



Research Article

Efficacy of Udumbara Moola Jala as Pathya Kalpa in Management of Mutrakrichhra: A Single-Arm Clinical Trial

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Abstract

Background: *Mutrakrichhra* (urinary tract infection) is characterised by painful micturition, burning sensation, and urinary frequency. Current antibiotic therapy faces challenges of antimicrobial resistance and side effects, necessitating the exploration of complementary interventions. *Udumbara Moola Jala* (*Ficus racemosa* L. root sap) represents a traditional Ayurvedic *Pathya kalpa* with *Sheeta Virya* (cooling potency) and Pitta-shamaka properties. Objective: To evaluate the clinical efficacy of *Udumbara moola jala* as a *Pathya kalpa* in managing *Mutrakrichhra* symptoms. Methods: A single-arm, pre-post interventional clinical trial was conducted at Bharati Vidyapeeth (Deemed to be University) Ayurved Hospital, Pune, from April 2024 to July 2025. Thirty participants aged 18-50 years with *Mutrakrichhra* symptoms received 20 mL of authenticated *Udumbara moola jala* twice daily before meals for seven days. Primary outcomes included Visual Analogue Scale assessment for pain, graded scales for burning micturition, and urinary frequency. Secondary outcomes comprised urine pus cell count and total WBC count. Results: Significant improvements were observed across all parameters ($p < 0.001$): lower abdominal pain decreased by 87.73% (5.43 to 0.67), pain during micturition by 85.63% (5.80 to 0.83), burning micturition by 81.63% (1.63 to 0.30), and urinary frequency by 75.51% (1.63 to 0.40). Objective parameters showed a 69.70% reduction in urine pus cells (2.20/hpf to 0.67/hpf) and a 29.72% decrease in total WBC count (10,263.33 cells/mm³ to 7,213.33 cells/mm³). Conclusions: *Udumbara moola jala* demonstrates significant therapeutic efficacy as a safe, economical *Pathya kalpa* intervention for *Mutrakrichhra* management, supporting integration as a complementary therapy in urinary tract infections.

Keywords: *Mutrakrichhra*, *Udumbara*, *Pathya kalpa*, *Udumbar Jala*, *Urinary tract infection*, *Ayurveda*.

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Introduction

Mutrakrichhra, described in Ayurveda as painful and difficult urination, closely parallels the modern clinical entity of urinary tract infection (UTI). Acharya Madhava defines it as “*mutrasya krcchrena mahata dukkhena pravrttih*”, meaning painful and

difficult micturition.(1) In contemporary medicine, UTIs are recognised as one of the most prevalent bacterial infections, particularly affecting women of reproductive age and the elderly. Globally, 404.61 million cases were reported in 2019, with an incidence rate of 50.76 per 1,000 person-years. Women are 3.6 times more prone to infection due to anatomical predisposition. With antibiotic resistance on the rise and projections suggesting cases may reach 652.8 million by 2050, there is a pressing need to explore safe and effective alternative therapies. (2)(3)

The pathogenesis of *Mutrakrichhra* involves vitiation of *Pitta* and *Apana Vata* in the *Mutravaha Srotas*, manifesting as burning micturition (*Daha*), suprapubic pain (*Bastimehanashoola*), increased frequency (*Muhur muhur mutrata*), and sometimes

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haematuria. Modern lifestyle factors, including improper dietary habits, altered bowel and urinary patterns, suppression of natural urges (*Vegadharana*), dehydration, and stress, contribute to dosha vitiation and subsequent urinary disorders. (4)

Current biomedical management primarily relies on antibiotics and analgesics. However, over-reliance on such medications can lead to side effects, Pitta aggravation, and antimicrobial resistance. Ayurveda emphasizes *Pathya Ahara-Vihara* as an equally essential component of treatment to ensure proper dosha balance and physiological functioning.

Pathya kalpa refers to therapeutic dietary preparations that aid digestion and correct *doshic* imbalance without burdening *Agni* (digestive fire). These interventions are particularly effective in conditions like *Mutrakrichhra*, where recurrent episodes are triggered by lifestyle and dietary errors. Acharya Kashyapa emphasizes Pathya not merely as a supportive measure, but as pivotal in treating *Srotovikriti*.

Udumbara (*Ficus racemosa* Linn.), a member of *Mutrasangrahaniya gana*, *Kashaya skandhas* and *Nyagrodhadi Gana*, is well-documented in Ayurveda for its *Sheeta Veerya* (cooling energy), *Kashaya* and *Madhura Rasa*, and *Pitta-Shamaka* actions. Classical texts describe its use in disorders like *Prameha*, *Mutrakrichhra*, *Raktapitta*, and *Pradara*. (5)

Root sap is used for treating diabetes and popular remedy for mumps and other inflammatory enlargements. (6) Water naturally exudes from the root of the *Udumbara* tree. This water is extremely cooling (*atishita*), and it pacifies the aggravated *Pitta dosha* and vitiated *Rakta dhatu*, (8) which may help reduce Burning Micturition. Folk medicine has recorded the internal use of *Udumbara Jala* – as a cold infusion of its root - in various urinary conditions.

