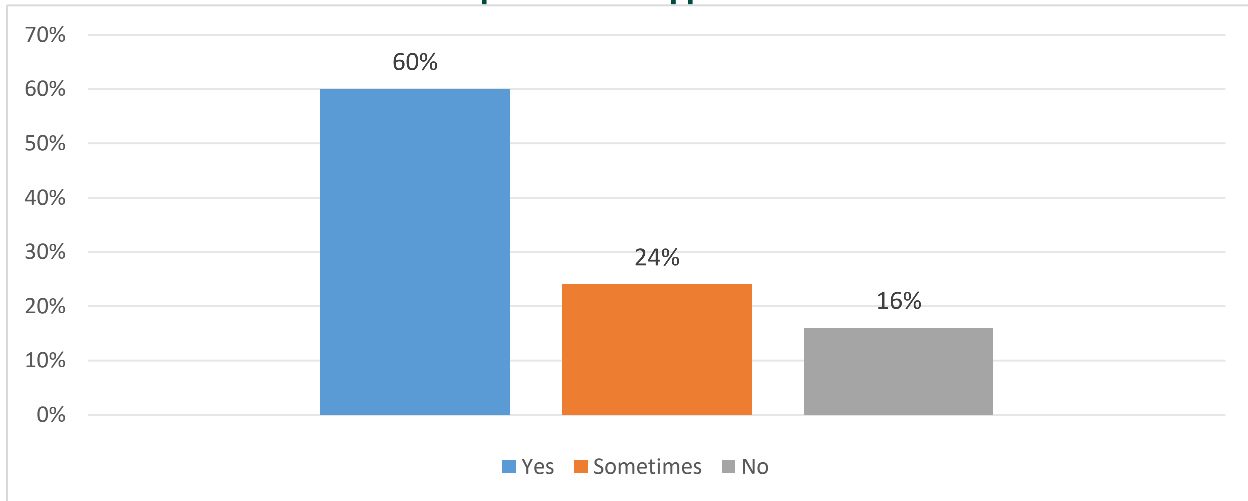
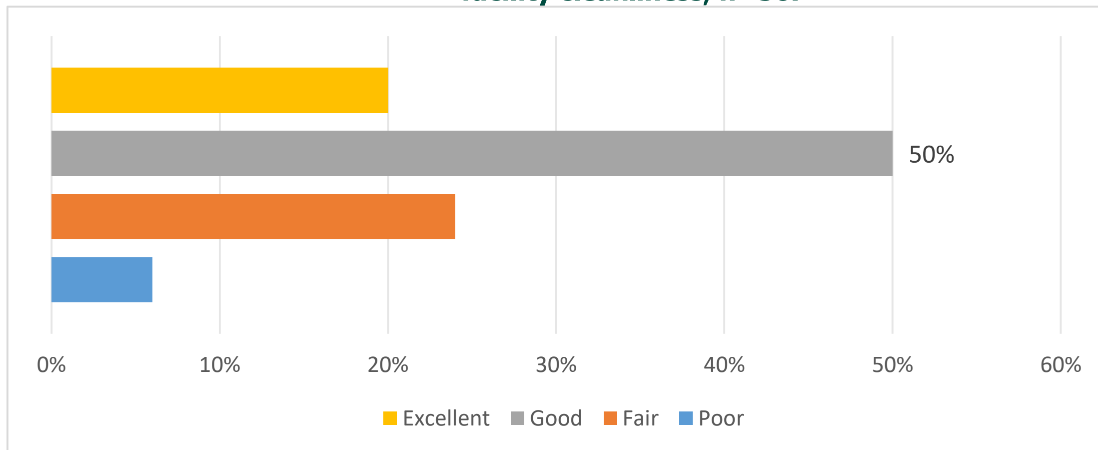
From the information in Table 3, most of the respondents, 35(70.0%), received their full course of medication during the last visit, leaving the remaining 15(30.0%) under-medicated. Additionally, counseling on UTI prevention was provided to the majority 30(60.0%), yet a substantial minority 20(40.0%) reported no preventive education. Furthermore, waiting times clustered around 30–60 minutes for half of the respondents, compared with 10(20.0%) who waited under 30 minutes and 15(30.0%) over an hour.

Figure 6: Showing the distribution of respondents according to whether healthcare workers were respectful and supportive. n=50.



From figure 6, staff attitude was rated positively by the majority, 30(60.0%), but a noteworthy minority, 6(16.0%), experienced disrespect.

Figure 7: Showing the distribution of respondents according to how they rated healthcare facility cleanliness, n=50.



From the information in Figure 7, facility cleanliness earned a "Good" or "Excellent" rating from 35(70.0%), which is the highest combined share, while the minority, only 3(6.0%), considered it poor.

