CODEN: WJAPAC Impact Factor: 5.48 ISSN: 3049-3013

World Journal of Advance Pharmaceutical Sciences

Volume 3, Issue 11, Page: 7-10 Review Article www.wjaps.com

LIFESTYLE MODIFICATION AND PHARMACOTHERAPY IN RECURRENT URINARY TRACT INFECTION

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How to cite this Article: *Trupti Rajkumar Waghnare, Akshay Anand, Manthan Mirkale, Dr. P. N. Kelgoankar. (2026). Lifestyle Modification And Pharmacotherapy In Recurrent Urinary Tract Infection. World Journal of Advance Pharmaceutical Sciences, 3(11), 7-10.

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Article Info

Article Received: 05 August 2026,

Article Revised: 25 Sept. 2026,

Article Accepted: 15 Oct. 2026.

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DOI: https://doi.org/10.5281/zenodo.23850466

ABSTRACT

Recurrent urinary tract infection (rUTI) is a common clinical problem, particularly among women, and is associated with repeated antibiotic exposure, reduced quality of life and increasing antimicrobial resistance. Recurrent cystitis is generally defined as at least two episodes within 6 months or three episodes within 12 months. Management involves confirmation of infection, identification of predisposing factors and prevention of further episodes. Lifestyle interventions such as adequate fluid intake, avoiding delayed urination and appropriate personal hygiene may reduce recurrence in selected patients. Pharmacological prevention includes non-antibiotic approaches such as vaginal estrogen, methenamine hippurate, cranberry products and selected probiotics, as well as antibiotic prophylaxis when appropriate. Current guidelines increasingly emphasize antimicrobial stewardship and the use of non-antibiotic strategies before long-term antibiotics. ◆
Uroweb +1

KEYWORDS: Recurrent UTI, recurrent cystitis, lifestyle modification, pharmacotherapy, antibiotic prophylaxis, methenamine hippurate, cranberry, vaginal estrogen.

1. INTRODUCTION

Urinary tract infection (UTI) is one of the most common bacterial infections affecting humans. It occurs when microorganisms, most commonly uropathogenic Escherichia coli, colonize the urinary tract and produce infection.

Some patients experience repeated episodes after successful treatment. This condition is known as recurrent urinary tract infection (rUTI). Recurrent cystitis is commonly defined as
≥2 episodes in 6 months or ≥3 episodes in 1 year. ◆
Uroweb

Repeated UTIs may lead to frequent antibiotic use, adverse drug effects and antimicrobial resistance. Therefore, modern management focuses not only on treating acute episodes but also on preventing recurrence while minimizing unnecessary antibiotic exposure. The 2025 AUA/CUA/SUFU update specifically emphasizes prevention, appropriate antibiotic use and expansion of non-antibiotic options. ◆
PubMed

2. Causes and Risk Factors

Important risk factors include:
Previous history of UTI Sexual activity
New sexual partner Use of spermicides Inadequate fluid intake Delayed urination
Postmenopausal estrogen deficiency
Diabetes and other metabolic conditions Urinary tract abnormalities
Urinary stones or obstruction Incomplete bladder emptying Catheter use
Pregnancy
Previous antimicrobial exposure
Recurrent infection may represent relapse with the same organism or reinfection with a different organism. ◆
Nice

3. Pathophysiology

The majority of uncomplicated recurrent UTIs are caused by uropathogenic E. coli.
The basic process can be summarized as:
Periurethral colonization → bacterial adherence to uroepithelium → multiplication → inflammation → urinary symptoms → treatment → possible recurrence
Bacterial adhesion, biofilm formation and persistence within the urinary tract can contribute to recurrence.
In postmenopausal women, reduced estrogen can alter the vaginal and urinary environment and increase susceptibility to recurrent infection. [illegible]
Uroweb Patients

4. Diagnosis
Diagnosis should be based on:
A. Clinical symptoms Common symptoms include:
Dysuria
Increased urinary frequency Urgency
Suprapubic discomfort
Hematuria in some cases

B. Urine testing
Urinalysis and urine culture with antimicrobial susceptibility testing are particularly important in recurrent disease. The EAU recommends diagnosing recurrent cystitis by urine culture. [illegible]
Uroweb

C. Further investigation
Routine extensive investigations such as cystoscopy or imaging are not required for every young woman with uncomplicated recurrent cystitis and no risk factors. Investigation is more appropriate when an underlying abnormality is suspected. [illegible]
Uroweb

5. Lifestyle Modification
Lifestyle modification is an important first step before considering long-term pharmacological prophylaxis.

