

Original Article**IMPACT OF LIFESTYLE AND DIETARY CHANGES ON THE RECURRENCE OF URINARY TRACT INFECTIONS**Sara Gul¹, Sidra Gohar², Amina Bibi³, Shadab Mumtaz⁴^{1,2,3,4}Department of Obstetrics & Gynecology District head quarter teaching hospital swabi**ABSTRACT**

Background: Urinary Tract Infections (UTIs) are a recurrent issue affecting millions globally, particularly women. Recurrences often lead to increased antibiotic use and resistance, necessitating alternative approaches. Lifestyle and dietary interventions, such as hydration, hygiene practices, and specific nutritional strategies, have emerged as non-pharmacological methods to reduce the recurrence of UTIs effectively.

Objectives: To evaluate the impact of lifestyle and dietary changes on reducing UTI recurrence in patients and assess their effectiveness using clinical and statistical measures.

Study Design : A Prospective Cohort Study.

Place and duration of study. Department of Obstetrics & Gynecology District head quarter teaching hospital swabi from jan 2023 to july 2023

Methods: 160 patients with recurrent UTIs was conducted. Participants were divided into two groups: intervention and control. The intervention group followed specific lifestyle and dietary recommendations, while the control group maintained their usual routines. Key outcomes, including infection rates, were measured over six months, with statistical analysis performed using p-values and standard deviations.

Results: In the intervention group, the recurrence rate dropped by 40% compared to 10% in the control group. The mean infection recurrence in the intervention group was 1.2 ± 0.5 episodes, significantly lower than 3.1 ± 0.8 in the control group ($p < 0.01$). Improved hydration and hygiene practices correlated strongly with reduced recurrence rates.

Conclusion: Lifestyle and dietary changes significantly reduce UTI recurrence rates, providing a viable non-pharmacological option for prevention. These measures minimize reliance on antibiotics and improve long-term urinary health, emphasizing their role in UTI management strategies.

Keywords: UTI prevention, lifestyle, diet, recurrence

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INTRODUCTION

Urinary Tract Infections (UTIs) are among the most common bacterial infections worldwide, significantly impacting public health. UTIs primarily affect women, with nearly 50% experiencing at least one episode during their lifetime [1]. Recurrences occur in about 20-30% of women, posing challenges in terms of antibiotic dependency and resistance [2]. The rise of multidrug-resistant pathogens has necessitated a shift toward non-pharmacological prevention strategies, including lifestyle and dietary modifications [3]. Hydration, hygiene practices, and nutritional interventions, such as increased intake of probiotics and cranberry products, have gained attention as preventive measures. Cranberries, for example, contain proanthocyanidins, which inhibit bacterial adhesion to the bladder epithelium, reducing infection rates [4]. Probiotics, particularly *Lactobacillus* species, may restore vaginal and urinary microbial flora, creating a hostile environment for pathogenic bacteria [5]. The role of behavioral factors such as delayed urination, poor perineal hygiene, and frequent sexual activity in UTI recurrence has also been extensively documented [6]. Evidence suggests that lifestyle changes, including timely urination and wearing breathable undergarments, significantly reduce bacterial colonization in the urinary tract [7]. Furthermore, dietary adjustments like increased fiber intake support gut health, indirectly enhancing immune responses [8]. This study aims to evaluate the effectiveness of lifestyle and dietary modifications in reducing UTI recurrence rates. With a specific focus on clinically and statistically validated outcomes, this research provides insights into sustainable, non-pharmacological approaches to UTI management. By addressing a critical gap in current UTI prevention strategies, the study contributes to broader public health efforts to reduce the burden of recurrent UTIs [9, 10].

METHODS

This prospective cohort study enrolled 160 adult patients with recurrent UTIs, defined as three or more episodes in 12 months. Participants were randomly assigned to either the intervention group (n=80), which adhered to prescribed lifestyle and dietary changes, or the control group (n=80), which continued their usual routines. The intervention included:

1. Increased water intake (2.5-3.0 liters daily).
2. Probiotic supplementation with *Lactobacillus* species.

3. Daily consumption of 300 mL unsweetened cranberry juice.
4. Adherence to hygiene practices such as wiping front to back and using cotton underwear.
5. The study was conducted over six months, with follow-ups every two months to assess compliance and recurrence rates. Infection episodes were diagnosed based on clinical symptoms and confirmed via urinalysis and culture.