Discussion

Socio-demographic factors associated with recurrent urinary tract infections among women of reproductive age (15–49 years)

This study documented that the age distribution in the sample was notably youthful, with 86.0% of women aged 18–30 years. This predominance suggests that recurrent UTIs (rUTIs) disproportionately affect women in early

adulthood, likely due to higher sexual activity and hormonal fluctuations characteristic of this life stage. Indeed, Anton et al. (2025), He et al. (2025). Similarly, the 18–27–year bracket was identified as carrying the highest rUTI incidence globally, attributing this peak to both behavioral exposures and physiological susceptibility. Such concordance underscores the need for targeted education on preventive behaviors such as timely voiding and genital hygiene among young women.

A majority (64.0%) of our participants were single, a pattern that likely reflects local relationship dynamics where non-marital partnerships and potentially inconsistent condom use or hygiene practices predominate. This finding implies that sexual health interventions must address the realities of casual and multiple partnerships, rather than focusing solely on married populations. By contrast, a UK primary-care analysis reported that married or cohabitating women had a 40% higher risk of recurrence than single women (Anton et al., 2025), highlighting how distinct social norms shape rUTI vulnerability across settings.

Educational attainment showed that the highest proportion (52.0%) had completed secondary school, whereas only 4.0% had no formal education. Although secondary-educated women typically exhibit greater health literacy, enabling better adherence to hygiene and treatment guidelines, UTI remains prevalent in this group. In contrast, studies from Ethiopia and Nigeria found that women without secondary education had over twice the odds of recurrence compared to their educated peers (Abdullahi et al., 2021; Tamirat et al., 2020). The persistence of rUTIs among our relatively educated cohort suggests that structural barriers such as access to clean water and affordable care may override the protective benefits of education, indicating that complementary system-level interventions are required.

Finally, regarding household income, 50.0% of women earned 100,000–200,000 UGX monthly, with 30.0% in the lowest bracket (<100,000 UGX). While this middle-income majority likely faces fewer absolute financial constraints than the poorest quintiles, who, in Nigerian surveys, experienced 2.5-times higher rUTI rates (Abdullahi et al., 2021), costs for hygiene products and clinic visits may still pose significant barriers. Moreover, even modest income groups may prioritize other household needs over preventive supplies, reinforcing the need for subsidized interventions or community-based provision of UTI prevention materials.

Individual factors associated with recurrent urinary tract infections among women of reproductive age (15–49 years)

This study documented that 60.0% of women reported at least one UTI in the past year, highlighting a substantial burden of recurrence in this primary-care setting. This high incidence implies that initial infections are not being fully resolved or that exposure to risk factors remains unabated—necessitating stronger follow-up and prevention strategies. Physiologically, unresolved bacterial reservoirs and repeated epithelial damage can foster reinfection, while behaviorally, persistent exposures (e.g., sexual intercourse without timely voiding) maintain risk. Comparable prevalence, although not solely recurrent, was documented in East Africa, where Makeri et al. (2023) found an overall UTI prevalence of 24.9% in primary-care attendees, underscoring that our recurrence rate far exceeds general incidence and demands targeted recurrence-specific interventions.

Despite this heavy recurrence burden, 90.0% of participants practiced daily genital hygiene, a finding that suggests individual knowledge and intent are high, yet structural barriers may have undermined effective prevention. Good hygiene is known to disrupt uropathogen colonization (Anton et al., 2025), but in contexts of limited access to clean water or private facilities, routines may be sub-optimal. Okesanya et al. (2024) similarly attributed 80% of rUTI cases in South African townships to poor personal hygiene exacerbated by water scarcity, indicating that even well-informed women cannot fully translate knowledge into practice without adequate resources.

Regarding sexual behavior, 60.0% of women reported occasional intercourse, well below the 65% "frequent sex" reported among Nigerian rUTI sufferers (Abdullahi et al., 2021) but still sufficient to elevate risk. Sexual activity facilitates uropathogen ascent through mechanical transfer and can disrupt vaginal flora, particularly when barrier methods or post-coital voiding are inconsistent. The comparatively lower but still significant rate of frequent sexual activity in our cohort underscores the need for counseling on behavioral modifications, such as urination immediately after intercourse and consistent condom use, as recommended by global experts (Ahmed et al., 2023).

Only 16.0% of respondents reported a chronic condition (e.g., diabetes), yet this minority likely faces disproportionate risk: diabetes doubles rUTI odds by promoting glycosuria and impairing neutrophil function (Ahmed et al., 2023; Amiri et al., 2025). The relatively low prevalence of Comorbidities in our sample may partly explain why individual behaviors dominate recurrence patterns here; nonetheless, the elevated susceptibility of this subgroup warrants integrated chronic-disease and UTI management protocols to reduce their outsized contribution to overall recurrence rates.

