

**Survey on Prevalence, Complication and Treatment of Urinary
Tract Infection (UTI) at Dhaka Medical College and Hospital,
Dhaka**



Daffodil
International
University

[In the partial fulfillment of the requirements for the degree of Masters of
Pharmacy]

Submitted To

Department of Pharmacy
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APPROVAL

This thesis paper, “**Survey on Prevalence, Complication and Treatment of Urinary Tract Infection (UTI) at Dhaka Medical College and Hospital, Dhaka**”, submitted to the Department of Pharmacy, Faculty of Health & Life Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Masters of Pharmacy and approved as to its style and contents.

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DECLARATION

I hereby declare that this thesis report, “**Survey on Prevalence, Complication and Treatment of Urinary Tract Infection (UTI) at Dhaka Medical College and Hospital, Dhaka**”. I am declaring that this thesis is my original work. I also declare that neither this thesis nor any part thereof has been submitted elsewhere for the award of Masters or any degree.

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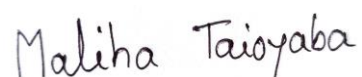
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The persons who guided me in this process and faculties who kept me on track.

Abstract

Urinary tract infections (UTIs) are highly prevalent, with approximately half of all women experiencing at least one in their lifetime. Among elderly individuals and nursing home residents, UTIs are the leading cause of infection and bacteremia. A study conducted at Dhaka Medical College and Hospital examined the dietary habits and hygiene practices of UTI patients. The study utilized questionnaires administered individually to patients. The results showed that 32% of respondents claimed to practice proper hygiene for UTI prevention, while 42% were unaware that wearing tight-fitted clothing during menstruation could contribute to UTIs. Additionally, 35% reported having genital skin diseases, whereas 65% did not. The majority of respondents (50%) said in the pie chart that their doctor had recommended urine analysis, followed by ultrasound with 15% and CT scan with 25% for urinary tract infection diagnosis. In the survey, 25% of participants indicated that kidney infections (pyelonephritis) are the most common complication associated with untreated UTIs. 30% responders replied that they have been experienced needing to pee more often than usual during the night (nocturia). Moreover, 25% retorted that pain or a burning sensation when peeing (dysuria). Regarding treatment, 35% of patients were prescribed nitrofurantoin monohydrate, and 25% received a combination of Cefuroxime and clavulanic acid. Overall, the findings indicate a lack of awareness and adherence to proper hygiene practices and dietary habits among UTI patients.

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Chapter 1

Introduction

1. Introduction

Urinary Tract Infections (UTIs) are among the most common bacterial infections affecting individuals worldwide, with significant health implications and economic burdens. In Bangladesh, particularly at Dhaka Medical College and Hospital (DMCH), UTIs are a frequent cause of hospital visits and admissions. Despite the availability of antibiotics for treatment, the recurrence of UTIs remains a significant concern, often necessitating exploration of preventive strategies to reduce incidence and recurrence [1]. Preventive measures, including adequate hydration, stringent hygiene practices, and dietary modifications, have been advocated to mitigate the risk of UTIs. Hydration is believed to help by flushing out bacteria from the urinary tract, while proper hygiene practices, such as regular washing and wiping from front to back, can prevent the introduction and spread of pathogens. Dietary changes, such as increased intake of cranberry products and probiotics, are also considered beneficial in preventing UTIs by creating a less favorable environment for bacterial growth [2]. This survey aims to evaluate the effectiveness of these preventive measures in UTI patients treated at DMCH. By systematically assessing patient adherence to these practices and correlating them with UTI recurrence rates, we hope to identify which measures are most effective in reducing the frequency and severity of UTIs. Understanding the impact of these preventive strategies can provide valuable insights for healthcare providers in developing comprehensive care plans that emphasize non-pharmacological interventions alongside traditional treatments [3]. The findings from this survey will not only contribute to better patient outcomes at DMCH but also offer evidence-based recommendations that can be adopted in similar healthcare settings. This research underscores the importance of a holistic approach to UTI management, incorporating both medical and lifestyle interventions to enhance patient health and well-being [4].

1.1 Pathogenesis of UTI

Urinary tract infections (UTIs) are among the most common bacterial infections affecting humans. The pathogenesis of UTIs involves a series of complex interactions between the uropathogen and the host's urinary tract environment [5]. Here is an overview of the key steps and factors involved in the development of a UTI:

1. Colonization

a. Ascending Route: Most UTIs are caused by bacteria that ascend from the urethra to the bladder (cystitis) and can further ascend to the kidneys (pyelonephritis). *Escherichia coli* (*E. coli*) is the most common uropathogen, responsible for 70-95% of UTIs [6].

b. Hematogenous Route: Less commonly, bacteria can reach the urinary tract through the bloodstream. This route is usually associated with systemic infections.

2. Adherence and Invasion

a. Bacterial Adhesins: Uropathogenic *E. coli* (UPEC) have specialized surface structures, such as pili or fimbriae (e.g., type 1 fimbriae and P fimbriae), that facilitate adhesion to the uroepithelium. This adhesion is crucial for colonization and infection [7].

b. Biofilm Formation: Some bacteria can form biofilms on the urinary tract's mucosal surfaces, protecting them from the host immune response and antibiotic treatment.

3. Evasion of Host Defenses

a. Avoiding Immune Response: UPEC can evade the immune system through various mechanisms, including altering surface antigens and secreting factors that suppress the immune response [8].

b. Intracellular Lifestyle: Some uropathogens can invade bladder epithelial cells, creating intracellular bacterial communities (IBCs) that shield them from the immune system and antibiotics.

4. Infection and Inflammation

a. Toxin Production: UPEC and other uropathogens produce toxins (e.g., hemolysin, cytotoxic necrotizing factor 1) that can damage host cells and tissues, contributing to inflammation and symptoms of UTI [9].

b. Host Inflammatory Response: The infection triggers an inflammatory response, leading to the recruitment of immune cells, production of cytokines, and release of reactive oxygen species. This response results in the symptoms of UTI, such as pain, urgency, frequency, and sometimes fever.

