Original Research Article

EPIDEMIOLOGICAL PROFILE OF URINARY INFECTION IN WOMEN MEDICAL STUDENTS

ABSTRACT

Introduction: Urinary tract infection is an infection that occurs due to the ascension of bacteria from the perianal region to the urinary tract. The most affected population is female, due to anatomical factors and lifestyle habits that may predispose individuals to this infection.
Aim: The objective of this study is to outline the epidemiological profile of urinary infections in female medical students.
Methodology: A urine culture was performed on 41 urine samples from medical students. These women responded to a questionnaire addressing lifestyle habits that could promote urinary infections.
Results: All urine cultures were negative. 70.7% of the samples showed microbial contamination with the growth of more than one type of bacteria. Through the descriptive analysis of the questionnaire, it was observed that medical students have lifestyle habits that prevent urinary tract infections, such as: emptying the bladder frequently, having adequate water intake, cleaning the perianal region after sexual intercourse, avoiding the indiscriminate use of antibiotics, and not showing classic signs of infection on the day of sample collection.
Conclusion: It is believed that, due to the high level of education of medical students, they have greater knowledge regarding lifestyle habits that can help them avoid urinary infections, thus preventing the proliferation of uropathogenic bacteria. However, a high rate of contamination of urine samples received for urine culture was observed.

Keywords: Cystitis; Urinary infection; medical students.

1. INTRODUCTION

Urinary tract infection is a condition that begins with the uncontrolled proliferation of microorganisms from the urogenital microbiota, which ascend to the urinary tract—mainly the bladder—causing local and, in more severe cases, systemic infection when they migrate to the kidneys [1].
The population most affected is female, due to anatomical factors and lifestyle habits. The perianal region in women is narrower than in men, which facilitates the migration of bacteria from the anus to the vulvar and vaginal regions. The habit of bladder retention and low daily water intake are some of the factors that lead to the occurrence of infection [2].
In approximately 80% of cases of urinary tract infection, *Escherichia coli*, a gram-negative bacterium from the Enterobacteriaceae family, is the causative agent [3]. Normally, *E. coli* is harmless to the human body; however, the indiscriminate use of antimicrobials has led to bacterial resistance. This occurs when the microorganism continues to proliferate even in the presence of drugs that should inhibit this process. One of the mechanisms bacteria use to circumvent the action of the drug is the production and release of extended-spectrum beta-lactamases [2, 3].

UNDER PEER REVIEW

Despite advancements in medicine and research aimed at improving the population's quality of life, harmful habits and the overuse of medications contribute to the prevalence of preventable diseases. This is why it is important to conduct cross-sectional epidemiological studies, such as this one, which highlight the prevalence of pathologies that have become public health problems and result in high costs to government resources [4].
In this sense, the objective of this study is to outline the epidemiological profile of urinary infections in female medical students.

2. METHODOLOGY

The present study was approved by CEP/UNIRG under CAAE number: 69635523.3.0000.5518 on 05/29/2023. Urine samples were collected from medical students at the University of Gurupi UNIRG in the year 2023. The samples were subjected to urine culture analysis at the University's Microbiology Laboratory. The participants completed a questionnaire regarding lifestyle habits that may predispose them to urinary tract infections.
The women were instructed regarding adequate urine collection. The urine samples were received in the morning at the Microbiology Laboratory of the UNIRG University for subsequent laboratory processing.
Urine was inoculated onto CLED agar (Cystine Lactose Electrolyte Deficient Agar) and incubated at 36°C for 24h. Colonies grown on CLED agar were counted and multiplied by the relative volume of the platinum loop, thus obtaining the number of colonies/mL of urine. Samples with a colony count greater than 10^5 CFU/mL (Colony Forming Units) of urine were considered indicative of infection.

3. RESULTS AND DISCUSSION

Forty-one urine samples were collected and analyzed. None had a colony count greater than 10^5 CFU/mL of urine; therefore, no medical student had a urinary infection on the day of collection.
Twelve urine samples showed no bacterial growth on CLED Agar (29.3%). More than 70% of the samples showed colony counts of up to 10^4 CFU/mL, with the presence of two or three different types of bacteria, indicating contamination during sample collection.

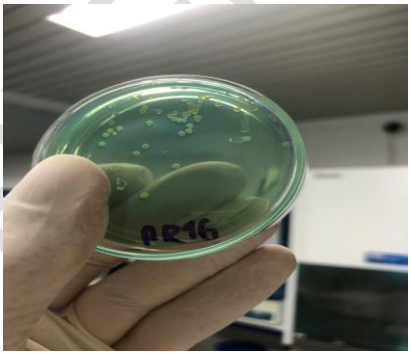

Figure 1: Bacterial growth on CLED Agar.

Table 1. Epidemiological characteristics of the women investigated.

VARIABLES		*n*	*%*
Age	17 – 20 years	17	41,4%
	21 – 25 years old	18	43,9%
	26 – 30 years	2	4,8%
	31 – 34 years old	4	9,7%
Course period	Basic cycle	36	87,8%

UNDER PEER REVIEW

	Clinical cycle	5	12,2%
Daily water consumption	Up to 1 liter	6	14,6%
	2 liters	19	46,3%
	3 liters	12	29,2%
	4 liters	4	9,7%
Bladder retention	Yes	12	29,2%
	No	29	70,7%
Emptying frequency/day	Up to 3 times	2	4,8%
	4 to 6 times	17	41,4%
	More than 6 times	22	53,6%
Avoid drinking liquids during classes	Yes	12	29,2%
	No	29	70,7%

In Table 1, we observed that most of the medical students were young adult women (43.9%), and the majority (87.8%) were enrolled in the basic medical cycle. A large proportion (46.3%) reported consuming an average of 2 liters of water daily, which contributes to a healthy daily water intake. Additionally, 70.7% of the students indicated that they do not retain urine, a behavior that promotes the elimination of bacteria from the urinary system, and stated that they empty their bladder up to six times a day. Furthermore, 70.7% of students also reported that they do not avoid drinking liquids during class time.

