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The Burden of Urinary Tract Infections: Identifying Knowledge Gaps and Preventive Strategies among Female Undergraduates in the University of Benin

OBIAGELI OGOCHUKWU EGBOCHUKU, CHINWE NNEAMAKA ATEDHOR
University of Benin, Benin-City, Edo State, Nigeria

Abstract. Urinary Tract Infections (UTIs) are becoming a global burden, with the leading causal organism being Escherichia Coli (E.coli). It is increasingly becoming an issue of concern among undergraduates due to lifestyle and other environmental factors. This study aimed to identify knowledge gaps and preventive strategies for UTIs among female undergraduates of University of Benin. Descriptive survey was conducted among female undergraduates of the university. Multistage sampling was used to select 234 respondents for the study. A pre-tested multiple-choice question was used to elicit information on the knowledge and preventive practices of the respondents. Data was analyzed using descriptive statistics of frequency counts and percentages while inferential statistics using t-test and Pearson correlation was used to show difference and relationship between the variables of interest. Findings indicate that about 46% of the respondents had moderate level of knowledge while responses varied for preventive practices with only 17.5% wiping the genital area correctly from front to back. 42.3% of the respondents change their sanitary towel after over 12 hours, 28.2% urinate less than four times daily while only 35.5% wash their genitourinary after using the rest room. The study emphasizes the need to intensify efforts to improve knowledge on UTIs among students as it is expected to impact their preventive practices. While UTIs can be treated, they can lead to more serious infections and even kidney damage if left untreated, so mass enlightenment is imperative, especially among this susceptible population.

Keywords: Urinary Tract Infections, Female undergraduates, Knowledge, Preventive practices, Nigeria.

1. Introduction

Urinary Tract Infections (UTIs) are significant public health concern and the most common bacterial infections. It is the second most common infectious diseases affecting millions of people worldwide annually, and are four times more likely to occur in females than males. The female anatomy plays a huge role in this, given that the major predisposing factor is the shorter urethras in females, as opposed to their male counterparts (Dessie et al., 2024; Osonoga et al., 2024; Lala et al., 2023). Although UTIs affect people of all age groups, including neonates, the frequency of UTIs has been shown to increase with age. While the aged are at greater risk, women within the ages of 16 and 35 years are highly susceptible to UTIs due to lifestyle and behavioural practices, making undergraduates a target population for this study. According to Medina & Castillo-Pino (2019), the occurrence of uncomplicated UTIs significantly surges during the years of peak sexual activity, which is usually between 18 and 39 years. These places increased sexual activity as a major factor that predisposes younger women to UTIs.

UTIs are generally caused by a wide range of pathogens, including Klebsiella pneumoniae, Staphylococcus saprophyticus, Enterococcus faecalis, Proteus mirabilis, and Escherichia Coli (Flores-Mireles et al., 2015). E.coli has been shown to be the major causal organism, accounting for about 70-95% of UTIs globally (Omoruyi et al., 2024; Saidu & Ologbosere, 2022; Kandel et al., 2019; Mirsoleymani et al., 2014) and other countries including the United States, where approximately seven million women are affected annually (Yamaji et al., 2018). They are among the most common bacterial infections causing discomfort, morbidity and economic burden.

UTIs can affect both the upper and lower urinary tracts. Upper UTIs, also known as pyelonephritis, primarily affect the kidneys and ureters, making them more severe than lower UTIs that affect the bladder and urethra. Lower UTIs, commonly called cystitis, are usually uncomplicated and can be treated with antibiotics, but upper UTIs can potentially be life threatening if left untreated. Unfortunately, individuals with a history of UTIs are highly prone to recurrent infections. In fact, about 27% of women have a confirmed recurrence of UTIs within 6 months after the first, and 2.7% have a

second recurrence within another six months (Alós, 2005).