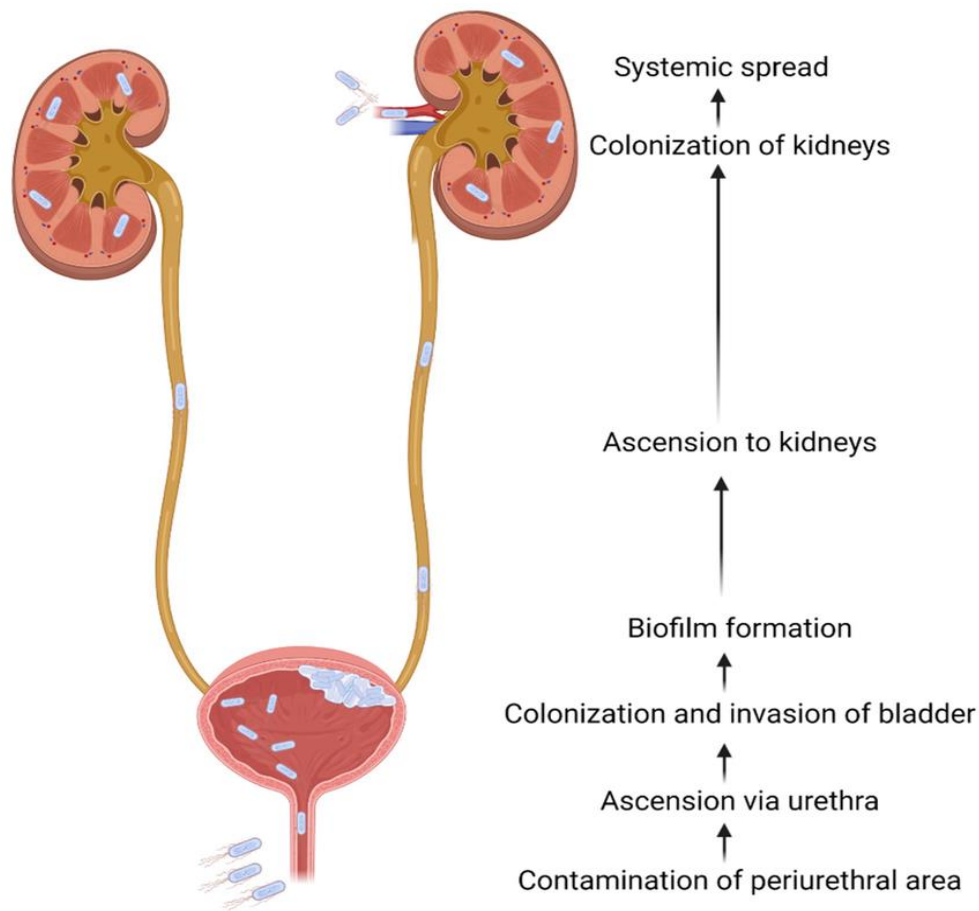


Figure 1: Pathogenesis of UTI [10]

1.2 Causes of Urinary Tract Infections (UTIs)

Most UTIs are bacterial in origin, with *Escherichia coli* (*E. coli*) being the most frequent cause. Other bacteria like *Klebsiella*, *Proteus*, *Enterococcus*, and *Staphylococcus saprophyticus* can also lead to UTIs [11]. The structure of the urinary tract plays a role, especially in women. The shorter urethra in females allows bacteria to more easily travel from the rectum to the bladder. Sexual intercourse can introduce bacteria into the urinary tract, raising the risk of UTIs, particularly in women. Catheters, commonly used in hospitals or by individuals with urinary incontinence or difficulty emptying their bladder, can introduce bacteria into the urinary tract [12]. Improper hygiene practices, such as wiping from back to front after a bowel movement, can introduce bacteria into the urinary tract. Conditions or medications that weaken the immune system, like diabetes, HIV/AIDS,

or corticosteroids, can increase the likelihood of UTIs. Any blockage in the urinary tract, such as kidney stones or an enlarged prostate in men, can prevent the bladder from completely emptying, providing an environment for bacteria to grow [13]. Inability to fully empty the bladder can lead to stagnant urine, which fosters bacterial growth. Congenital abnormalities in the urinary tract, such as vesicoureteral reflux (a condition where urine flows backward from the bladder to the kidneys), can elevate the risk of UTIs. Hormonal fluctuations during pregnancy and menopause can alter vaginal flora, making women more susceptible to UTIs [14].

1.3 Relationship among hydration, hygiene practices, and dietary changes on Urinary Tract Infection (UTI)

Urinary Tract Infections (UTIs) are a common health issue, particularly among women. The risk of developing a UTI can be influenced by various factors, including hydration, hygiene practices, and dietary changes [15]. Here is a detailed explanation of how these factors interplay:

1. Hydration

Importance:

Adequate hydration helps flush out bacteria from the urinary tract, reducing the risk of infection. Drinking plenty of water increases urine output, which can help clear bacteria from the bladder and urethra.

Recommendations:

Drink at least 8 glasses (around 2 liters) of water daily. Increase fluid intake if physically active or living in a hot climate [16].

2. Hygiene Practices

Personal Hygiene:

Wiping from front to back after using the toilet helps prevent bacteria from the anal area from entering the urethra.

Avoiding the use of harsh soaps, douches, and feminine sprays that can irritate the urethra and disrupt the normal vaginal flora [17].

Sexual Hygiene:

Urinating before and after sexual activity helps clear the urethra of any bacteria introduced during intercourse.

Ensuring both partners maintain good genital hygiene can reduce the transfer of bacteria.

Clothing:

Wearing cotton underwear and avoiding tight-fitting clothes can help keep the genital area dry and reduce the risk of bacterial growth [18].

3. Dietary Changes

Foods to Include:

Cranberry Juice: Contains compounds that prevent bacteria from adhering to the walls of the urinary tract.

Probiotics: Found in yogurt and other fermented foods, probiotics can help maintain a healthy balance of bacteria in the gut and urinary tract.

High-fiber Foods: Vegetables, fruits, and whole grains can help prevent constipation, which can otherwise contribute to UTI risk [19].

Foods to Avoid:

Caffeine and Alcohol: These can irritate the bladder and exacerbate UTI symptoms.

Spicy Foods: Can also irritate the bladder.

Sugary Foods: High sugar intake can promote the growth of bacteria.

Interrelationship of Hydration, Hygiene, and Diet

Hydration and Hygiene: Adequate hydration supports good hygiene by ensuring regular urination, which helps flush out bacteria [20].

Hygiene and Diet: A diet rich in probiotics and high-fiber foods supports a healthy balance of bacteria in the gut and urinary tract, complementing good hygiene practices to prevent infections.

Hydration and Diet: Drinking fluids, especially those like cranberry juice, can have dual benefits by hydrating and providing specific compounds that prevent bacterial adherence [21].

Preventative Strategies

Regular Hydration:

Set reminders to drink water throughout the day. Carry a water bottle to ensure constant access to fluids.

Maintain Good Hygiene:

Practice good toilet and sexual hygiene. Wear appropriate clothing to reduce moisture buildup [22].

Balanced Diet:

Incorporate foods that support urinary tract health. Avoid irritants that can exacerbate UTI symptoms.

Chapter 2

Literature Review

2.1 Literature Review

❖ Analysis 1

Menstrual hygiene management (MHM) practices differ due to various factors such as socioeconomic status, personal preferences, local customs and beliefs, and access to sanitary facilities and clean water. For women and girls in less privileged environments, MHM practices can be particularly challenging and unhygienic. Unsanitary MHM practices can increase the risk of urogenital infections, including bacterial vaginosis (BV) and urinary tract infections (UTIs). The aim of the study was to explore the relationship between MHM practices and urogenital infections, considering environmental variables. A syndromic approach was used to identify cases and controls. Participants provided vaginal swabs to assess the risk of BV based on Amsel's criteria, and urine samples were cultured to determine the presence of UTIs. Initiatives that ensure women have access to private spaces with running water for MHM and educate them about safer, affordable MHM products may help reduce the incidence of urogenital infections. Further research is needed to evaluate the effectiveness of specific management strategies for reusable pads and other hazardous menstrual health disorders [19].

❖ Analysis 2

Despite the frequent inclusion of small health actions and habits in nursing and medical literature as potential causes for urinary tract infections (UTIs) in women, they have not been extensively researched. In a case-control study, we explored the relationships between UTIs and several commonly cited risk factors, including eating habits, clothing, soap use, and urination habits. We evaluated how health-related behaviors and practices contribute to the increased risk of UTIs linked to diaphragm use and sexual activity. First-time UTI patients were compared with controls who had never experienced a UTI, and second-time UTI patients were compared with first-time UTI patients. This study, which included 181 controls, 19 secondary cases, and 25 primary cases from a university health center, revealed that consuming soft drinks and using tampons were significantly associated ($RR = 1.4$) with both initial and recurrent UTIs. While some other practices showed weaker associations with UTIs, these habits, when combined, may considerably increase the risk of developing a first-time or recurrent UTI [20].