Finally, 24.0% of women admitted to self-medicating with leftover antibiotics—an alarming practice that fuels antimicrobial resistance (AMR) and complicates future treatment. In Sub-Saharan Africa, rising AMR among uropathogens has been linked to unregulated antibiotic use and stock-outs, with the WHO Africa region reporting some of the highest AMR burdens globally (Sartorius et al., 2024). Our findings align with this pattern and signal an urgent need for stewardship interventions such as community education on completing prescribed courses and improved dispensary practices—to preserve antibiotic efficacy and break the cycle of resistant rUTI.

Health system factors associated with recurrent urinary tract infections among women of reproductive age (15–49 years)

The fact that 80.0% of women had previously sought UTI care at Bombo HC III indicates strong service utilization but also suggests that many patients experience repeat visits rather than a definitive cure. This pattern implies gaps in effective treatment or follow-up, as repeated attendances may reflect unresolved infections or inadequate patient education. In Uganda, Chan et al. (2021) found that 80% of suspected rUTI cases received empirical antibiotics without laboratory confirmation, often leading to sub-optimal outcomes. Our high utilization rate, therefore, underscores the need to strengthen diagnostic capacity and adherence to clinical guidelines to ensure first-visit effectiveness.

Regarding geographic access, 50.0% of respondents lived 1–5 km from the facility, more than double the 20.0% beyond 5 km, yet far above the 30.0% living within 1 km. This middle-distance majority suggests that transportation barriers, while not extreme, may still deter timely care; women who travel longer distances often delay seeking treatment, exacerbating infection severity. Sado et al. (2023) reported that 70% of East African clinicians resorted to empirical prescribing due to lab inaccessibility, a problem compounded when patients live farther from well-equipped centers. Improving outreach services or establishing satellite diagnostic points could mitigate these distance-related delays.

Drug availability was rated “Good” or “Excellent” by 60.0% of women, whereas only 10.0% deemed it poor, suggesting relatively reliable supply chains at Bombo HC III. Nonetheless, qualitative research in South Africa and Sierra Leone highlights that intermittent stock-outs drive both under-treatment and antimicrobial resistance (Campbell et al., 2022; Aggarwal & Leslie, 2025b). Maintaining consistent stocks of first-line agents like Nitrofurantoin and trimethoprim-sulfamethoxazole is therefore critical to prevent treatment interruptions that fuel recurrence.

Indeed, 70.0% of women received their full medication course during the last visit, leaving 30.0% under-medicated. Partial treatment not only fails to eradicate infection but also selects for resistant strains. Park et al. (2024) observed in the U.S. that patient pressure and workflow constraints often lead clinicians to shorten courses or choose broad-spectrum antibiotics, contributing to resistance and relapse. In our setting, ensuring patients leave with the complete regimen and understand its importance should be a core stewardship objective.

Finally, 60.0% of women reported receiving counseling on UTI prevention, yet 40.0% did not. Preventive education covering hydration, hygiene, and voiding practices has been shown to reduce recurrence by up to 30% when integrated into care (Turcu et al., 2025). The substantial minority missing out on counseling represents a critical missed opportunity: standardizing nurse-led education sessions, as demonstrated by Hansen et al. (2022) in Kenya, can bridge this gap and empower women to adopt protective behaviors.

Conclusion

Young, educated women face a 60% UTI recurrence rate driven by behavioral risks, such as self-medication, and structural resource constraints. Addressing this requires integrated interventions focusing on hygiene, education, and antibiotic stewardship. Standardizing nurse-led education could bridge a 40% counseling gap and potentially reduce recurrence by up to 30%.

Recommendation

Tailored interventions such as youth-focused sexual health education, community sanitation improvements, and subsidized hygiene supplies are therefore essential to address the unique needs of this demographic.

Integrated behavioral interventions, combined with chronic-disease management and robust antimicrobial-stewardship education, are critical to mitigate these individual-level risks.

Improve drug availability and diagnostic capacity at Bombo HC III to ensure complete and effective treatment for all women.

Outreach services should also target women living farther from the facility to bridge access gaps and improve care-seeking behavior.

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Lastly, heartfelt thanks to my classmates, friends, and everyone who offered moral, academic, and emotional support during this research process.

List of abbreviations

UTI Urinary Tract Infection
RUTI: Recurrent Urinary Tract Infection
WHO World Health Organization
MOH Ministry of Health
ANC Antenatal Care

Source of funding

The study was not funded.

Conflict of interest

The author declares that there was no conflict of interest.

Author contributions

KS- Investigated the study
AO- Supervised the Study.
HN- Supervised the Study.
FS-Supervised the Study.
JFN-Supervised the Study.

Data availability

Data is available upon request.

Informed consent

There was full disclosure; full comprehension, and respondents voluntarily consented to participate in the study.

Author biography

Silas Kiggundu is a student at Mildmay Institute of Health Sciences, pursuing a diploma in clinical medicine and community health.
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Jane Frank Nalubega is a research supervisor at Mildmay Institute of Health Sciences.

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