The prevalence of UTIs among university students is a concern with studies showing varying rates across different institutions (Adekunle et al., 2023; Erinle et al., 2022). Undergraduates are predisposed to UTIs due to lifestyle factors like high stress levels, poor personal hygiene, limited access to healthcare services, and lack of hygienic utilities, especially toilet facilities. Female undergraduates are particularly vulnerable due to their age, lifestyle and limited knowledge about UTIs (Godwin et al., 2023). While most studies have not directly linked the use of unsanitary toilets to UTIs, they are the primary reason for delayed urination (Dessie et al., 2024) Although urine is naturally antimicrobial, clinical isolates of certain UTI-causing bacteria have been shown to grow in human urine (Ipe et al., 2016). As such, frequent urination can significantly decrease the risk of UTIs. Sadly, this is a luxury that most undergraduates cannot afford.

In addition to the female anatomy, the etiology of UTIs has been associated with certain risk factors such as age, diabetes, spinal cord injury, kidney transplant, urinary catheterization, menopause, abnormal urinary tract anatomy, obesity, pregnancy, and more common causes like dehydration, poor personal hygiene, sexual intercourse, and even certain birth control methods like the use of spermicides and diaphragms (Kranz et al., 2018). Symptoms of UTIs include frequent, painful, and often insignificant urination, urinary incontinence, weak urine stream, a feeling of incomplete urination, bloody, cloudy, or foul-smelling urine, and abdominal pain. Due to how inconveniencing these symptoms are, recurrent UTIs can be quite burdensome. Apart from the personal burden of a reduced quality of life as a result of the social and psychological effects, there's also a societal burden associated with the clinical and economic effects of UTIs (Öztürk & Murt, 2020). The burden of UTI is further complicated by the increasing trend of antibiotic resistance, making treatment challenging.

Some of the prevalent causes of UTIs can be checked by preventive measures as simple as staying hydrated, frequent urination, wiping from front to back, change of birth control method, urinating immediately after sex, and avoiding the use of irritants around the genital area. Although UTIs are mostly uncomplicated, the increase in antibiotic-resistant strains of certain bacteria now makes it a lot more difficult to treat UTIs (Godwin et al., 2023; Sharma et al., 2016; Manjunath et al., 2011).

Despite the significant prevalence of UTIs, there is still limited knowledge about the causes, symptoms and preventive strategies among female undergraduates. This knowledge gap has the potential to delay diagnosis, cause inadequate treatment and increase risk of complications. Furthermore, poor preventive practices such as inadequate hygiene, infrequent urination and poor dietary habits also exacerbate the risk of developing UTIs. The University of Benin like many other institutions of higher learning cannot be excluded from the burden of UTIs in Nigeria. This study therefore aims to assess the knowledge and preventive practices of UTIs among female undergraduates of the University of Benin. By identifying knowledge gaps and preventive strategies, this study will provide insights into the development of effective prevention strategies, ultimately improving the health and wellbeing of female undergraduates as well as inform the development of policies and programmes aimed at promoting the health and wellbeing of female undergraduates in the University of Benin and beyond.

1.1 Purpose of the Study

The purpose of this study is to:

- Determine the level of knowledge of Urinary Tract Infections among female undergraduates in the University of Benin.
- Identify the preventive practices for Urinary Tract infections among female undergraduates in the University of Benin.
- Evaluate the difference in knowledge of Urinary Tract Infections between health related and non-health related female undergraduates in the University of Benin.
- Examine the relationship between knowledge and preventive practices for Urinary Tract Infections among female undergraduates in the University of Benin.

1.2 Study Area

The University of Benin is a well-established institution with students cut across various backgrounds. As a hub of academic excellence, it provides a suitable environment for conducting research on health-related topics including UTIs. The University is situated in Benin City, the capital of Edo State in the southern region of Nigeria. The city's unique cultural and socio-economic characteristics may influence the knowledge, attitudes and practices of students regarding UTIs.
The University of Benin Health Centre provides medical services to students including diagnosis and treatment of UTIs. The University's academic environment and research infrastructure also make it an ideal location for conducting studies on UTIs. It also has about eight hostel facilities on campus for female students and many private facilities around the school environment. Researchers can therefore take advantage of the university's resources, including libraries, research facilities and expert guidance to explore various aspects of UTIs among female undergraduates