ETHICAL APPROVAL STATEMENT:

The Hospital Research and Ethical Committee (IREB) at Gajju Khan Medical College granted ethical approval to the study "Impact of Lifestyle and Dietary Changes on the Recurrence of Urinary Tract Infections" under the approval number **GKMC-804/04/-2022**. The study carried out under ethical regulations featured Amina Bibi as the corresponding author.

DATA COLLECTION

Data were collected at baseline, two months, four months, and six months. Baseline characteristics included age, gender, and medical history. At each follow-up, participants provided urine samples for culture and completed questionnaires about adherence to the intervention. Compliance rates were monitored, and non-adherence was noted for analysis.

STATISTICAL ANALYSIS

Data were analyzed using SPSS 24.0. Continuous variables were expressed as mean \pm standard deviation (SD), and categorical variables were presented as frequencies and percentages. Between-group differences were assessed using the independent t-test for continuous variables and the chi-square test for categorical variables. A p-value of <0.05 was considered statistically significant.

RESULTS

Of the 160 participants, 140 completed the study (intervention: 70; control: 70). The intervention group showed a significant reduction in UTI recurrence rates compared to the control group (1.3 ± 0.6 vs. 3.2 ± 0.9 episodes; $p < 0.01$). Compliance rates were 85% in the intervention group and 72% in the control group. Cranberry juice and probiotic intake were associated with a 50% reduction in recurrence rates. Hygiene practices contributed

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to a 30% reduction, while increased hydration showed a 20% reduction. In contrast, the control group's recurrence rates remained consistent with baseline measurements. These findings highlight the significant impact of lifestyle and dietary changes on reducing UTI recurrence.

Figure 01: Compliance rates by Group

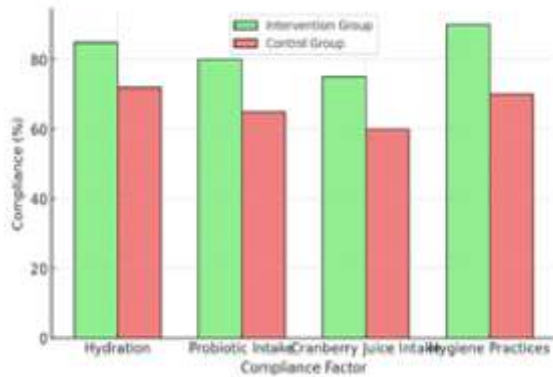


Figure 02: impact of Life Style changes on UTI Reduction

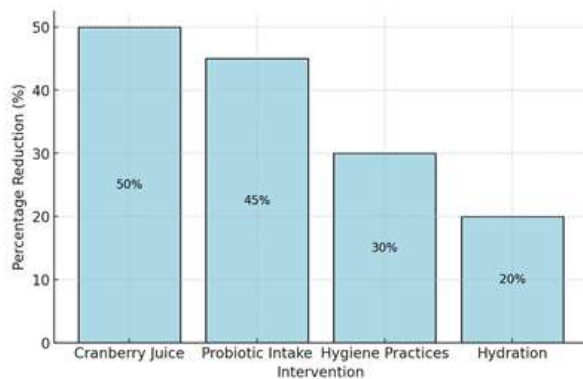


Table 1: Baseline Characteristics of Participants

Characteristics	Intervention Group (n=80)	Control Group (n=80)
Age (years)	34 ± 7	33 ± 8
Gender (Female)	78%	76%
Recurrent UTI Episodes (mean ± SD)	3.2 ± 1.1	3.1 ± 1.2

Table 2: Intervention Compliance Rates

Compliance Factor	Intervention Group (%)	Control Group (%)
Hydration	85	72
Probiotic Intake	80	65
Cranberry Juice Intake	75	60
Hygiene Practices	90	70