❖ Analysis 3

Urinary tract infections (UTIs) are triggered by bacteria present in feces, and dietary choices can affect the characteristics of the fecal bacterial flora, potentially influencing the risk of developing a UTI. We conducted a case-control study among fertile women to investigate the nutritional status and other risk factors associated with UTIs. The study compared 185 women of similar age who had not experienced an acute UTI in the past five years with 139 women (average age: 30.5 years) who were employed at a university hospital or a student health center. A questionnaire was used to gather information about the women's dietary habits and other lifestyle practices [21].

Chapter 3

Purpose of the study

3.1 Purpose of this investigation

- To assess the prevalence of Urinary Tract Infections (UTIs).
- To investigate the daily life hygiene practices of UTI patients.
- To examine the dietary habits of UTI patients.
- To determine the correlation between daily life hygiene practices and UTI occurrence.
- To explore the relationship between dietary habits and UTI incidence.

Chapter 4

Materials and Methods

4. Methodology

➡ I have started work for this survey in February 2024.



Questionnaire design
and preparation



Data Collection



Data processing

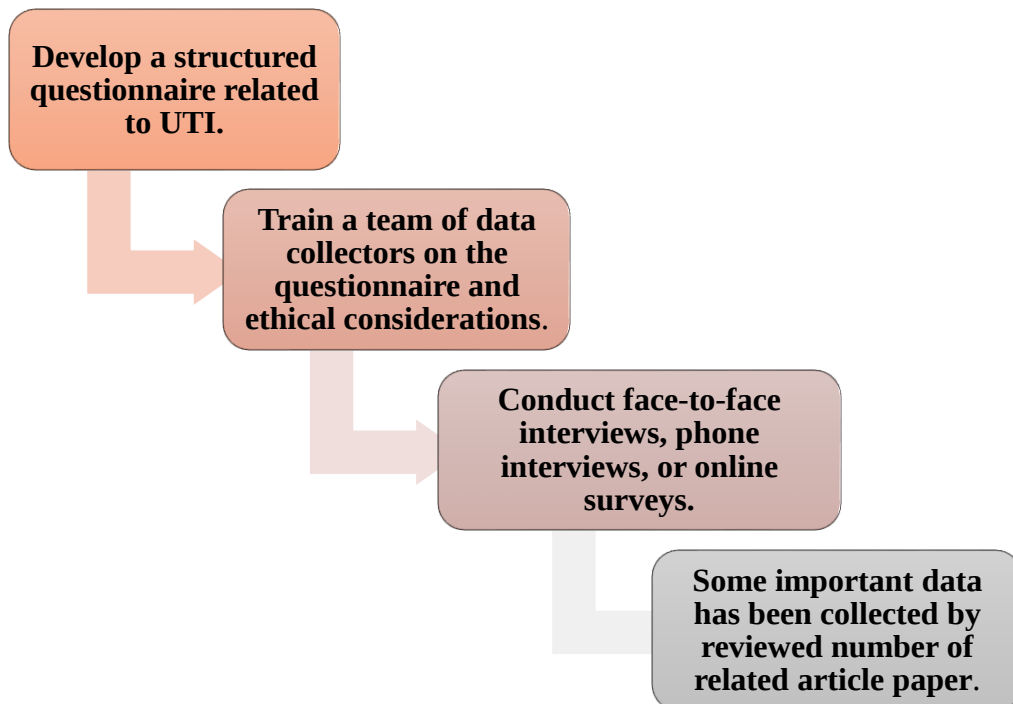


Documentation

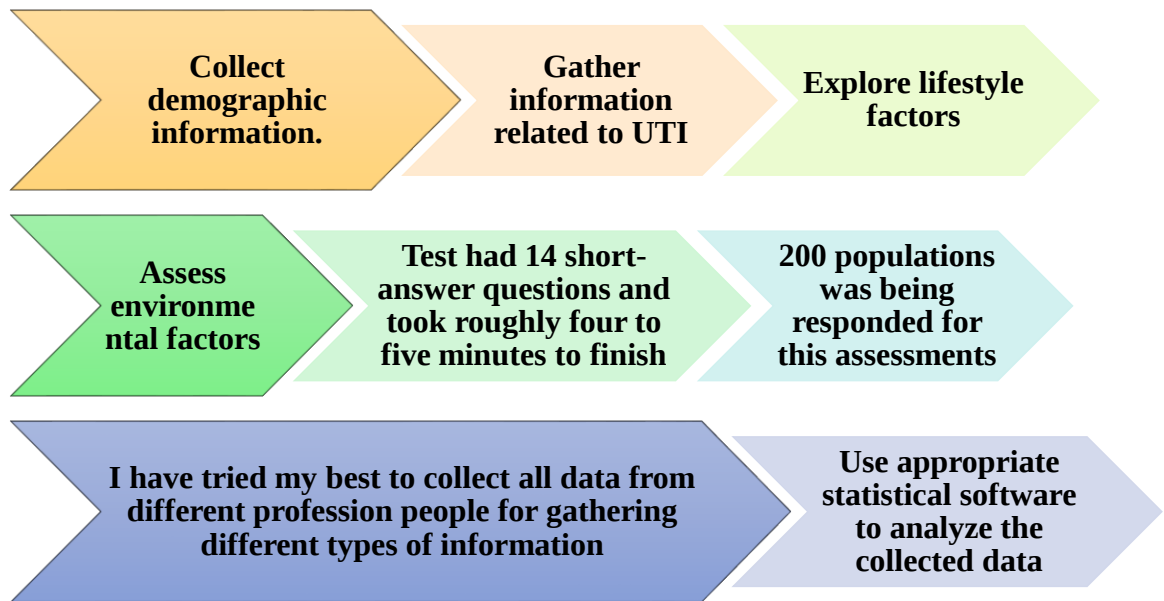


Outcome

4.2 Data Collection



4.2 Data Variables & Analysis process



Chapter 5

Result & Discussion

5.1 Age of responders

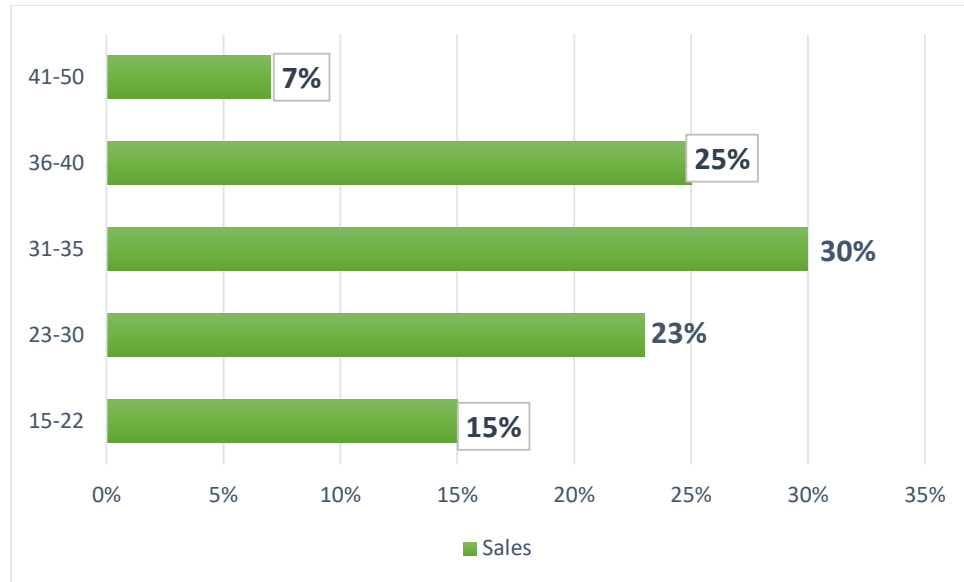


Figure 2: Age of responders

Discussion: Different age demographics have engaged with the evaluation conducted in this investigation. The participants' age span encompassed individuals between 31 and 35 years old. Among these, 25% fell within the age bracket of 36 to 40, while 15% were aged between 15 and 22.