2. Methodology

A quantitative study using descriptive survey research design was carried out to assess the knowledge and preventive practices for Urinary Tract infection among

female undergraduates in the University of Benin. The study aimed to determine the level of knowledge and preventive practices of UTIs among female undergraduates as well as evaluate the knowledge difference between health related and non-health related disciplines including identifying the relationship between knowledge and preventive practices for UTIs. The study comprised female students duly registered for the 2024/25 session as captured by the academic planning department of the university. The inclusion criteria required female students who have been allocated bed space in the school hostel facilities, to ensure that only registered students participate as they are the ones eligible for bed space. Students who stay in school hostel facilities are also more exposed to risk factors for UTIs, thus may be more eligible to respond to the items raised in the questionnaire.

The population of this study consists of 82,716 female undergraduates from 15 faculties in the University of Benin. The multi-stage sampling technique was used to select 234 respondents for the study. The female students were grouped into health related and non-health related faculties, giving a total of six health related and nine non-health related faculties. Simple random sampling technique was then used to select three faculties from each group. Finally, using proportionate sampling, 2% of the students from each of the selected faculties were picked to give a total of 234 respondents for the study. A questionnaire was developed to collect data from the undergraduates on their knowledge and preventive practices of UTIs. The instrument was made up of ten items to test knowledge of UTIs among undergraduates as well as ten items to elicit information on preventive practices. Score between 0-4, indicated low knowledge, 5-7, moderate knowledge, 8-10, high knowledge. Percentages was used to determine their preventive practices with response options Data was analyzed using SPSS version 25. Descriptive statistics, using percentages was used to summarize items on knowledge and preventive practices, while t-test and Pearson correlation were employed to look at knowledge difference between health related and non-health related faculties and to determine the relationship between knowledge and preventive practices, respectively.

Ethical clearance was gotten from the university's ethics committee and informed consent of the respondents was duly sort.

3. Results

Table one: Level of knowledge about urinary tract infections (UTIs) among female Undergraduates in the University of Benin

Knowledge	Frequency	Percent
Low	88	37.6
Moderate	108	46.2
High	38	16.2
Total	234	100.0

*Score of 0 to 4: Low knowledge; 5- 7: Moderate knowledge; 8-10: High knowledge

Research Question One sought to determine the level of knowledge about urinary tract infections (UTIs) among female undergraduate students at the University of Benin. The findings, as presented in Table One, show that out of a total of 234 respondents, 88 students (representing 37.6%) demonstrated a low level of knowledge about UTIs, based on scores ranging from 0 to 4. Meanwhile, 108 students (46.2%) exhibited a moderate level of knowledge, with scores between 5 and 7. Only 38 students (16.2%) attained a high level of knowledge, scoring between 8 and 10. The results indicate that while a substantial proportion of the students possess moderate knowledge, a significant number still have low awareness of urinary tract infections.

Table Two: Preventive strategies for UTIs among female undergraduates in the university of Benin

s/n	Items	Frequency	Percentage
1.	**How often do you wash your genitourinary area after using the restroom?**		
	Always	83	35.5
	Sometimes	146	62.4
	Never	5	2.1
2	**What type of underwear do you usually wear?**		
	Silk	6	2.1
	Nylon	23	9.8
	Cotton	123	52.8
	Polyester	83	35.5
3	How often do you urinate in a day?		
	4-6 times	12	5.1
	7-10 times	8	29.1
	More than ten times	88	37.6
	Less than 4 times	66	28.2
4	**Do you usually urinate after sexual intercourse?**		
	Yes	46	19.7
	No	87	37.2
	Sometimes	101	43.2

5	**How many glasses of water do you drink per day?**		
	More than 8 glasses	59	25.2
	4-7 glasses	140	59.8
	Rarely	17	7.3
	Less than 4 glasses	18	7.7
6	**What type of menstrual product do you usually use?**		
	Sanitary Pads	134	57.3
	Tampons	48	20.5
	Tissue paper	47	20.1
	others please specify	5	2.1
7	**How often do you change your menstrual product?**		
	Every 4-6 hours	18	7.7
	Every 8-12 hours	58	24.8
	More than 12 hours	99	42.3
	Less than 4 hours	59	25.2
8	**How do you wipe after using the toilet?**		
	From front to back	41	17.5
	Back to front	92	39.3
	No particular order	101	43.2
9	**Do you avoid drinks like alcohol that trigger UTI?**		
	Yes	141	62.8
	NO	87	37.2
10	**How often do you wash the genital area with scented soap?**		
	Always	11	4.7
	Never	81	34.6
	Sometimes	142	60.7