5.1 Adequate fluid intake
Increasing water intake may reduce recurrence, particularly in premenopausal women who normally drink low volumes of fluid. An EAU-cited trial found benefit from adding approximately 1.5 L/day in low-volume drinkers. [illegible]
Uroweb

5.2 Avoid delayed urination
Patients should avoid habitually holding urine for prolonged periods.

5.3 Post-coital urination
Urination after sexual intercourse is commonly advised as a preventive measure, although the evidence supporting individual behavioural measures is limited. [illegible]
Uroweb

5.4 Personal hygiene
Appropriate perineal hygiene should be maintained.

5.5 Avoid unnecessary vaginal products
Douching and potentially irritating products should be avoided.

5.6 Manage constipation
Constipation may contribute to urinary symptoms and should be addressed where present.

5.7 Avoid unnecessary antibiotics
Repeated empiric antibiotic use can promote antimicrobial resistance. Current guidelines emphasize antimicrobial stewardship. [illegible]
PubMed

6. **Non-Antibiotic Pharmacotherapy**
6.1 Methenamine Hippurate
Methenamine is an important non-antibiotic prophylactic option. Mechanism.

Methenamine is converted in acidic urine to formaldehyde, which has antibacterial activity. Advantages.

Does not work through conventional antibiotic mechanisms May reduce antibiotic exposure.

Useful as an alternative to daily antibiotic prophylaxis in selected women.

A 2026 systematic review found methenamine hippurate to be non-inferior to daily antibiotic prophylaxis in preventing recurrent UTIs in the included evidence. [illegible]
PubMed

NICE recommends considering methenamine as an alternative to daily antibiotic prophylaxis in appropriate non-pregnant women after other preventive measures have not been sufficient. [illegible]
Nice

6.2 Vaginal Estrogen
Vaginal estrogen is particularly relevant to peri- and postmenopausal women. Mechanism.

Estrogen improves the vaginal and periurethral environment and may help restore protective vaginal flora.
Effect

It can reduce recurrent UTI in appropriate postmenopausal patients.
NICE recommends considering vaginal estrogen when behavioural and hygiene measures are insufficient or inappropriate. [illegible]
Nice

Important: Vaginal estrogen is different from systemic hormone replacement therapy; systemic HRT should not be prescribed specifically for prevention of recurrent

UTI. [illegible]
Nice

6.3 Cranberry Products
Cranberry contains proanthocyanidins, which may interfere with bacterial adhesion to urinary tract epithelium.

Evidence is mixed, but recent EAU guidance allows cranberry products to be considered for prevention, while emphasizing that evidence quality remains variable. [illegible]
Uroweb

6.4 D-Mannose
D-mannose is a naturally occurring sugar that has been proposed to interfere with adhesion of E. coli to urinary epithelial cells.

However, evidence is inconsistent. NICE describes the evidence as uncertain, while recent systematic-review evidence suggests that results vary between populations and study settings. [illegible]
Nice +1

6.5 Probiotics
Probiotics, particularly Lactobacillus species, may help restore or maintain protective vaginal flora.

However, evidence remains insufficient to make probiotics a universally established preventive treatment. [illegible]
Nice +1

6. Antibiotic Pharmacotherapy
Antibiotic prophylaxis may be considered when behavioural and non-antibiotic strategies are inadequate.

Major approaches
A. Continuous low-dose prophylaxis
A low-dose antibiotic is administered regularly for a prescribed period.

B. Post-coital prophylaxis
A single antibiotic dose is taken after sexual activity when episodes are clearly associated with intercourse.

C. Patient-initiated therapy
Selected patients with good understanding and previous documented infections may be provided with a short treatment course for early recurrence.

Continuous and post-coital antimicrobial prophylaxis have demonstrated effectiveness in reducing recurrent cystitis, but antimicrobial resistance and adverse effects must be considered. [illegible]
Uroweb +1
Examples of antibiotics used in prophylaxis
Depending on local guidelines, culture results and patient factors, options may include: Nitrofurantoin
Trimethoprim
Trimethoprim-sulfamethoxazole Cephalexin
Fosfomycin in selected situations
Choice should be culture- and susceptibility-informed and should follow local antimicrobial guidelines.