Table 2. Hygiene habits that may predispose to UTIs.

VARIABLES		*n*	*%*
Hygiene after defecation	Yes	24	58,5%
	No	17	41,5%
Use of vaginal douche	Yes	12	29,2%
	No	29	70,3%
Use of toilet paper	Yes	37	90,2%
	No	4	9,7%
Cleaning after sexual intercourse	Yes	34	83%
	No	7	17%
Urine after sexual intercourse	Yes	36	87,8%
	No	5	12,2%
Perform anal sex followed by vaginal sex	Yes	2	4,9%
	No	39	95,1%

Of the variables analyzed, 58.5% reported cleaning their genitals after defecation, 87.8% urinated after sexual intercourse, and 95.1% reported not engaging in anal sex followed by vaginal sex. Although there is no strong evidence, the European Society of Urology recommends hygiene after defecation, post-coital urination, and avoiding anal sex followed by vaginal sex. Thus, behavioral strategies may help reduce the prevalence of urinary tract infections in women [5].
Of those interviewed, 29.2% reported using a vaginal douche. In a cross-sectional study by Marconi et al. it was observed that vaginal douching is associated with a depletion of the vaginal microbiome, particularly a reduction in the presence of *Lactobacillus* sp., making the region more vulnerable to various infections, including urinary tract infections [6].
In this study, 90.2% of the students say they use toilet paper after urinating. Recurrent incorrect use of this product may be one of the risk factors for the occurrence of urinary tract infections. Araújo *et al.*, observed in a literature review that the best way to clean the vulva using toilet paper is in the anteroposterior direction, or, even better, with soap and water. This makes it difficult for uropathogenic bacteria to migrate to the vulvar region. In addition, Araújo *et al.*, also observed that excessive cleaning of this region can become harmful, leading to urinary infections, given that, in excess, cleaning changes the pH and makes the region susceptible to bacterial invasion [7].

Table 3. Clinical characteristics that may predispose to UTIs.

VARIABLES		*n*	*%*
Has pathology in the urinary system	Yes	2	4,9%
	No	39	95,1%
Was taking antibiotics	Yes	1	97,6%
	No	40	2,4%
Recurrent infection	Yes	19	46,3%
	No	22	53,7%
Dysuria in the last 12 months	Yes	7	17%
	No	34	83%
Polaciúria in the last 12 months	Yes	11	26,8%
	No	30	73,2%
Urgent urination in the last 12 months	Yes	10	24,4%
	No	31	75,6%
Terminal hematuria in the last 12 months	Yes	1	2,4%
	No	40	97,6%
Abdominal pain in the last 12 months	Yes	26	63,4%
	No	15	36,6%
Flank pain in the last 12 months	Yes	9	22%
	No	32	78%

During the application of the questionnaires, the interviewees were asked whether they had any previously diagnosed pathology of the urinary system, to which 95.1% stated that they did not. In a master's thesis by Spínola, the relationship between the incidence of anatomical anomalies of the urinary system and complicated and recurrent infections was observed, identifying these anomalies as a risk factor for urinary tract infections [8].

Of the total number of students questioned, 97.6% responded that they were not using any type of antibiotic, whether prescribed or non-prescribed. Fonseca et al. published a study in which the relationship between antibiotic resistance and the vaginal microbiota was observed in women who had had a urinary tract infection at least once in their lives. During the research, it was found that 31% of women are sensitive to the first-choice medication, which, according to the Brazilian Federation of Gynecology and Obstetrics (FEBRASGO), is nitrofurantoin. In contrast, rarely prescribed medications, such as ertapenem, showed 96% sensitivity in the samples analyzed. Worryingly, 17% of the samples showed the release of extended-spectrum beta-lactamases in phenotypic tests, thus exposing the presence of uropathogenic bacteria with antimicrobial resistance, especially modified E. coli [9, 10].

Concerning recurrent infections, 46.3% responded that they have or have had a urinary tract infection more than once. According to a study by Nunes, the incidence of recurrent urinary tract infections, which may be caused by genetic factors that predispose individuals to the condition, or by inappropriate habits that increase the incidence of the disease, is evident [11].

Regarding classic symptoms of urinary tract infections in women, medical students reported that, for the most part, they rarely experience them on a recurring basis. However, 63.4% of medical students reported experiencing abdominal pain in the last 12 months, which can be attributed to dysmenorrhea, as this is a population of childbearing age. According to a study by Zanella et al., 40 to 90% of women of childbearing age are affected by this condition [12].

4.CONCLUSION

In conclusion, based on the results, medical students, who belong to a highly educated group, are more knowledgeable about habits that can help prevent urinary infections, such as adequate daily water intake, regular bladder emptying, and proper and consistent cleaning of the perianal region, all of which help prevent the proliferation of uropathogenic bacteria.

However, despite their high level of education, there was a lack of knowledge regarding urine collection, as a high contamination rate was observed in the analyzed urine cultures. Therefore, clinicians' guidance is essential when instructing patients on how to properly collect a urine sample for culture.

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UNDER PEER REVIEW

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