Research Question Two explored the preventive strategies female undergraduate students at the University of Benin employ to avoid urinary tract infections (UTIs). The findings in Table Three revealed a variety of hygiene and lifestyle practices. In terms of genital hygiene, 52.6% of the students reported washing their genital area several times a week, while 35.5% did so daily. A smaller proportion washed rarely (9.8%) or never (2.1%). Regarding underwear choices, more than half (52.8%) preferred cotton underwear, which is generally considered healthier for preventing infections, while others wore polyester (35.5%), nylon (9.8%), and silk (2.1%).

When it came to urination frequency, 37.6% of students urinated more than ten times a day, 29.1% between 7-10 times, 28.2% less than four times, and only 5.1% between 4-6 times daily. About post-sexual hygiene, 43.2% said they sometimes urinated after intercourse, 37.2% said no, and 19.7% said yes. Hydration practices showed that 59.8% drank 4-7 glasses of water daily, 25.2% drank more than 8 glasses, while a small number rarely drank water (7.3%) or drank less than 4 glasses a day (7.7%). Regarding menstrual hygiene, the majority (57.3%) used sanitary pads, 20.5% used tampons, 20.1% used tissue paper, and 2.1% used other unspecified products. However, only 7.7% changed their menstrual product every 4-6 hours, while most (42.3%) changed after more than 12 hours, 25.2% changed after less than 4 hours, and 24.8% every 8-12 hours.

In terms of toilet hygiene, 43.2% had no particular order for wiping after toilet use, 39.3% wiped from back to front (which can increase UTI risk), and only 17.5% wiped from front to back (the correct method). Most students (62.8%) reported avoiding drinks like alcohol that could trigger UTIs, while 37.2% did not. Finally, concerning the use of scented soaps, a majority (60.7%) reported sometimes washing their genital area with scented soap, 34.6% said they never did, and 4.7% said they always did. The findings suggest that while many students engage in some positive preventive practices such as frequent washing, wearing cotton underwear, and moderate hydration, risky behaviors like improper wiping techniques, delayed menstrual product changes, and inconsistent genital care practices could still expose them to UTI risks.

Table 3: Difference in knowledge of UTIs between students in health-related and non-health related disciplines

	Discipline	**N**	**Mean**	**Std. Deviation**	**df**	**T**	**Sig.**
Knowledge	Health	152	7.25	2.32	232	3.56	0.00
	Non health related	82	5.95	1.60			

Research Question Three aimed to determine whether there is a difference in the level of knowledge about urinary tract infections (UTIs) between female undergraduate students in health-related disciplines and those in non-health-related disciplines at the University of Benin. The corresponding null hypothesis (Ho_2) stated that there is no significant difference between the two groups. Results presented in Table three show that students in health-related disciplines had a higher mean knowledge score (M = 7.25, SD = 2.32) compared to students in non-health-related disciplines (M = 5.95, SD = 1.60). The independent sample t-test yielded a t-value of 3.56 with a significance level (p-value) of 0.00, which is less than the standard alpha level of 0.05.

Given this result, the null hypothesis is rejected. This means there is a statistically significant difference in the knowledge of urinary tract infections between students in health-related disciplines and those in non-health-related disciplines, with students from health-related fields demonstrating greater knowledge.

Table 4: Pearson correlation on knowledge relationship with preventive practices for urinary tract infections (UTI'S) among female undergraduate students in the University of Benin

		Knowledge	Preventive
Knowledge	Pearson Correlation	1	.037
	Sig. (2-tailed)		.574
	N	234	234
Preventive	Pearson Correlation	.037	1
	Sig. (2-tailed)	.574	
	N	234	234

Research Question Four sought to determine whether knowledge about urinary tract infections (UTIs) influences preventive practices among female undergraduate students at the University of Benin. To test this, the null hypothesis (Ho_1) stated that there is no significant relationship between knowledge and preventive practices for UTIs among the students.