While various formulations have been researched for *Mutrakrichhra*, *Udumbara Jala*, a simple, accessible, and natural *Pathya kalpa* remains underexplored. Its *Pitta-Vata Shamana*, *Mutrala*, and *Shothahara* qualities (6) make it ideal for conditions presenting with burning micturition, painful urination, and scanty urine - all symptoms characteristic of *Pittaja Mutrakrichhra*. This study aims to scientifically evaluate the clinical efficacy of *Udumbara moola jala* as *Pathya kalpa* in patients with *Mutrakrichhra*.

Methods

Study Design and Setting

This single-arm, pre-test-post-test clinical study was conducted at Bharati Vidyapeeth (Deemed to be University) Ayurved Hospital, Katraj, Pune, India, between March 2024 and July 2025.

Ethics and Registration

The study received ethical clearance from the Institutional Ethics Committee on October 4, 2023, and was registered with the Clinical Trial Registry of India (CTRI) on March 28, 2024 (Registration number: CTRI/2024/03/063245). Written informed consent was obtained from all participants in accordance with the principles of the Declaration of Helsinki.

Participants

Inclusion Criteria: Subjects aged 18-50 years presenting with symptoms of *Mutrakrichhra*, including *Bastimehanashoola* (lower abdominal pain), *Muhur muhur mutrata* (increased urinary frequency), *Sadaha mutrata* (burning micturition), and *Krichhren*

mutrata (painful micturition), irrespective of sex, religion, and socio-economic status.

Exclusion Criteria: Pregnant women; subjects with severe illness; those suffering from urinary calculi, benign prostatic hyperplasia, prostatitis, diabetes mellitus, sexually transmitted diseases, or trauma; subjects taking higher doses of antibiotics or steroids; those with systemic disorders like cancer or cardiac illness; subjects with fever or abundant pus cells in urine.

Subjects were screened through detailed clinical examination, urine routine and microscopy, blood investigations including random blood sugar levels, and ultrasonography when required to rule out systemic diseases.

Sample Size Calculation

Based on the prevalence rate of 2.2% at Bharati Ayurved Hospital, the sample size was calculated using the formula $n = Z^2P(1-P)/d^2$, yielding $n=30$ subjects.

Intervention

Udumbara Jala was collected from authenticated plants in the Pune region following standardised operating procedures. (7)(13) Plant authentication was performed at Sheetal Laboratory, Pune, on May 21, 2024. Participants received 20 mL of *Udumbara moola jala* orally twice daily before meals for 7 days.

Outcome Measures

Subjective Parameters: (4)

- Lower abdominal pain and pain during micturition assessed using Visual Analogue Scale (0-10)
- Burning micturition graded as: absent (0), mild-occasional (1), moderate with every voiding (2), severe with every voiding (3)
- Urinary frequency graded as: <5 times/day (0), 5-8 times/day (1), 8-12 times/day (2), >12 times/day (3)

Objective Parameters:

- Urine routine and microscopic examination for pus cells
- Complete blood count for Total WBC count (cells/mm³)

Follow-up Schedule

Assessments were conducted on days 3, 5, 7, and post-treatment follow-up on day 15.

Statistical Analysis

The Wilcoxon signed-rank test was used for subjective clinical parameters and non-parametric objective data. A paired t-test was applied for WBC counts. Statistical significance was set at $p<0.05$.

Results

Participant Demographics

A total of 33 patients were enrolled, with 3 dropouts (2 lost to follow-up, 1 withdrew consent), resulting in a final sample of 30 subjects. The demographic distribution showed 53% males and 47% females, with 64% in the 20-30 years age group. Vata-Pitta prakriti was the most common (47%).

Clinical Outcomes

Subjective Parameters

All subjective parameters showed statistically significant improvements ($p<0.001$):

- Lower abdominal pain: Mean score reduced from 5.43 to 0.67, representing 87.73% improvement ($z=-4.8$, $p<0.001$)
- Burning micturition: Mean score decreased from 1.63 to 0.30, showing 81.63% improvement ($z=-4.8$, $p<0.001$)
- Pain during micturition: Mean score reduced from 5.80 to 0.83, demonstrating 85.63% improvement ($z=-4.8$, $p<0.001$)
- Urinary frequency: Mean grade improved from 1.63 to 0.40, indicating 75.51% improvement ($z=-4.6$, $p<0.001$)

Objective Parameters

Both objective markers demonstrated significant improvements:

- Pus cells in urine: Mean grade reduced from 2.20 to 0.67 per HPF, showing 69.70% improvement ($z=-4.6$, $p<0.001$)
- Total WBC count: Mean count decreased from 10,263.33 cells/mm³ to 7,213.33 cells/mm³, representing 29.72% improvement ($t=9.209$, $p<0.001$)

Other urinary parameters such as epithelial cells, RBCs, and bacterial presence were also recorded; however, significant statistical changes were primarily observed in pus cell count.

Safety Profile

No adverse events were reported during the study period, confirming the safety profile of *Udumbara moola jala* as a *Pathya kalpa* intervention.

