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EFFECTIVENESS OF THIRIKANDAGATHI KIYAAZHAM IN TREATING AZHAL NEERCHURUKKU (URINARY TRACT INFECTION) – A CASE SERIES

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Keywords:

Neerchurukku, Siddha, UTI, *E. coli*, *Siruneer noigal*

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ABSTRACT: Urinary tract infections (*Azhal Neerchurukku*) are among the most common bacterial infections, causing significant discomfort and reduced daily functioning. This descriptive case series aimed to observe outcomes following the administration of the Siddha medicine *Thirikandagathi Kiyaazham* (TKK) in the management of *Azhal Neerchurukku* (UTI). **Methods:** Twenty participants diagnosed with *Azhal Neerchurukku* (UTI) were administered 50 ml of TKK twice daily for 10 days. Clinical symptoms (using the UTISA questionnaire), total WBC count, and urine culture results were assessed before and after the intervention. **Results:** Observational data indicated improvements in clinical symptom scores and urine culture findings in post-intervention. Notably, a transition to culture-negative status was observed in 50% of cases where *Escherichia coli* was initially isolated. **Conclusion:** In this case series, a 10-day course of TKK was associated with observed improvements in clinical and laboratory parameters among participants, particularly in *E. coli*-associated cases. These preliminary findings suggest that TKK may serve as a promising Siddha therapeutic option for managing *Azhal Neerchurukku* (UTI). Definitive conclusions regarding therapeutic efficacy require future controlled studies.

INTRODUCTION: Urinary tract infections (UTIs) represent a significant global health burden, particularly among women [1]. It is estimated that approximately 150 million cases occur worldwide each year, resulting in substantial morbidity and an economic burden exceeding 6 billion US dollars [2]. Epidemiologically, about 40% of women and 12% of men experience at least one UTI in their lifetime [2]. The most common causative agents are Gram-negative bacteria of the Enterobacteriaceae family, with *Escherichia coli* being the predominant pathogen in acute community-acquired infections [1]. Overall, Gram-negative bacteria account for roughly 90% of UTIs, while Gram-positive bacteria are responsible for the remaining 10% [3]. *Pseudomonas aeruginosa* is typically implicated in specific clinical contexts, such as following catheterization, urological instrumentation, or in hospital-acquired (nosocomial) infections [4]. Within the Siddha system of medicine, urinary disorders (*siruneer noigal*) are classified into categories including *neerinai arukkal noi*.

The clinical presentation of *Azhal Neerchurukku* within this framework shares significant symptomatic similarities with the modern diagnosis of UTI, allowing for a clinical correlation to be drawn [5]. Understanding the prevalence, rising antibiotic resistance, and associated risk factors of UTIs is crucial for effective management. This study aimed to evaluate the therapeutic outcomes

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associated with the Siddha formulation *Thirikandagathi Kiyaazham* (TKK) in patients presenting with symptoms of *Azhal Neerchurukku* (correlated with UTI) at the outpatient department of the Government Siddha Medical College & Hospital, Palayamkottai.

Literature Review

***Thirikandagathi Kiyaazham*:**

Book Reference: Anubava Vaithiya Deva Ragasiyam (Part-4) [6].

Page no: 527

Year of Publication: 1926

The pharmacological properties attributed to the individual ingredients of TKK are based primarily on *in-vitro*, *in-vivo*, and review literature. While the reported bioactivities are relevant to the pathophysiology of urinary tract infections, direct clinical evidence for TKK's efficacy in UTI in humans is being investigated in the present study.

