

CYSTITIS IN YOUNG WOMEN: A LITERATURE REVIEW <https://doi.org/10.56238/sevened2024.030-014>**Hamilton Batista de Matos Junior¹, Anna Jullia Guedes de Miranda², Gabriel Gonçalves Durão³ and Karine Queiroz Poletto⁴****ABSTRACT**

Introduction: Urinary tract infection (UTI) is a very prevalent disease, with high occurrence in women, affecting the urethra, bladder, ureters and kidneys, and may manifest due to the invasion of exogenous bacteria or the proliferation of microbiota from the digestive tract.

Objective: to present the latest updates on the topic of cystitis in young women.

Methodology: this is an integrative literature review, whose articles were identified through a search in the digital libraries Medical Publications (PubMed), Scientific Electronic Library Online (SciELO) and Google Scholar during the first half of 2024. **Results:** 13 studies published between 2012 and 2022 were selected to continue the study. **Conclusion:** despite the high incidence of the disease, studies on the etiology and treatment of UTI are quite concise. What has been shown new are the prophylactic methods that have been studied, however, there is still a lack of their long-term benefits.

Keywords: Cystitis. Urinary tract infections. Women.

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INTRODUCTION

Urinary tract infection (UTI) is a very prevalent disease, with a high occurrence in women, affecting the urethra, bladder, ureters and kidneys. The reason why the incidence is higher in females is mainly due to anatomical issues, such as a shorter urethra and the short distance between the anus and the urethral meatus (LAZARROTO, 2012). This provides an easy translocation of the bacteria present in the anal region to the urethral region. In addition, improper water intake may be associated with the onset of UTI. According to Nerbass *et al.* (2021), carried out an experiment with nursing technicians from a health center, and concluded that professionals who reported low water intake had a higher prevalence of cystitis compared to those who ingested the appropriate amount of water.

UTI can manifest itself due to the invasion of exogenous bacteria or the proliferation of the microbiota from the digestive tract, the latter being the most common to occur (HADDAD, FERNANDES, 2019). *Escherichia coli*, a normal bacterium of the human gut microbiota, is the most common cause of UTI, accounting for up to 85% of infections (SAMPAIO *et al.*, 2022). Other pathogens may also be present and responsible for the infection, such as *Staphylococcus saprophyticus*, *Klebsiella pneumoniae*, and *Proteus mirabilis*, which account for 4% of acute cystitis infections (HADDAD, FERNANDES, 2019).

Gram-negative Escherichia coli bacteria are microorganisms that do not have the ability to survive and/or multiply outside their natural environment. However, some of these bacteria may have strains with high virulence power, leading to the pathogenesis of the disease, which are called uropathogenic *E. coli* (UPEC). For its permanence and proliferation in the urinary tract, *E. coli* has fimbriae, polysaccharide capsule, iron acquisition systems, and secretes toxins. The fimbriae are used to attach to the bladder epithelium, in this way, a process of vacuolization of the bacteria inside the cell occurs. The colony can be protected from the host's immunity, and thus ascend to the kidneys (SILVA, 2022).

Complicated and uncomplicated, it is a way of classifying this type of infection according to prognosis. It is said to be uncomplicated UTI when it occurs in young, non-pregnant women and in the absence of structural or functional abnormalities of the urinary tract. On the other hand, the categorization of complicated is when it affects patients who fit into at least one of the following conditions: pregnant, diabetic, with kidney failure, urinary tract obstruction, immunosuppressed, who have undergone kidney transplantation, history of UTI in childhood, presence of indwelling urinary catheter or nephrostomy, in addition to anatomical or functional dysfunctions (DA SILVA *et al.*, 2021; HADDAD, FERNANDES, 2019).



There is another classification of urinary tract infection, but in relation to frequency, it can be isolated or recurrent. The first type is when a single infection occurs in a woman who has no previous history of UTI, and resolves quickly with antimicrobials in an empirical way. The recurrent one, also called relapse, concerns a woman with at least two cases of UTI in a period of six months or three in a period of twelve months (NUNES, 2022).