5.2 Gender of participants

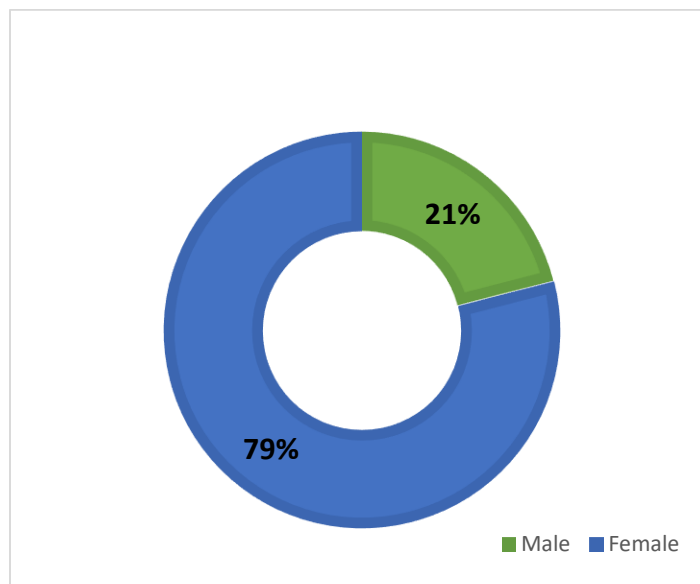


Figure 3: Gender of participants

Discussion: Figure 3 exhibits a snapshot of the demographic information of the participants. The majority, comprising 79%, are female, while 21% are male. It is commonly observed that women are more susceptible to urinary tract infections (UTIs) in most circumstances.

5.3 Professional status of responders

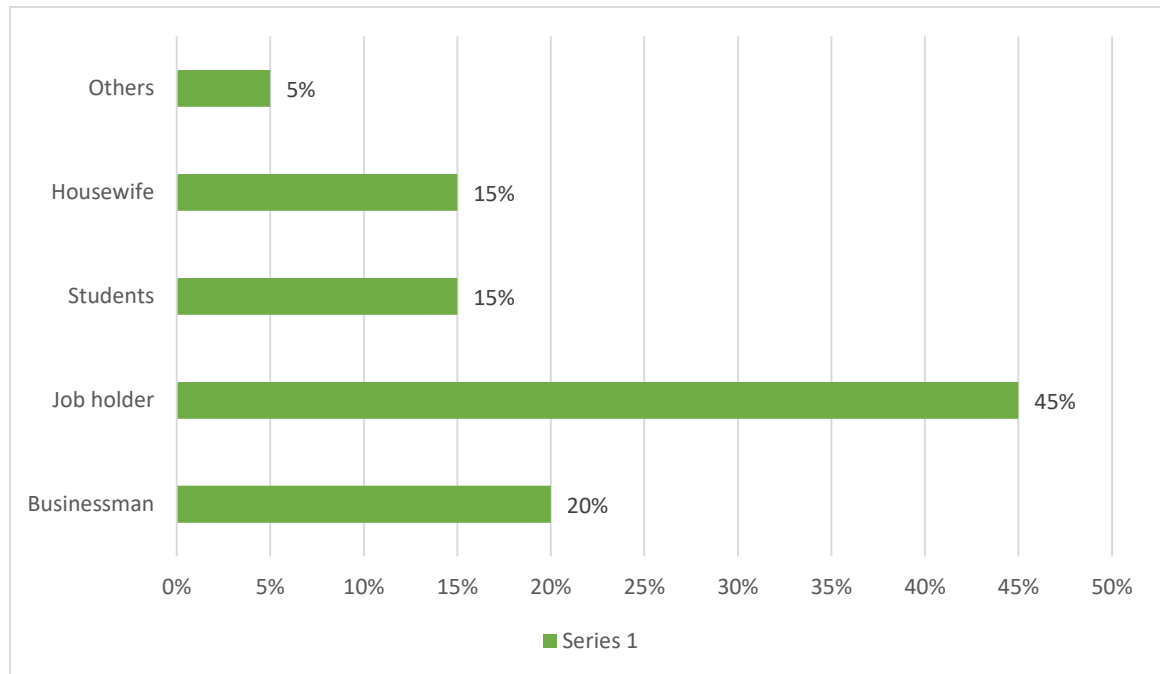


Figure 4: Professional status

Discussion: Different professional personnel has been chosen for this survey. According to figure 5 most of the participants are Job holder (45%), also 20% are businessman.

5.4 Rate of urination

Q: How often do you usually urinate between waking up in the morning and going to bed at night?

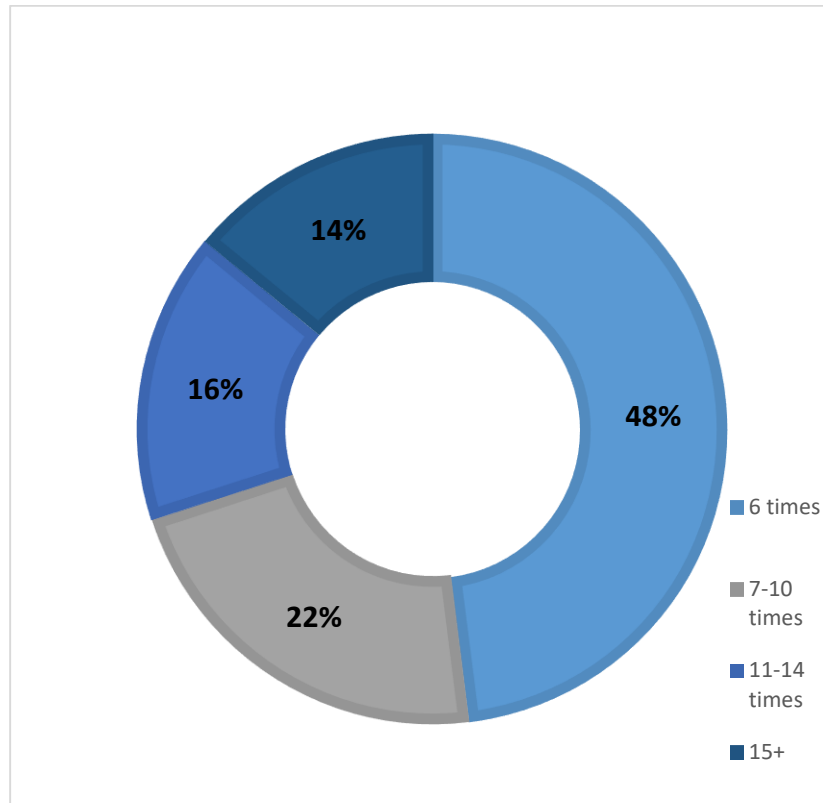


Figure 5: Incidence of urination rate

Interpretation: Frequent urination is a prevalent symptom among those with UTIs. According to the study, most patients (48%) reported urinating six times from morning to night, while 22% of participants mentioned urinating between 7-10 times during the same period.