TABLE 1: INGREDIENTS OF TKK WITH REPORTED PHYTOCHEMICALS AND BIOACTIVITIES RELEVANT TO UTI MANAGEMENT

S. no.	Tamil Name (Part Used)	Scientific Name	Key Reported Phytochemicals	Reported Pharmacological Activities Relevant To UTI
1	*Kadukkai* (Fruit rind)	*Terminalia chebula*	Tannins (chebulic acid), flavonoids, anthraquinone glycosides [7]	Antimicrobial activity against uropathogens Anti-inflammatory Antipyretic effects Antioxidant activity
2	*Nelli* (Dried fruit)	*Emblica officinalis*	Tannins, flavonoids, saponins, ascorbic acid [8]	Broad-spectrum antibacterial activity Anti-inflammatory Immunomodulatory potential High antioxidant capacity
3	*Sirukanpeelai* (Whole plant)	*Aerva lanata*	Alkaloids, flavonoids, lupeol, tannic acid [9]	Diuretic and Antiurolithiatic activity Antimicrobial properties Anti-inflammatory effects

TABLE 2: SHOWS THE PROPERTIES OF TRIAL DRUG TKK AS PER MATERIA MEDICA [10]

S. no.	Drug	Taste	Potency	Post-digestive transformation	Action
1	*Kadukkai thol*	Pungent	Heat	Sweet	--
2	*Nellivatral*	Sweet, Astringent, Sour	Cold	Sweet	Astringent Laxative, diuretic and refrigerant
3	*Sirukanpeelai*	Bitter	Heat	Pungent	Diuretic, Lithontriptic

MATERIALS AND METHODS: Ingredients of *Thirikandagathi kiyaazham* as shown in **Fig. 1.**

1. *Kadukkai thol (Terminalia chebula)* - 1 palam
2. *Nellivatral (Emblica officinalis*) -1 palam
3. *Sirukanpeelai (Aerva lanata*) – 1 palam

FIG. 1: SHOWS THE INGREDIENTS OF THE TRIAL DRUG TKK

Standard Operative Procedures: The raw drug 1, 2 were purchased from raw drug store, Tirunelveli district. Sirukanpeelai was collected from nearby village in Tirunelveli district. They were dried and purified. Required quantity was coarse powdered as kudineer chooranam formulation with a shelf life of 3 monthsas shown in **Fig. 2.** Then the kudineer chooranam was stored in air tight container. The prepared drug is dispensed to the participants in pockets and advised to prepare decotion (kudineer) in 1:4 ratio [11]. A dose of 50 ml of decoction was advised to be mixed with honey as an adjuvant (*Anubanam*). The quantity of honey varied according to the participant's thegi as mentioned in Anubava vaithiya deva ragasiyam.

- For *Vatha thegi*: 12.5 ml (a 1:4 ratio) was specified.
- For *Pitha thegi*: 6.25 ml (a 1:8 ratio) was specified.
- For *Kapha thegi*: 3.13 ml (a 1:16 ratio) was specified

FIG. 2: SHOWS THE PREPARED TRIAL DRUG TKK

TABLE 3: SHOWS THE DETAILED DESCRIPTION OF DRUG PROFILE AND STUDY DESIGN

Drug Profile	
Medicine	Thirikandagathi kiyaazham
Adjuvant	Honey
Dose	50 ml twice a day
Duration	10 days
Study Design	
Study Type	Descriptive study
Study Design	Case series
Study Place	OPD, Government Siddha Medical College, Palayamkottai
Study Period	4 months
Sample Size	20 patients (both male and female)

Methodological Limitations: A major limitation of this study design is the absence of a control or comparator group and the sample size (n=20). Consequently, while the study can describe changes in outcomes following the intervention, it cannot definitively attribute these changes to the drug's efficacy. The findings should therefore be interpreted as preliminary observations.

Methodology: This study was conducted on the campus of the Government Siddha Medical College (GSMC), Palayamkottai. The study protocol was approved by the Institutional Ethics Committee (IEC) (Ref No: GSMC-XIII IEC-Br I/2/24.05.2024) and was prospectively registered with the Clinical Trials Registry - India (CTRI/2024/07/069808). Following these approvals, potential participants were informed about the study's terms and objectives in the regional language, and written informed consent was obtained prior to enrollment. Clinical symptoms were assessed using the UTISA Questionnaire [12], and laboratory investigations (Total WBC count and Urine culture) were performed. Outcomes for each participant were analyzed by comparing pre-treatment and post-treatment data points