Several studies seek the best way to avoid contracting the pathology. Behavioral reeducation of women is essential, such as adequate water intake and correct hygiene of the perianal region. In a review study by Llano *et al.* (2020), showed that patients with a history of recurrent UTI who took cranberry juice significantly decreased symptoms of the infection. The explanation is due to the metabolization of flavonoids - such as prostacyclins - present in the juice, such as phenylpropionic, phenyl acetic, benzoic and cinnamic acids. These metabolites have been shown to have an inhibitory action on the adhesion of UPEC to urinary tract cells. In this context, this study seeks to highlight the latest updates on the topic of cystitis in young women.

MATERIALS AND METHODS

The present research is an Integrative Literature Review (RIL). The articles were identified through a search in the digital libraries Medical Publications (PubMed), Scientific Electronic Library Online (SciELO) and Google Scholar during the first half of 2024, using the terms according to the Health Sciences Descriptors (DeCS): "Cystitis", "Women", "Prophylaxis" and "Relapse". Eligible studies were limited to Portuguese and English, using full-text articles or books. Meeting summaries, comments, news and letters were excluded. There was a limitation of the publication date restricting the years 2012 to June 2022. Reference lists of eligible articles were searched for relevant studies. Finally, the articles were discussed and synthesized so that there was a better understanding of the theme, they were carefully read so that the necessary information could be extracted.

RESULTS

This integrative review was based on the analysis of 13 studies published between 2012 and 2022 available on the PubMed, SciELO, and Google scholar platforms in English and Portuguese.

From these data, a table was elaborated to promote the characterization of the articles used. The variables considered for this stage were: author/authors, year, research title, type of study, and published journal (Table 1). After completion, it was observed that most of the selected articles date from 2022 (35.7%), followed by articles published in 2021

(28.5%) and the remaining articles date from 2020 (7.1%), 2018 (14.2%) and 2012 (7.1%). Due to the language of origin, the selected studies were mostly written in Portuguese (78.5%) and the others in English (21.4%). Table 2 presents an analysis of the contents of the scientific productions analyzed, their objectives and final considerations.

Table 1: Characterization of the articles included in the literature review regarding the author(s), year, title of the article, type of study and journal. Gurupi, Tocantins, Brazil, 2024.

No.	Author(s)/Year	Article title	Type of study	Magazine
1	Viana, Carvalho 2022 - Dates	Efficacy of prophylactic treatment in women with uncomplicated recurrent urinary tract infections (cystitis): an integrative review. Efficacy of prophylactic treatment in women with recurrent uncomplicated urinary tract infections (cystitis): an integrative review.	Review Article	Journal of Ethics and Political Philosophy
2	Tano <i>et al.</i> , 2022	Susceptibility to first-choice antimicrobial treatment for urinary tract infections caused by <i>Escherichia coli</i> isolates from urine samples from women in the southern Brazilian community. Susceptibility to first choice antimicrobial treatment for urinary tract infections to <i>escherichia coli</i> isolates from women urine samples in community South Brazil.	Original article	The Brazilian Journal of Infectious Diseases
3	Silva, 2022	Analysis of the type II toxin-antitoxin system in the bacterial physiology of a hybrid strain: atypical enteropathogenic <i>Escherichia coli</i> and extraintestinal <i>E. coli</i> . Analysis of the type II toxin-antitoxin system in physiology bacterial strain of a hybrid strain: <i>Escherichia coli</i> atypical enteropathogenic and extraintestinal <i>E. coli</i> .	Original article	Butantan Institute Repository
4	Nunes, 2022	Urinary tract infection by <i>escherichia coli</i> and its resistance to ciprofloxacin. Urinary infection by <i>escherichia coli</i> and its resistance to ciprofloxacin.	Review Article	Cogna Repository
5	Sampaio <i>et al.</i> , 2022	Urinary tract infections in women. Urinary tract infections in women.	Review Article	Medicine Science and Art

