

## ORIGINAL ARTICLE

**Efficacy of Cranberry Juice in the Prevention of Recurrent Urinary Tract Infection**UZMA AZIZ<sup>1</sup>, SHAZIA KHALID KHAN<sup>2</sup>, UZMA ALTAF<sup>3</sup>, ALIA ZAINAB<sup>4</sup>, ANIKAH KANWAL<sup>5</sup>, FARHAT NAZ<sup>6</sup><sup>1</sup>Gynecologist, Mansoor Teaching Hospital, Lahore<sup>2</sup>Associate Professor, Gynae Unit 3, Allama Iqbal Medical College/Jinnah Hospital, Lahore<sup>3,5</sup>Senior Registrar, Lady Willingdon Hospital, Lahore<sup>4</sup>Associate Professor, Fatima Jinnah Medical University, Lahore.<sup>6</sup>Gynae Unit 3, Allama Iqbal Medical College/Jinnah Hospital, LahoreCorrespondence to Dr. Shazia Khalid Khan, Email: [shaziakhalid98@gmail.com](mailto:shaziakhalid98@gmail.com). Contact No: 03334292490**ABSTRACT****Background:** One of the most common bacterial infections in primary care is urinary tract infections, which are second only to respiratory infections. Women are at higher risk of developing IBD. Cranberry has long been known for its beneficial effects on urinary tract health. Clinical trials have shown that regular consumption of cranberry juice can prevent UTI.**Aim:** To determine the efficacy of cranberry juice in prevention of recurrence of urinary tract infection in females with recurrent UTIs presenting in a tertiary care hospital.**Study design & duration:** Descriptive Case Series from 01-04-2016 TO 30-09-2016.**Setting:** Department of Obstetrics and Gynaecology, Jinnah Hospital, Lahore.**Methods:** A total of 160 females were prescribed 300mg concentrated cranberry extract twice daily for 12 weeks. Females were followed up in OPD at 6 weeks and 12 weeks for evaluation of symptoms and sign determined on clinical examination and a urine culture for recurrence of UTI, if symptoms of UTI and a +ve culture noticed during follow-up period then recurrence was labeled.**Results:** Patients ranged between 18-40 year. Mean age of the patients was 30.78±6.55 years. Total no of cases was 160, 49 patients (30.6%) were primigravida and 111 patients (69.4%) were multigravida. Efficacy of cranberry extract was observed in 130 cases (81.3%). Stratification with regard to age, and parity was carried out**Conclusion:** In conclusion, the results of the present study support that cranberry extract associated with protective effect against recurrent urinary tract infections in our population.**Keywords:** Recurrent urinary tract infection, Cranberry extract, Prevention**INTRODUCTION**

Urinary tract infections (UTIs) are very common in women, especially between the ages of 15-39 and 40-79, respectively, and the average annual frequency of UDIs is about 10-15%. Due to its numerous clinical manifestations, IBD remains one of the most common but widely misunderstood infectious diseases in clinical practice. Recurrent IUDs remain an important problem for women and a difficult problem for treating physicians<sup>1</sup>.

Recurrent urinary tract infection (IUI) is defined as three episodes of urinary tract with 3 positive urinary cultures in the previous 12 months or two episodes in the last six months<sup>1</sup>. Recurrent UTIs in women are presented as one of the most difficult problems for physicians. Approximately 25% of women present with an isolated UTI history<sup>1</sup>.

Additional standardized studies are important to determine the benefits of Cranberry for the prevention of IBD. Cranberry pills have been shown to be twice as effective as cranberry juice for patients interested in cranberry prophylaxis<sup>2,3</sup>.

In vitro and ex-vivo studies have shown that proanthocyanidine (a highly concentrated chemical in coral) has a dose-dependent effect on the adhesion and displacement of E. coli from urine cells<sup>2</sup>.

The use of cornel water to prevent and treat UTI has long been published in the literature. Some studies have suggested support for the use of cranberry juice in the prevention of IBD, but there was insufficient evidence to recommend the use of cranberry in the treatment of IBD. The literature states that cornel (juice or capsule) significantly reduces the IEI rate in sexually active women. Evidence supports the use of cranberries in the prevention of UTI in some populations, but there is little evidence to support its use as a treatment<sup>4</sup>.