TABLE 4: SHOWS THE CRITERIA FOR INCLUSION, EXCLUSION IN THIS STUDY

Inclusion criteria	Exclusion criteria
Age limit: 20 – 60 years.	Chronic kidney disease
Both gender	Autoimmune glomerulonephritis
Patients with symptoms of dysuria	Benign prostrate hypertrophy
Frequency of urination	Renal calculi
Urgency of urination	Diabetes mellitus
Hematuria	Pregnancy & lactating women
Low back pain	
Fever (<103°F)	
Urine culture: Positive	

The exclusion of patients with diabetes mellitus, while limiting the generalizability of findings, was implemented as a safety precaution due to the carbohydrate content of the honey used as an adjuvant, which posed a potential risk for blood glucose dysregulation

Method of Approach:

Clinical Assessment:

Utisa Questionnaire: used at baseline and follow-up.

Laboratory Assessment: Total WBC count, Urine culture.

RESULTS:

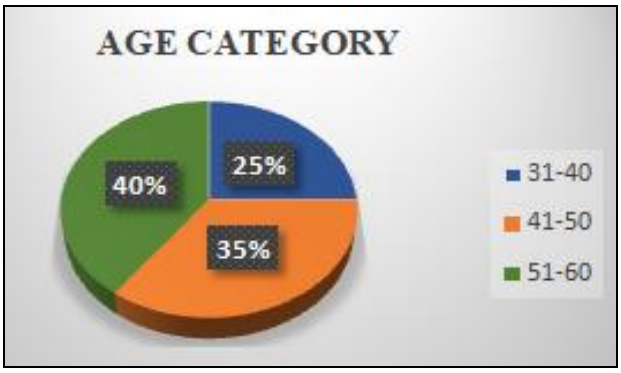

FIG. 3: SHOWS THE AGE GROUPING OF STUDY PARTICIPANTS

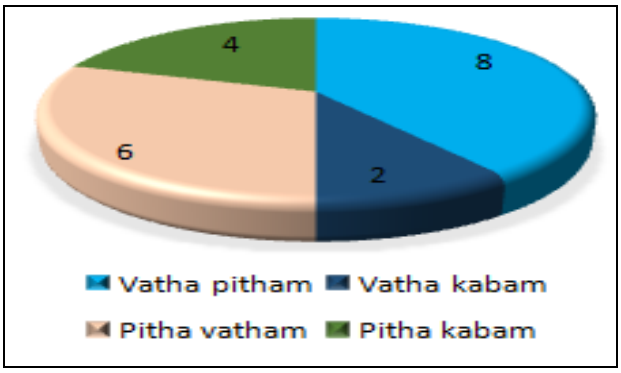

FIG. 4: SHOWS THE NADI DISTRIBUTION OF STUDY PARTICIPANTS

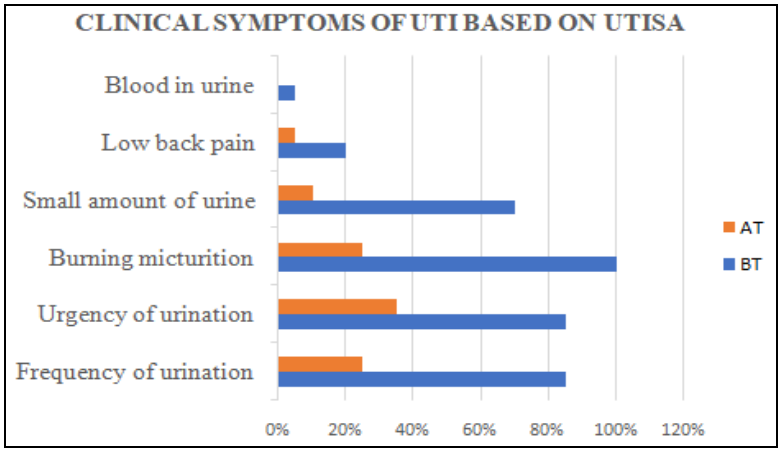

FIG. 5: SHOWS THE CLINICAL SYMPTOMS OF AZHAL NEERCHURUKKU (UTI). (BT- Before Treatment; AT- After treatment)