6	DA Silva <i>et al.</i> , 2021	Risk factors for urinary tract infections: an integrative review. Risk factors for urinary tract infections: integrative review.	Review Article	Electronic Journal Health Collection
7	Nerbass <i>et al.</i> , 2021	Nursing technicians have a higher prevalence of urinary tract symptoms and infections than other occupations in dialysis units. Female nurses have a higher prevalence of urinary tract symptoms and infection than other occupations in dialysis units.	Original article	Brazilian Journal of Nephrology
8	Silva, Souza, 2021	Urinary tract infection in pregnant women: an integrative review. Urinary tract infection in pregnant women: an integrative review.	Review Article	Research, Society and Development
9	Da Silva, Cimadon, 2021	Use of vaccinium macrocarpon (cranberry) in the prophylaxis of urinary tract infections: an integrative review. Use of Vaccinium macrocarpon (Cranberry) in the prophylaxis of urinary tract infections: integrative review.	Review Article	Challenges Magazine
10	Llano, Arribas, Bartolomé, 2020	Cranberry Polyphenols and Prevention of Urinary Tract Infections: Relevant Considerations. Cranberry polyphenols and prevention against urinary tract infections: relevant considerations.	Review Article	Molecules
11	Naber, Wagenlehner, 2018	New antibiotics in the treatment of urinary tract infections. Novel antibiotics in the treatment of urinary tract infections.	Review Article	European Urology Focus
12	Haddad, Fernandes, 2019	Urinary tract infection. Urinary tract infection.	Review Article	Female
13	Lazarotto, Gomes, Pereira, 2012	Clinical evaluation of uncomplicated urinary tract infection in women. Clinical evaluation of not complicated urinary infection in women.	Review Article	Facene/Famene

Source: Survey data

Table 2: Analysis of the contents of the scientific productions included. Gurupi, Tocantins, Brazil, 2024.

No.	Authors no	Purpose of the Article	Key considerations
1	Viana, Carvalho 2022 - Dates	Observe, analyze, and understand through an integrative review the main Results achieved in the literature regarding the efficacy of prophylactic treatment in women with uncomplicated recurrent urinary tract infections.	The use of <i>Vaccinium macrocarpon</i> – Cranberry has been used since they have antimicrobial action on the plant. It is a good ally in UTI therapy and, therefore, the indication is that there may be greater dissemination among patients affected by UTI as an alternative to the use of antibiotics.
2	Tano <i>et al.</i> , 2022	Evaluate or profile antimicrobial susceptibility towards the first-line treatment for UTI caused by <i>E. coli</i> isolated in urine samples from Women of the community and presence of extended-spectrum beta-lactamase (ESBL).	The antimicrobial susceptibility profile was similar to that reported in the literature, with resistance to TMP-SMX greater than 30% in the samples studied. Nitrofurantoin maintains high sensitivity rates in excess of 90%. Quinolone resistance increases proportionally with age, as does ESBL.
3	Silva, 2022	To analyze the toxin-antitoxin (TA) type II system in the bacterial physiology of a hybrid strain: <i>Escherichia coli</i> atypical enteropathogenic and <i>E. coli</i> extraintestinal	The data indicate that the TA systems seem to be involved in the stress response of the hybrid strain: <i>atypical enteropathogenic Escherichia coli</i> and extraintestinal <i>E. coli</i> , therefore involved in its physiological processes. Increased gene expression occurred when the bacterium was exposed to acidic environments and environments of nutritional stress.
4	Nunes, 2022	Show than or Indiscriminate use from drugs without a medical prescription is serious and is very frequent in the days from Today, consequently bacteria have been creating a large resistance drugs and they are not effective in combat the infection.	There is a high prevalence of UTI in men and women caused by <i>Escherichia Coli</i> in the hospital setting. There is an indiscriminate use of drugs without a medical prescription, causing a major public health problem, as inappropriate use leads bacteria to have a great resistance to certain drugs that were effective some time ago and are not able to fight infection today.
5	Sampaio <i>and</i>	Review the etiology, pathogenesis, diagnosis	The main route of infection is ascending, from the retrograde access of perineum bacteria, through