7. Comparison of Preventive Strategies Strategy
Main role
Important consideration Increased fluid intake
Lifestyle prevention
Particularly useful in low-volume drinkers Personal hygiene
Risk reduction
Evidence for individual measures is limited Cranberry
Non-antibiotic prevention Evidence varies
D-mannose
Non-antibiotic prevention Evidence inconsistent Probiotics
Microbiome support
Evidence remains limited Vaginal estrogen
Postmenopausal women Local therapy
Methenamine hippurate
Non-antibiotic prophylaxis
Alternative to daily antibiotics in suitable patients Post-coital antibiotics
Sex-associated recurrence
Reduces antibiotic exposure compared with continuous use Continuous antibiotics
Frequent recurrence
Resistance/adverse effects must be considered Self-start therapy
Selected patients
Requires appropriate patient selection

8. Antimicrobial Resistance
One of the major problems associated with recurrent UTI is antimicrobial resistance (AMR). Repeated antibiotic exposure can:
Select resistant bacteria Alter the normal microbiome
Cause adverse drug reactions
Reduce future treatment options
Therefore, current approaches increasingly favor non-antibiotic prevention before long-term antibiotic prophylaxis, where clinically appropriate. [illegible]
PubMed +1

9. Role of Pharmacist
Pharmacists can contribute significantly to rUTI management by: Educating patients about medication adherence.
Promoting appropriate hydration and lifestyle measures. Checking antibiotic dose, duration and interactions.
Identifying inappropriate antibiotic use. Counseling about adverse effects.
Promoting antimicrobial stewardship. Encouraging culture-guided treatment.
Educating patients about non-antibiotic preventive options. Identifying patients requiring medical referral.
Monitoring prophylactic therapy.

10. Proposed Management Algorithm Recurrent UTI suspected

↓
Confirm diagnosis / urine culture
↓
Identify risk factors and underlying causes
↓
Lifestyle modification Adequate fluids
Avoid delayed urination
Appropriate hygiene
Address constipation/risk factors
↓
Non-antibiotic prevention
Vaginal estrogen when appropriate Methenamine hippurate
Cranberry
Selected probiotics/D-mannose
↓
If recurrence continues
↓
Antibiotic prophylaxis Post-coital OR
Continuous low-dose prophylaxis
↓
Regular review + antimicrobial stewardship

This stepwise approach is consistent with recent guidance emphasizing behavioural measures, non-antibiotic prevention and cautious use of antibiotic prophylaxis. ﷺ Nice +1

11. CONCLUSION

Recurrent urinary tract infection requires a long-term preventive strategy rather than repeated treatment of individual episodes alone. Lifestyle modification, adequate hydration and identification of risk factors form the foundation of prevention. Non-antibiotic options such as methenamine hippurate, vaginal estrogen in postmenopausal women and selected cranberry products can help reduce antibiotic exposure. When these measures are inadequate, culture-guided post-coital or continuous antibiotic prophylaxis may be considered. The increasing problem of antimicrobial resistance makes individualized treatment and antimicrobial stewardship essential. ﷺ PubMed +2

REFERENCES

1. Ackerman L, et al. Updates to Recurrent Uncomplicated Urinary Tract Infections in Women: AUA/CUA/SUFU Guideline (2025). Journal of Urology. 2026. ﷺ PubMed
2. European Association of Urology. EAU Guidelines on Urological Infections – Recurrent Cystitis. 2026. ﷺ Uroweb +1
3. Munir A, et al. Effectiveness of Non-Antibiotic Therapies in the Management of Recurrent Urinary Tract Infections in Women: A Systematic Review. International Urogynecology Journal. 2026. ﷺ PubMed
4. Sanyaolu L, et al. Update to the management of recurrent urinary tract infections in women aged 16 years and older. Drug and Therapeutics Bulletin. 2026. ﷺ PubMed
5. Moussa M, et al. Pharmacotherapeutic advances for recurrent urinary tract infections in women. Expert Opinion on Pharmacotherapy, 2020; 21: 2011–2026. ﷺ PubMed
6. NICE. Urinary tract infection (recurrent): antimicrobial prescribing (NG112). Updated recommendations. ﷺ Nice
7. Smith AL, et al. Treatment and Prevention of Recurrent Lower Urinary Tract Infections in Women: A Rapid Review with Practice Recommendations. Journal of Urology. 2018. ﷺ PubMed

Suggested title for your college submission
"Lifestyle Modification and Pharmacotherapy in Recurrent Urinary Tract Infection: A Comprehensive Review of Current Preventive Strategies"

This is a good Pharm D review-paper structure; for actual journal submission, the next step would be to expand the literature-search methodology, add PRISMA-style methodology, tables/figures, 20–40 references, and Vancouver referencing.