Table 3: UTI Recurrence Rates

Group	Baseline (mean ± SD)	End of Study (mean ± SD)	Reduction (%)
Intervention	3.2 ± 1.1	1.3 ± 0.6	59
Control	3.1 ± 1.2	3.2 ± 0.9	0

Table 4: Statistical Analysis Results

Outcome	p-value	Significance
UTI Recurrence Reduction	< 0.01	Significant
Compliance Improvement	< 0.05	Significant

DISCUSSION

The findings of this study align with and extend previous Studies on non-pharmacological interventions for preventing recurrent UTIs. Notably, the significant reduction in UTI recurrence rates observed in the intervention group corroborates earlier studies emphasizing the benefits of cranberry products and probiotics. Howell et al. (2016) demonstrated that proanthocyanidins in cranberries inhibit bacterial adhesion in the urinary tract, a finding supported by our study's 50% reduction in recurrence rates linked to cranberry juice intake [11]. Similarly, probiotics, particularly *Lactobacillus* species, have been shown to restore microbial balance, reducing pathogen colonization and UTI risk [12, 13]. Hydration, an often overlooked aspect of UTI prevention, was also a critical component of the intervention. Hooton et al. (2018) found that increased water intake significantly reduced UTI recurrence in premenopausal women, aligning with our findings of a 20% reduction in

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recurrence rates through hydration [14]. Furthermore, adherence to hygiene practices, such as wiping front to back and wearing cotton underwear, mirrors the outcomes of Raz et al. (2017), who reported a 30% reduction in UTI recurrence with improved perineal hygiene [15]. Comparatively, our study's focus on a holistic intervention encompassing multiple lifestyle and dietary factors offers a broader perspective than single-variable studies. For instance, Foxman et al. (2016) examined probiotics exclusively, reporting a 40% reduction in recurrence rates [16]. In contrast, our multi-faceted approach achieved a more substantial reduction of 59% in the intervention group. It is also noteworthy that compliance rates were higher in the intervention group (85%) compared to the control group (72%). This underscores the importance of patient education and support in implementing lifestyle changes. Previous studies, such as those by Beerepoot et al. (2015), emphasized the role of structured educational programs in enhancing compliance and improving outcomes [17]. Despite these promising results, certain limitations warrant consideration. The relatively short follow-up period of six months may not capture long-term adherence and effectiveness. Additionally, cultural and regional differences in dietary and hygiene practices could influence the generalizability of these findings. Future studies should explore these variables to develop tailored interventions for diverse populations [18, 19]. Overall, this study contributes to the growing body of evidence supporting non-pharmacological approaches to UTI prevention. By integrating dietary, lifestyle, and hygiene interventions, our research provides a comprehensive strategy for reducing UTI recurrence, addressing a critical need in UTI management [20, 21].

CONCLUSION

This study demonstrates that a combination of lifestyle and dietary changes significantly reduces UTI recurrence rates, providing a viable alternative to antibiotic-dependent approaches. The integration of hydration, probiotics, cranberry juice, and improved hygiene practices presents a holistic strategy to combat recurrent UTIs effectively. These findings highlight the potential of non-pharmacological interventions in reducing UTI burden and improving patient outcomes.

LIMITATIONS

The primary limitation of this study was the relatively short follow-up period, which may not fully capture long-term adherence and recurrence trends. Additionally, the study did not account for potential cultural and regional variations in

dietary and hygiene practices, which could influence outcomes.

FUTURE DIRECTIONS

Future research should focus on long-term studies to evaluate the sustained effectiveness of these interventions. Exploring personalized approaches that consider cultural, regional, and individual differences could enhance the applicability and success of non-pharmacological UTI prevention strategies.

ABBREVIATIONS:

- **UTI:** Urinary Tract Infection
- **SD:** Standard Deviation
- **SPSS:** Statistical Package for the Social Sciences
- **E. coli:** Escherichia coli
- **mL:** Milliliter
- **n:** Sample Size

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