	<i>al., 2022</i>	and treatment of urinary infections in women.	from the urethra to the bladder. <i>E. coli</i> is the most common cause of UTIs, accounting for 85% of community-acquired infections and 50% of hospital-acquired infections. Whenever possible, urine should be collected for evaluation of abnormal elements and antibiogram sediment and culture before starting treatment in patients with urinary tract infection. It recommends treatment with fosfomicin and nitrofurantoin according to the European Association of Urology.
6	Da Silva <i>et al.</i> , 2021	Analyze risk factors for urinary tract infections.	The main risk factors evidenced were the use of bladder catheters, unprotected sexual practices, previous genital infection, antibiotic resistance, lack or excess of hygiene in the genital areas, urethral anatomy, hyperglycemia, and hormonal changes.
7	Nerbass <i>et al.</i> , 2021	To compare the prevalence of self-reported urinary symptoms and infections and hydration markers between dialysis nursing technicians and other occupations sharing the same work environment.	The nursing technicians of the dialysis units reported a lower fluid intake and a higher prevalence of symptoms and urinary tract infection than the administrative and multidisciplinary team. In addition, employees who perceived environmental barriers to adequate hydration had a higher prevalence of urinary problems.
8	Silva, Souza, 2021	Do an integrative review addressing the main microbiological agents, clinical classifications, complications and therapeutic conducts in pregnant women.	These infections are usually caused by bacteria from the intestinal microbiota that contaminate the urinary tract, with <i>Escherichia coli</i> standing out with a greater predominance in 80% of cases. For effective treatment, it is necessary to identify the bacteria causing the infection, to select the appropriate antibiotic. Therefore, in order to reduce and control cases of urinary tract infections, prenatal consultations and early tests should be carried out to diagnose the infection in order to prevent possible perinatal and maternal complications.
9	Of Silva, Cimadon, 2021	Identify through a review of literature Antrodial ppetes Not present <i>Vaccinium macrocarpon</i> , its preventive effect and how adjuvant in the treatment of UTIs.	The information allows us to conclude that the use of <i>Vaccinium macrocarpon</i> is an effective therapy in cases of urinary infection, and is a prophylaxis for cases of recurrent infection due to the action of proanthocyanidins and anthocyanidins, which are the active ingredients present in the fruit, which prevent the fimbriae of the bacteria from being able to attach themselves to the wall of the urinary tract and thus cannot adhere and lead to infection



10	Llano, Arribas, Bartolomé, 2020	Analyze the protective effect of cranberry against urinary tract infections.	Consumption of cranberry (<i>Vaccinium macrocarpon</i>) has been shown to be effective in reducing the occurrence and severity of UTIs in women and preventing the adherence of pathogenic bacteria to the urinary tract. In addition, it may also decrease UTI-related symptoms by suppressing inflammatory cascades as an immune response to bacterial invasion
11	Naber, Wagenlehner, 2018	Report on studies on new antibiotics that are under development for the treatment of urinary tract infection.	Several new antibiotic agents for urinary tract infections include combinations of β -lactam/ β -lactamase inhibitors with cephalosporins and carbapenems. Siderophore cephalosporins, novel aminoglycosides, fluoroquinolones and tetracyclines are also in clinical development.
12	Haddad, Fernandes, 2019	To describe urinary tract infection through a literature review.	The main pathogen involved in UTI in women is <i>E. coli</i> , which is responsible for about 80% of all episodes of infection. UTI can be classified as both complicated and uncomplicated. In the case of acute uncomplicated bacterial cystitis in women, antimicrobial treatment in monodose or short course (three days) is preferred. In all cases of acute pyelonephritis, 10 to 14 days of antimicrobial treatment should be completed in an outpatient and/or inpatient setting. Fosfomycin and nitrofurantoin are considered drugs of choice in many countries. Urine culture is recommended only for recurrent UTI, in the presence of associated complications and in the presence of failure of initial treatment.
13	Lazarotto, Gomes, Pereira, 2012	Promote a clinical review of possible pathogens as well as the correct way to identify, diagnose and treat this type of pathology.	The microbiota of an uncomplicated UTI in women consists mainly of <i>Escherichia coli</i> (75 to 95%), with occasional infections of other enterobacterial species, such as <i>Proteus mirabilis</i> , <i>Klebsiella pneumoniae</i> , and other bacteria such as <i>Staphylococcus saprophyticus</i> . It is important to emphasize that the prescription of antibiotics should preferably be guided through urine culture and antibiogram, respectively. However, this fact should not be a reason to postpone the start of treatment in symptomatic cases. It suggests the use of nitrofurantoin and quinolones for empirical treatment.