5.5 Hygienity to prevent UTIs

Q: Have you maintained proper hygiene to prevent UTIs?

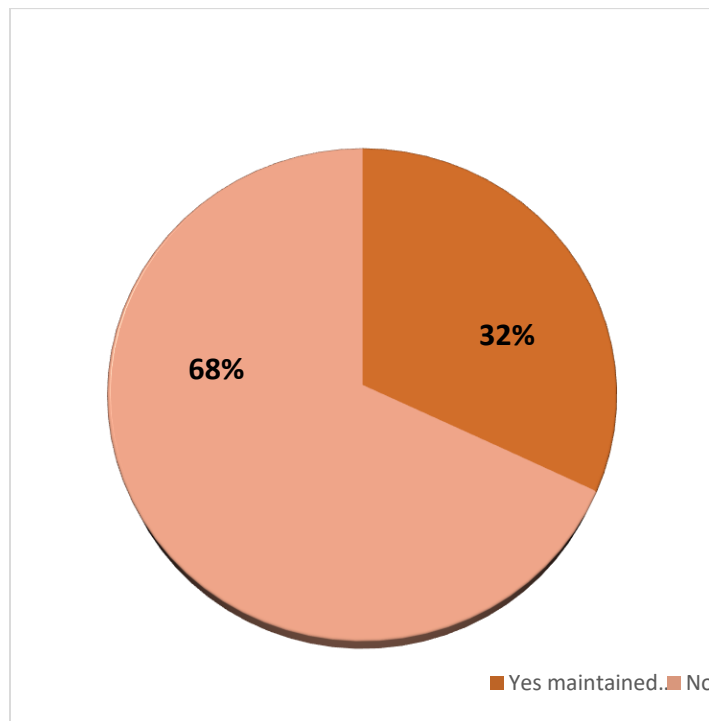


Figure 6: Hygienity to prevent UTIs

Discussion: Urinary tract infections (UTIs) are common, but there are several hygienic practices that can help prevent them. 32% responders replied that they have been maintained proper hygienity to prevent urinary tract infection (UTIs).

5.6 Regularity of urination at sleeping time

Q: How many times do you usually need to urinate between the time you go to bed at night and the time you wake up in the morning?

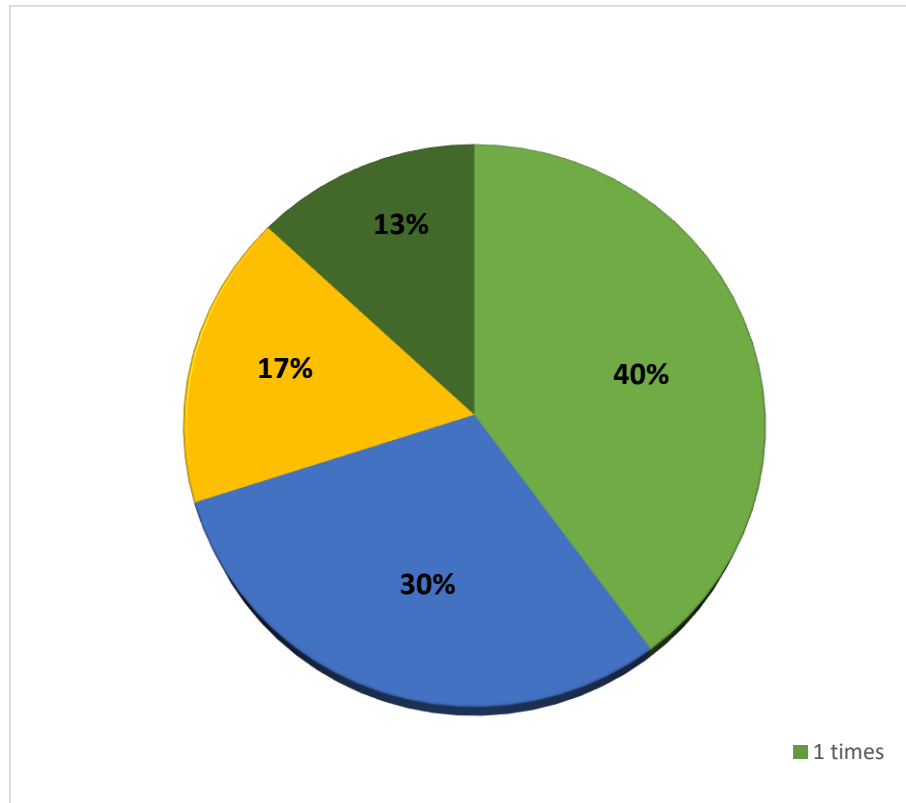


Figure 7: Regularity of urination at sleeping time

Explanation: Individuals with UTIs often experience nocturia, or increased nighttime urination. According to the analysis, 40% of UTI patients reported urinating twice between midnight and dawn. Additionally, 30% of participants stated they urinated once during the night and again upon waking in the morning.

5.7 Draining body-hugging fitted garments through your menstruation cycle

Q: Do you know wearing tight-fitted clothes during your menstruation cycle can lead to bacterial growth in the urinary tract?