Discussion

The present study highlights the significant clinical efficacy of *Udumbara moola jala* as a *Pathya Kalpa* in the management of *Mutrakrichhra*. Notable improvements were recorded in both subjective symptoms and objective inflammatory markers, validating the classical Ayurvedic claims of *Udumbara*'s therapeutic role in urinary disorders. Importantly, the findings provide a scientific basis for its clinical use, bridging traditional knowledge with contemporary medical evidence.

Pharmacological Rationale

The therapeutic effects observed can be explained through both Ayurvedic principles and modern pharmacological findings. In Ayurveda, *Udumbara* is described as having *Sheeta Veerya* (cooling potency), which pacifies aggravated *Pitta*, a key factor in the pathophysiology of *Mutrakrichhra*. Its *Kashaya Rasa* (astringent taste) confers *Stambhana* (astringent) and *Shothahara* (anti-inflammatory) properties, thereby reducing urinary tract inflammation and controlling infectious exudates. (8)(9)

Modern phytochemical studies complement this understanding. Extracts of *Ficus racemosa* L. exhibit significant antimicrobial activity against common uropathogens, including *Escherichia coli*, *Klebsiella pneumoniae*, and *Staphylococcus aureus*. Additionally, its phenolic compounds and flavonoids contribute to antioxidant and anti-inflammatory actions, while the natural cooling properties of the root exudate soothe inflamed urinary tract tissues. (11)

Clinical Significance of Findings

Subjective Parameters

Burning micturition showed an 81.63% improvement, underscoring *Udumbara*'s *Pitta-shamaka* activity in alleviating the cardinal symptom of *Mutrakrichhra*. Pain reduction during micturition (85.63%) reflects its analgesic and anti-inflammatory actions. The decline in urinary frequency (75.51%) suggests normalization of bladder function, while the greatest improvement

was noted in lower abdominal pain (87.73%), indicating effective relief of local inflammation and spasm. Collectively, these findings illustrate that *Udumbara moola jala* provides comprehensive symptomatic relief by addressing root causes, consistent with Ayurvedic principles.

Objective Parameters

A 69.70% reduction in urine pus cells confirms its antibacterial and anti-inflammatory effects, while the decrease in total WBC count (29.72%) demonstrates systemic anti-inflammatory action. These results indicate that the formulation exerts effects not only at the local urinary tract level but also on systemic immune regulation. (12)

Demographic Insights

The predominance of *Vata-Pitta prakriti* patients (47%) supports the Ayurvedic concept that individuals with this constitution are predisposed to *Pitta*-dominant disorders like *Mutrakrichhra*. The higher incidence observed in the 20–30-year age group (64%) reflects current lifestyle influences, including dietary patterns, occupational stress, and irregular routines, all of which aggravate *Vata* and *Pitta doshas* and increase susceptibility to UTIs.

Pathya Kalpa Perspective

The effectiveness of *Udumbara moola jala* underscores the Ayurvedic principle that *Pathya kalpa*—therapeutic dietary formulations—can serve as both preventive and curative interventions. (14) As *Mutra* (urine) is predominantly governed by the *Jala Mahabhuta* (water element) (15), the use of a *Jala*-based *Kalpa* ensures both homologous therapeutic action and optimal correction of derangements in the *Mutravaha Srotas* without disturbing *Agni*.

Comparison with Previous Studies

Previous phytochemical analyses have confirmed *Udumbara* root sap's favourable composition with no heavy metal contamination. Literature documents *Ficus racemosa* L.'s antimicrobial and anti-inflammatory properties, supporting our clinical findings. However, this is the first clinical trial specifically examining root sap as *Pathya kalpa* in *Mutrakrichhra*. (10)

Study Limitations

This study employed a single-arm design without a control group. Future research should include randomized controlled trials with larger sample sizes and longer follow-up periods. Standardization of *Udumbara Jala* preparation methods and dosage optimization requires further investigation.

Conclusion

Udumbara moola jala demonstrated robust clinical efficacy as a *Pathya kalpa* intervention in managing *Mutrakrichhra*, with significant improvements in both subjective symptoms and objective inflammatory markers. Its properties make it a safe, economical, and patient-friendly adjunct or preventive measure in recurrent or acute urinary tract infections. The intervention aligns with Ayurvedic principles of using gentle, natural therapies that support overall health without adverse effects.

Further large-scale, multicentre randomized controlled trials are warranted to establish standardized protocols and explore broader therapeutic applications. Comparative studies with conventional therapies and other Ayurvedic formulations would provide valuable insights into optimal treatment strategies for *Mutrakrichhra* management.

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Conflicts of Interest

The authors declare no competing interests.

Author Contributions

Shyam Maru conceived and designed the study, conducted the clinical assessments, and drafted the manuscript. Dr. Dhananjay M. Patil supervised the research, provided critical revisions, and approved the final version of the manuscript. Both authors read and approved the final manuscript.

Data Availability

The datasets supporting the findings of this study are available from the corresponding author on reasonable request. Due to patient privacy and ethical considerations, individual clinical data cannot be made publicly available.

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