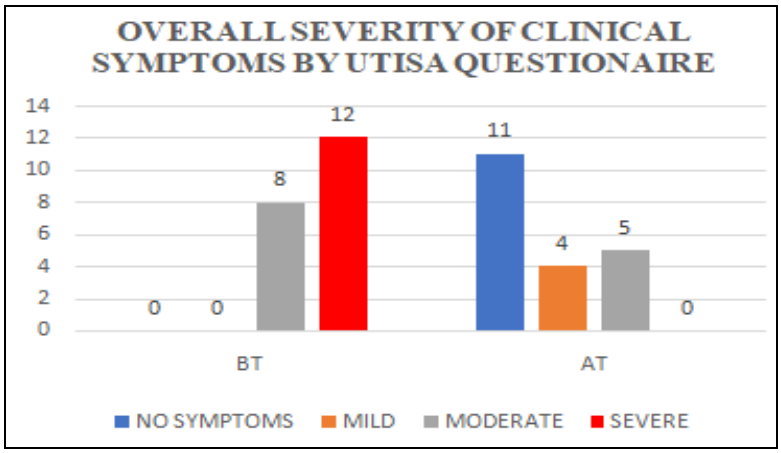

FIG. 6: SHOWS THE SEVERITY OF CLINICAL SYMPTOMS BY UTISA QUESTIONNAIRE

TABLE 5: SHOWS THE STATISTICAL ANALYSIS OF CLINICAL SYMPTOMS BASED ON UTISA (BEFORE AND AFTER TREATMENT)

Variable 1	Variable 2	t value	2 tailed p value	Significance
Frequency BT	Frequency AT	9.245	<0.001	HS
Urgency BT	Urgency AT	8.324	<0.001	HS
Burning Micturition BT	Burning Micturition AT	15.667	<0.001	HS
Small Amounts Of Urine BT	Small Amounts of Urine AT	5.819	<0.001	HS
Low Back Pain BT	Low Back Pain AT	1.161	0.260	Insignificant
Blood In Urine BT	Blood In Urine AT	1.000	0.330	Insignificant
Utisa BT	Utisa AT	13.262	<0.001	HS
T.WBC Count BT	T.WBC Count AT	3.191	.005	HS

TABLE 6: SHOWS THE MEAN AND STANDARD DEVIATION OF TOTAL WBC COUNT (BT & AT)

WBC- Total Count	Mean SD
Before Treatment	9402.00±3578.01
After Treatment	8117.50±2038.78

It is important to note that the clinical significance of this shift is ambiguous. The post-treatment mean remains well within normal physiological limits, and the high variability suggests the change may not be universally applicable or therapeutically meaningful.

TABLE 7: SHOWS THE STATISTICAL ANALYSIS OF WBC COUNT

Variable 1	Variable 2	T value	2 tailed p value	Significance
T. WBC Count BT	T. WBC Count AT	3.191	.005	HS

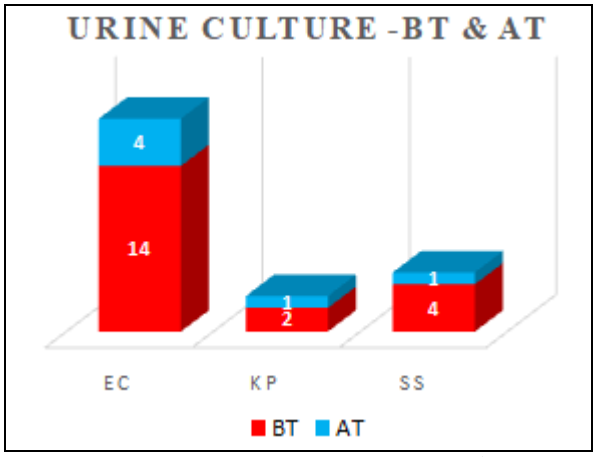

FIG. 7: SHOWS THE URINE CULTURE REPORTS IN TWO POINTS (BEFORE & AFTER TREATMENT). (EC- *Escherichia coli*; KP- *Klebsiella pneumoniae*; SS- *Staphylococcus saprophyticus*)