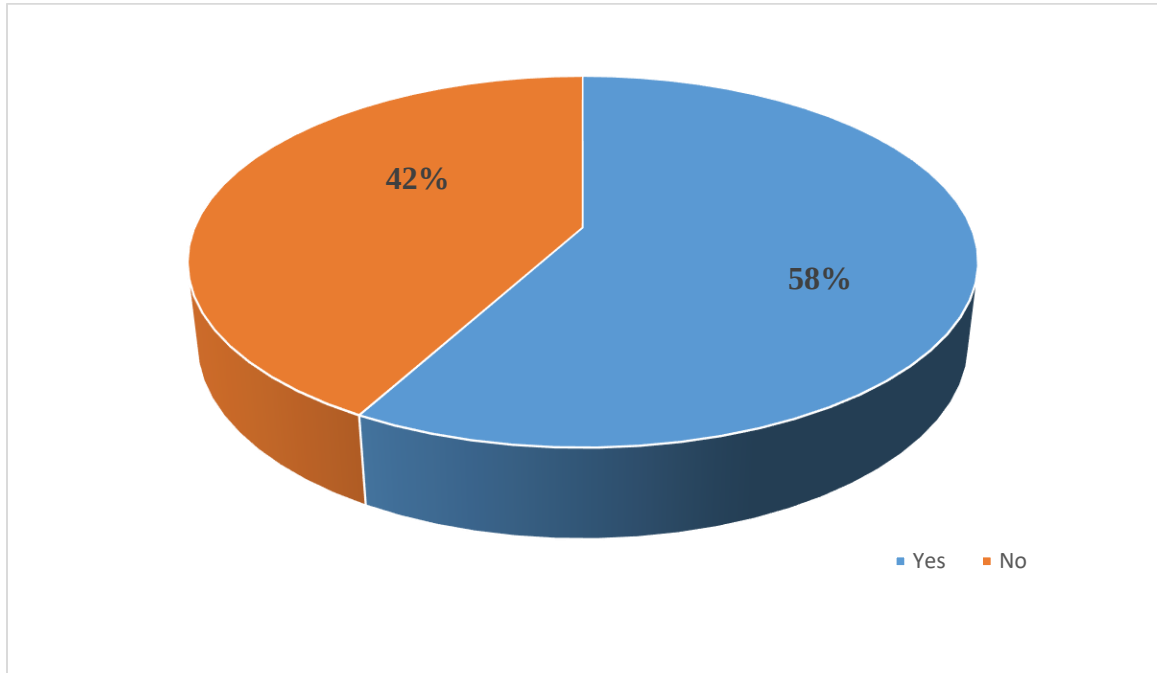


Figure 8: Wearing tight-fitted clothes during your menstruation cycle

Explanation: Maintaining good personal hygiene during menstruation can help prevent urinary tract infections. It's recommended to avoid very tight clothing during your period and choose more comfortable attire instead. Among those surveyed, 58% recognized this advice. However, 42% of respondents were unaware of the link between wearing tight clothing during menstruation and the increased risk of bacterial growth in the urinary tract.

5.8 Genital skin disease rate

Q: Do you have any genital skin disease?

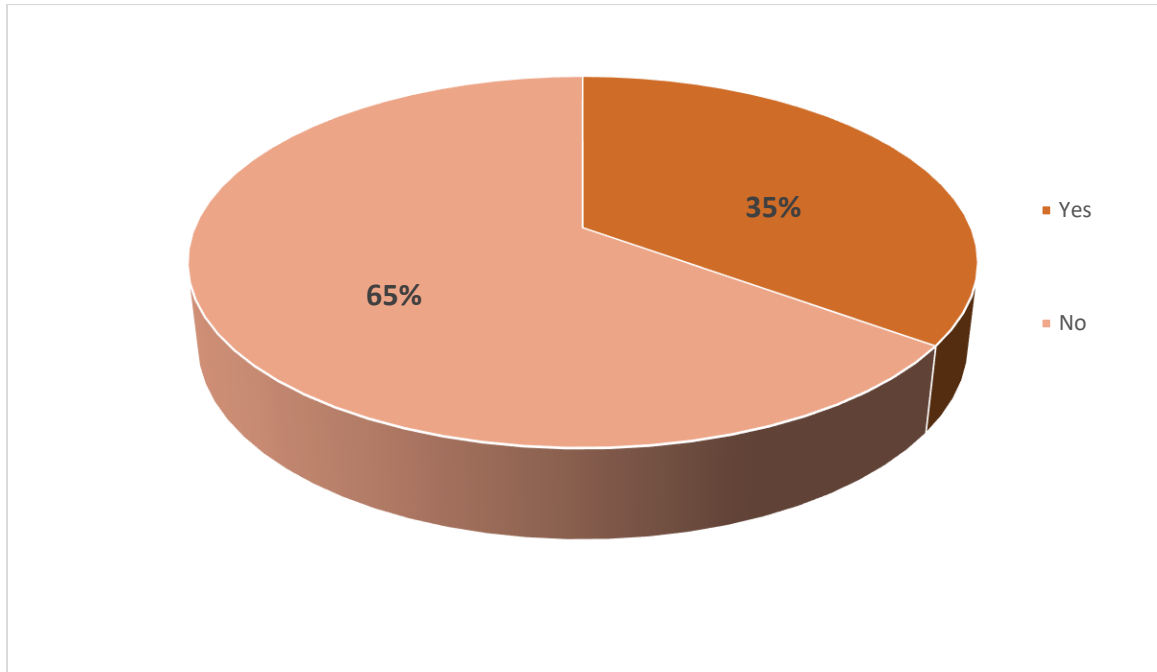


Figure 9: Genital skin disease rate

Explanation: Bacteria enter the urinary system through the urethra, leading to recurrent urinary tract infections (UTIs). Usually, these microorganisms originate from the rectum or skin. In the study, 35% of participants reported having genital skin conditions, while 65% did not.

5.9 Diagnosis of UTI

Q: Which diagnostic tools recommend for diagnosing UTI?

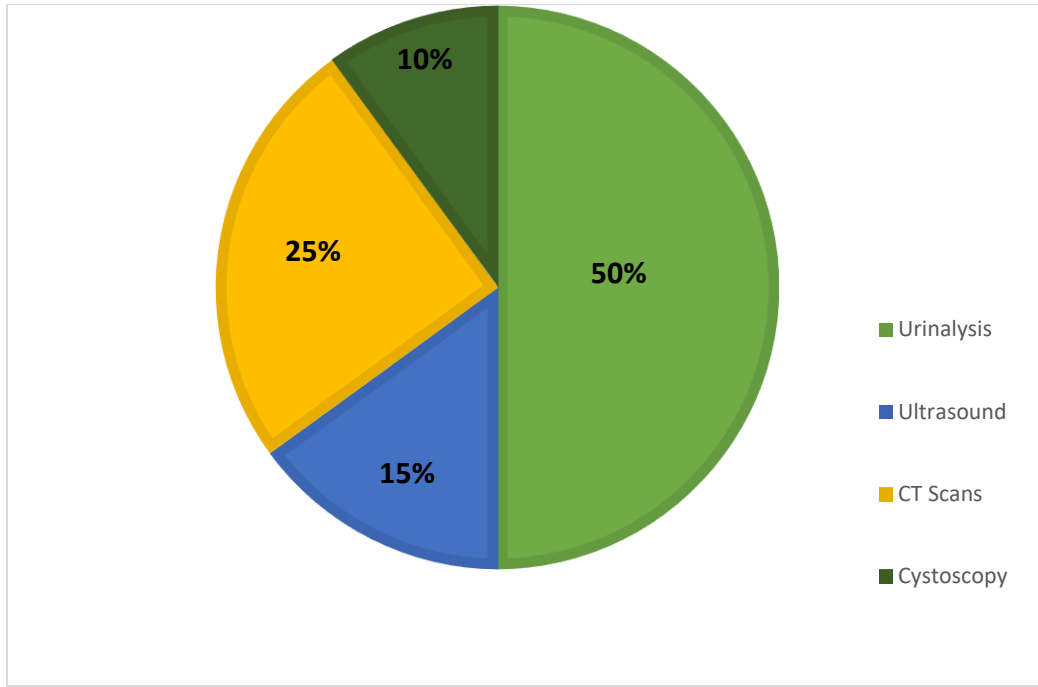


Figure 10: Diagnosis of UTI

Interpretation: The majority of respondents (50%) said in the pie chart that their doctor had recommended urine analysis, followed by ultrasound with 15% and CT scan with 25% for urinary tract infection diagnosis.

5.10 Common complications associated with untreated UTI

Q: What are the most common complications associated with untreated UTI that you have observed?