Source: Survey data

DISCUSSION

Urinary tract infection is a pathology of great incidence in the health area, and can be found due to the recurrent complaints of patients who seek medical care. In the hospital



environment, the incidence of UTI among men and women is similar, however, when making a cut of this environment, the prevalence in women is noted, this is due to both anatomical issues - smaller urethra in relation to men - and monthly hormonal oscillations (NUNES, 2022; SILVA *et al.*, 2021). According to Nunes (2022), due to the high incidence of the pathology, women have acted without medical consent and self-medicated with antimicrobials, causing, in many cases, bacterial resistance against the drug and, thus, increasing the chances of causing pyelonephritis, the most serious stage of urinary infection, thus becoming a public health problem with a more expensive treatment for the State, when requiring hospitalization and high-potency antibiotic therapy.

This literature review shows that the gold standard test for the identification of the pathogen that causes urinary tract infection is urine culture and antibiogram. The authors strongly indicate its use before starting treatment. However, the empirical prescription of antibiotics prescribed by a medical professional is still of great value and, in most cases, with a good prognosis. This is due to several randomized clinical trials showing that, for the most part, the etiological agent of UTI is *Escherichia coli* -Gram-negative enteric bacteria- which has been shown to be sensitive to the antibiotics nitrofurantoin and fosfomicin (LAZARROTO, GOMES, PEREIRA, 2012; HADDAD, FERNANDES, 2019).

In an analysis of different studies, the population and the scientific community saw as an alternative to antibiotic therapy, the use of herbal medicines that can act against the pathogen most present in UTI, *E. coli*. The use of *Vaccinium macrocarpon* (cranberry) has shown excellent results as a prophylactic means in cases of UTI. The active ingredients present in the fruit prevent the fimbriae of the bacteria from being able to attach themselves to the wall of the urinary tract, and thus, they do not adhere and are not able to reproduce and lead to infection. (DA SILVA, CIMADON, 2021; LLANO, ARRIBAS, BARTOLOMÉ, 2020).

Despite the evidence in the use of herbal medicine, to date the guidelines do not recommend the use of cranberry as the first choice in UTI prophylaxis. However, the prescription of the same can be done individually, based on a good analysis of the patient, taking into account risks and benefits (HADDAD, FERNANDES, 2019; VIANA, CARVALHO, 2022).

FINAL CONSIDERATIONS

Although there is due importance in better understanding cystitis in young women, studies on the etiology and treatment of UTI are quite concise and consequently of its complications. Thus, despite the high incidence of the disease and the possible serious



complications, the articles analyzed presented results that are already known. Studies point to the current use of nitrofurantoin and fosfomicin for outpatient treatment. Some evidence points to promising results regarding the knowledge of new prophylactic methods for this pathology, such as the use of *Vaccinium macrocarpon* (cranberry). Thus, more clinical studies are needed to prove which medications are effective for each pathogen, especially those with the highest incidence, also contemplating the complications that occur more frequently and the best possible treatments exposing their long-term benefits.



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