TABLE 8: SHOWS THE STATISTICAL ANALYSIS OF URINE CULTURE REPORTS

Variable 1	Variable 2	T value	2 tailed p value	Significance
E. coli BT	*E. coli* AT	4.359	<0.001	HS
K. pneum BT	*K. pneum* AT	1.000	0.330	Insignificant
Stap. sapro BT	*Stap. sapro* AT	1.000	0.330	Insignificant

DISCUSSION: Urinary tract infecions (UTI's) rank as one of the most prevalent bacterial infections affecting humans. These infections can vary in severity, but their high incidence makes them a common health concern across both genders. Antibiotic resistance is a critical issue that is escalating globally. In siddha literature, *Azhal neerchurukku* has been found to be equivalent to urinary tract infection [13]. Due to the deranged pitha humor in *Azhal neerchurukku*, drugs like *kadukkai thol* and *nelli vatral* have an effect on burning micturition related to *pitha* characteristics, owing to their properties of being sweet in taste and cold in potency which increases *kabam*. *Sirukanpeelai* have bitter taste. The taste sweet (*Kadukkai thol* & *Nelli vatral*) and bitter (*Sirukanpeelai*) soothens the aggravated *pitham*. In this trial drug TKK, *Terminalia chebula* was shown to have significant antimicrobial and antipyretic activity by suppressing the enhanced formation of various cytokines, thereby inhibiting the synthesis of prostaglandin E (PGE), which is involved in fever induction [14]. *Emblica officinalis* was found to possess antibacterial activity [8]. *Aerva lanata* was found to have antimicrobial properties and potent diuretic effects [15], while *Aerva lanata* promotes diuresis to expel vitiated humor (Pitham). With this background, *Thirikandagathi Kiyaazham* was selected for this case series. In this study, 20 cases were recruited, with a minimum age of 37 and a maximum of 59, over a period of 10 days. *Thirikandagathi Kiyaazham* was administered orally in honey as an adjuvant, with a dosage of 50 ml twice daily. Participants had a mean age of 47.55(50% male, 50% female) and their *Naadi* was reported graphically. The most common types of *Naadi* observed in this study were *Vaathapitham* and *Pithavatham*. After the intervention with

Thirikandagathi Kiyaazham, the overall severity of UTISA Questionnaire and total WBC count improved significantly, with a mean difference of 1,285 cells/cu.mm (from 9,402 cells/cu.mm to 8,117 cells/cu.mm). The prevalence of *E. coli* in urine cultures decreased from 70% of samples pre-treatment to 20% post-treatment. Smaller reductions were observed for *Klebsiella pneumoniae* (from 10% to 5%) and *Staphylococcus saprophyticus* (from 20% to 15%)."A student's t-test was performed on urine culture reports before and after treatment, yielding statistically significant results (p value < 0.05) for *E. coli*. In this preliminary case series, the use of *Thirikandagathi Kiyazham* was associated with observable improvements in clinical symptoms and laboratory parameters in participants with *Azhal neerchurukku* (UTI). Given the uncontrolled design, these findings should be interpreted as generating hypotheses for future rigorous clinical trials.

CONCLUSION: In this case series of 20 patients with *Azhal neerchurukku*, a 10-day intervention with *Thirikandagathi Kiyazham* was associated with observable improvements in clinical symptoms (UTISA score) and microbiological parameters. The formulation was well-tolerated, with no adverse events reported during the study period, and was found to be affordable and easy to administer. These preliminary findings suggest that *Thirikandagathi Kiyazham* may be a promising intervention worthy of further investigation in controlled clinical trials to formally establish its efficacy and safety profile.

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CONFLICTS OF INTEREST: Nil

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