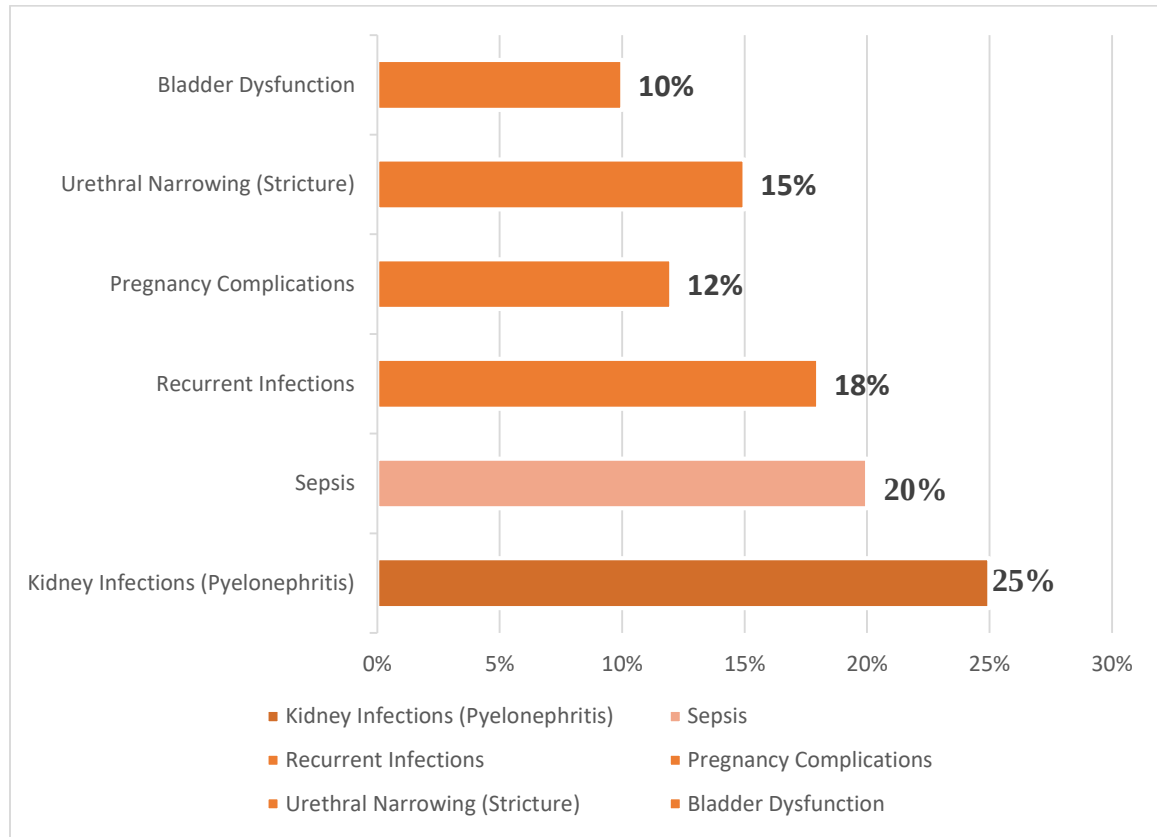


Figure 11: Common complications associated with untreated UTI

Interpretation:

In the survey, 25% of participants indicated that kidney infections (pyelonephritis) are the most common complication associated with untreated UTIs. Additionally, 20% of respondents mentioned sepsis, 18% cited recurrent infections, and 12% identified pregnancy complications as the most common issue arising from untreated UTIs.

5.11 Symptoms of urinary tract infection

Q: What kind of symptoms have you experienced?

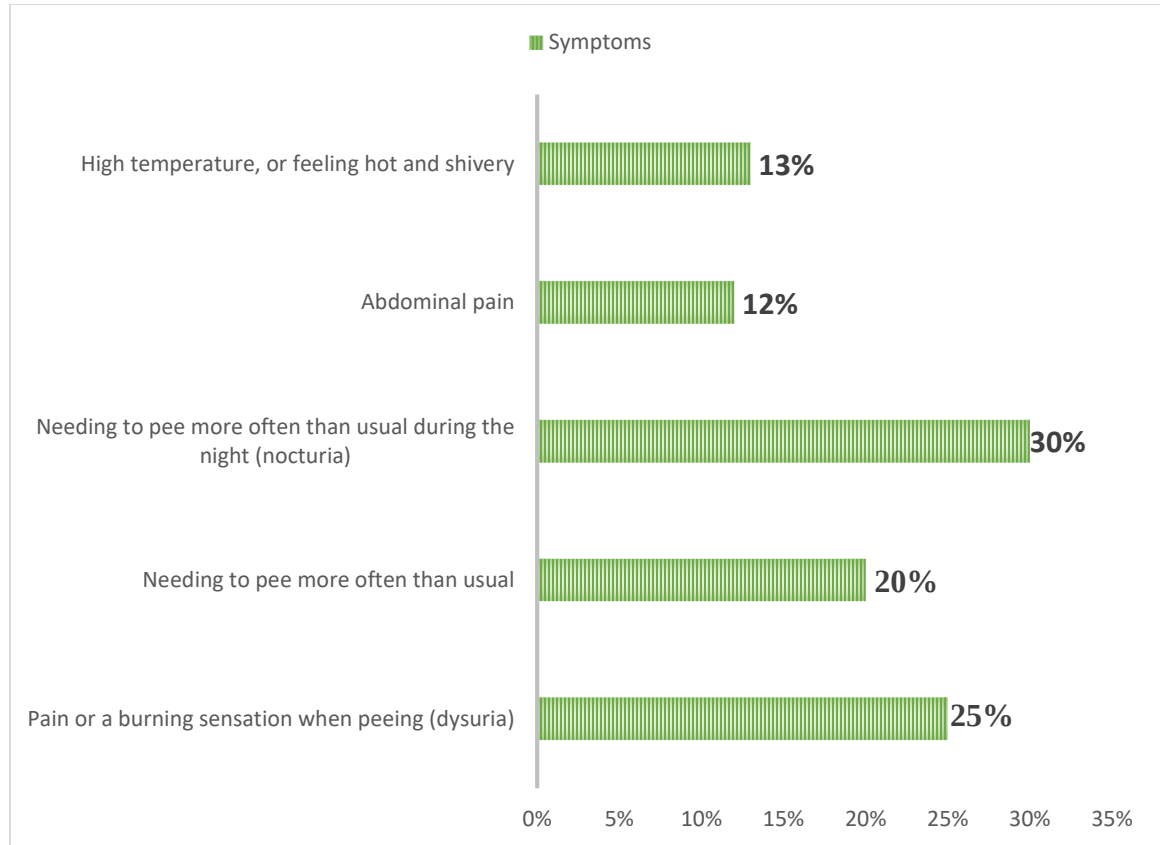


Figure 12: Symptoms of urinary tract infection

Interpretation: According to this survey, 30% responders replied that they have been experienced needing to pee more often than usual during the night (nocturia). Moreover, 25% retorted that pain or a burning sensation when peeing (dysuria), 20% replied that needing to pee more often than usual & 13% replied that high temperature, or feeling hot and shivery.

5.12 Medication did the doctor offer for urinary tract infection

Q: What medication did the doctor prescribe for the urinary tract infection?