The results presented in Table Four, using Pearson's correlation analysis, show a very weak positive correlation between knowledge and preventive practices ($r = .037$). However, the associated p-value (.574) is greater than the standard significance level of 0.05. This indicates that the relationship between knowledge and preventive practices is not statistically significant. Based on these findings, the null hypothesis is retained, meaning that knowledge about UTIs does not significantly influence the preventive practices adopted by female undergraduate students at the University of Benin.

4. Discussion

Adequate healthcare practice that promotes total health for every individual including women should include, education, counselling, planning, assessment and treatment (Alshahrani et al., 2022). Initiating good health starts from education to improve knowledge and then counselling to ensure adherence to prevent regimen. It is on this premise the study sought to provide valuable insights on the intersection between knowledge and preventive practices of urinary tract infection (UTI) among female undergraduates in the University of Benin.

The findings indicate unsatisfactory level of UTI knowledge, as only about 16% of the respondents had high level of knowledge, suggesting serious deficiencies in knowledge of UTI among the students. These findings agree with other studies which also reported inadequate level of knowledge of UTI among students (Osonuga et al., 2024; Okoro et al., 2018; Arundathi et al., 2016). Lack of knowledge about the diseases has the propensity to increase exposure, as the students are not likely to engage in practices that that are preventive. On the contrary, similar study conducted among nursing students at Lahore school of nursing, university of Lahore, reported that over 60% of the students had high level of knowledge of UTIs (Arooj et al., 2025). The high knowledge level no doubt is as a result of targeted education on such concepts such as UTIs in this setting which is also authenticated in the findings of this study as students in health-related disciplines demonstrated higher knowledge than their counterparts in the non-health related disciplines.

Knowledge of preventive practices for UTIs among students have been documented in several studies (Youssef et al., 2020; Mafuyai et al., 2019). Proper perennial hygiene during menstruation and after urination have the propensity to reduce UTIs associated in the genital area. A study conducted in a tertiary medical institute from north India showed that, students who practice correct perennial cleaning as well has good menstrual hygiene were less vulnerable to UTIs (Jelly et al., 2022). In accordance with this assertion, our study revealed that there is poor adherence to some of the recommended preventive practices for UTIs among the respondents. Correct wiping method of the perennial after urinating was practiced by only about 17% of the students, washing of the genitourinary was practiced by about 35% while about 40% will change their sanitary pads after about 12hours. This raises serious concern, highlighting the need for targeted interventions to promote behaviour change (Ajibade et al., 2021).

This study found no relationship between knowledge and preventive practices among the students. Though some studies have indicated knowledge as a strong predictor of UTI preventive practice (Osonoga et al., 2024). The weak positive correlation between knowledge and preventive prapctices suggest that knowledge alone is not sufficient to promote preventive practices, indicating that interventions should focus on addressing underlying factors that influence behaviour. This assertion is consistent with previous researches (Alshahrani et al., 2022; Kumar et al., 2021; Youssef et al., 2020; Ogunleye et al., 2019), where satisfactory knowledge and attitude towards preventive measures were observed with high levels of UTIs still prevalent among participants. This could be as a result of irregular screening or inconsistent practice of preventive measures. Similar study done in Jos, Nigeria among

female undergraduates reported positive relationship between UTI knowledge and their preventive practices (Mafuyai et al., 2019), Difference in outcome may lie in the higher level of knowledge among the Jos students.

5. Conclusion and Recommendations

This study has shown that there is poor knowledge of UTIs among undergraduates of the University of Benin. However, higher level of knowledge was identified among the health-related students. This research gap therefore calls for collaborative efforts targeted at providing valuable information towards improving knowledge of UTIs among university students. Such efforts should not only address knowledge, but also provide the necessary support and environment to ensure adequate practice of preventive measures, including prompt diagnosis and treatment.

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