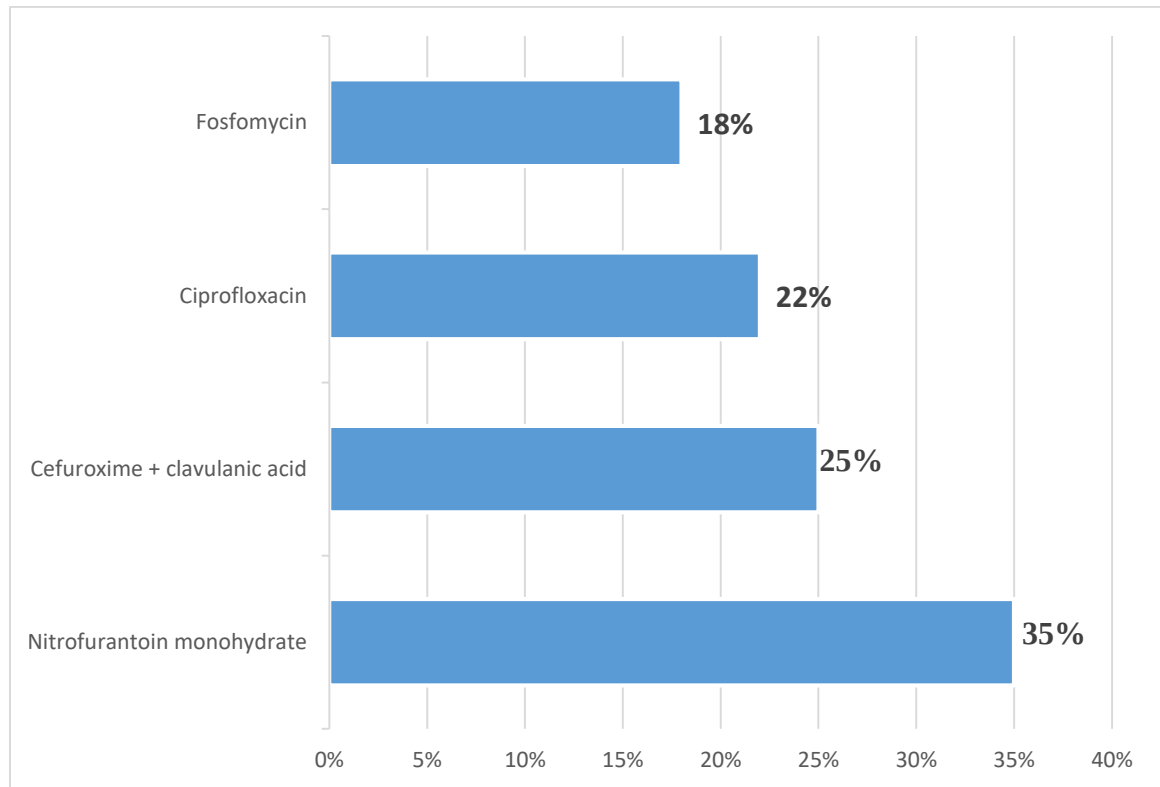


Figure 13: Medication did the doctor offer for urinary tract infection

Interpretation: As a result of bacterial infection, antibiotics were prescribed by healthcare providers. The study revealed that doctors have been prescribing a range of antibiotics. Specifically, 35% of respondents mentioned using nitrofurantoin monohydrate, while 25% reported taking a combination of cefuroxime and clavulanic acid.

5.13 Proper hygienity after sexual intercourse

Q: Have you maintain proper hygienity before & after sexual intercourse?

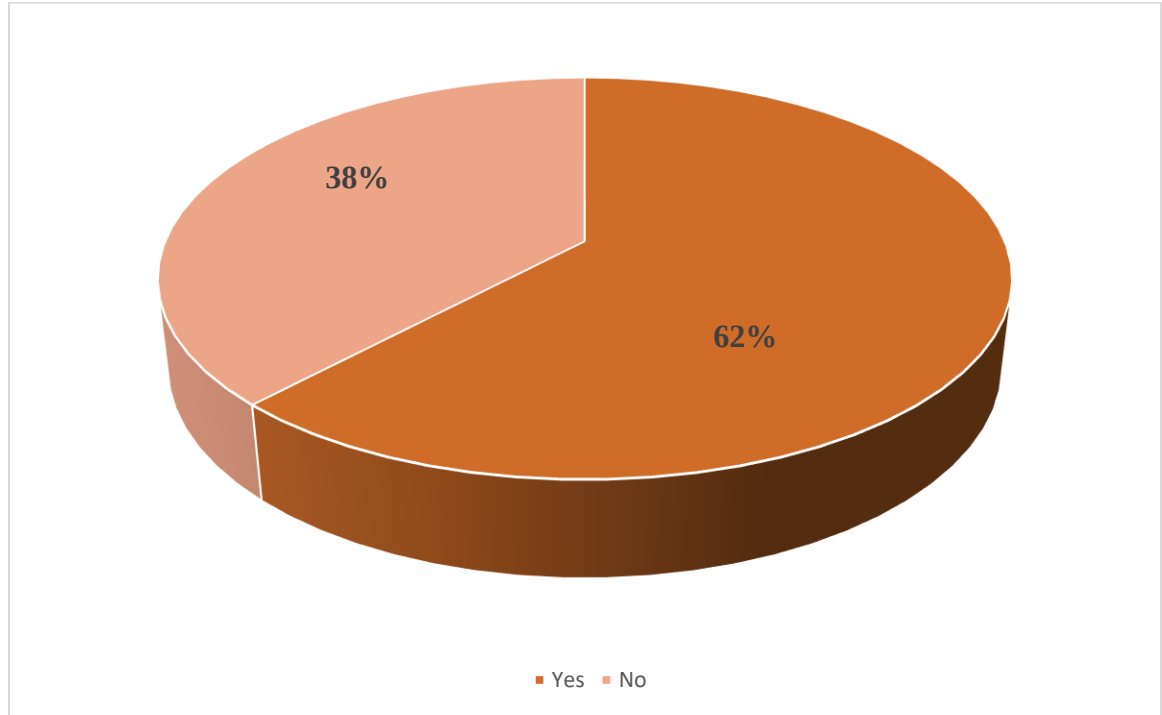


Figure 14: Proper hygienity after sexual intercourse

Interpretation: Removing bacteria from the bladder after intercourse can lower UTI risks. Some healthcare providers recommend urinating before sex to reduce UTI chances. Additionally, washing with warm water before sexual activity, especially for women, may decrease bacteria entering the urethra. According to the survey, 38% of patients were educated about crucial hygiene practices before and after sex, while the majority (62%) were unaware of these precautions.

Chapter 6

Conclusion

6. Conclusion

In summary, the study conducted at Dhaka Medical College and Hospital regarding the connection between daily hygiene practices and dietary habits among UTI patients has yielded valuable insights into the factors influencing UTI occurrences. The research underscores the significance of maintaining good hygiene practices and adopting a balanced diet to mitigate the risk of UTIs. The findings emphasize that adhering to proper hygiene routines significantly reduces the incidence of UTIs, highlighting the crucial role of cleanliness in preventing the spread of infectious agents. Additionally, the study advocates for a comprehensive approach to personal hygiene, including proper hand washing, genital care, and maintaining a clean living environment, as essential in UTI prevention. Regarding specific findings, a considerable portion of participants lacked awareness regarding the potential risks of wearing tight-fitted clothes during menstruation, which can lead to bacterial growth in the urinary tract. Additionally, a significant percentage of respondents reported genital skin diseases. However, a majority stated regular showering habits, which is encouraged for everyone. Furthermore, a notable portion reported incorporating probiotics and fermented foods into their diets, and a significant number mentioned consuming fruits like oranges during UTI episodes. Finally, the survey highlighted the diverse antibiotics prescribed by doctors for UTI treatment, with nitrofurantoin monohydrate and the combination of Cefuroxime and clavulanic acid being the most commonly mentioned.

Chapter 7

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