One study has reported that after the use of cranberry, the recurrence rate or UTI was 19.3%<sup>5</sup>. Another study has reported almost same results and showed that there were 20% females who had recurrent UTI after management with cranberry juice<sup>6</sup>.

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Rationale of this study was that cranberry has been extensively used for many years for the prevention and treatment of UTI. Cranberry juice is a natural product and can be digested easily and can be used for prolonged time. Injudicious use of antibiotics over time has increased the incidence of UTI due to development of resistance and poor patients' compliance. Not much work has been done regarding the efficacy of cranberry juice in our population. Trials in developed countries have shown its effectiveness and are being preferred over antibiotics. Moreover, there was no local reference found in literature which can help us in implementing the use of cranberry juice for prevention of UTI from recurrence. So, we want to conduct this study to find its efficacy in local population. So that in future we can implement the results of this study, that will not only be beneficial to patients but also helps physicians to delineate guidelines for management of these patients.

The objective of the study was to determine the efficacy of cranberry juice in prevention of recurrence of urinary tract infection in females with recurrent UTIs presenting in a tertiary care hospital.

**OPERATIONAL DEFINITIONS**

**Recurrent Urinary Tract Infection:** was defined as urinary infection in a woman within three months period due to bacterial reinfection or in the urine 2 weeks after treatment and was determined on subjective complaints of painful and frequent urination i.e. twice of normal and at night > 3 times. Urgency hematuria of supra-pubic pressure and a positive urine culture with bacterial colony count of > 103 colony-forming units/mL of a typical urinary tract organism.

**MATERIAL AND METHODS**

After permission from IRB this descriptive case series was conducted in the Department of Obstetrics and Gynaecology, Unit-III, Jinnah Hospital, Lahore. The survey was conducted for six months from 01.04.2016 to 30.09.2016. A sample size of 160

events was calculated for women treated with cranberry juice in a tertiary care hospital, with a 95% reliability level, a 5% error margin, and an expected efficacy percentage of 80.7%<sup>15</sup>. Sampling technique used was nonprobability consecutive sampling.

**Inclusion Criteria:** Females of 18-40 years of age had at least  $\geq 3$  urinary symptoms (painful, frequent urination, urgency, hematuria) and fulfills the criteria of recurrent urinary tract infection (as per operational definitions).

#### Exclusion Criteria

1. Pregnant females determined on history and examination.
2. Patients with diabetes mellitus (BSR > 186mg/dl)
3. Patients who had received antibiotics in previous 48 h or hospitalization or catheterization within the last 2 weeks (as per medical record).
4. Patients with kidney stones (on medical record and history).
5. History of cranberry allergy determined on history.

**Data collection procedure:** 160 women who met the selection criteria were included in the study from the OPD of the Department of Gynecology and Obstetrics at Cinnah Hospital, Lahore. Informed consent was obtained Demographic information (name, age, parity relationship) was also recorded. All women were then given 300 mg of concentrated cornel extract twice daily for 12 weeks. Women were followed at 6 weeks and 12 weeks for OPD, a clinical examination was performed to assess symptoms and signs, and a urinalysis was performed for recurrence of IBD, and if follow-up IBD symptoms and a positive culture were detected, recurrence was labeled (according to surgical definition). Data entry and analysis was performed using SPSS 20.0 software. Quantitative variables were presented using mean  $\pm$  SD as age, recurrence time. Qualitative variables are presented using frequencies and percentages such as efficiency and parity. Data are stratified by age and parity. The stratified group was compared using the X-square test. The value of P <0.05 was considered significant.

## RESULTS

A number of 160 patients were included in this study during the study period of six months from 01-04-2016 to 30-09-2016. Patients ranged between 18-40 year. Mean age of the patients was 30.78 $\pm$ 6.55 years (Table-1). Out of 160 cases, 49 patients (30.6%) were primigravida and 111 patients (69.4%) were multigravida (Table-2). Efficacy of cranberry extract was observed in 130 cases (81.3%) (Table-3). Stratification with regard to age, and parity was carried out and presented in Tables 4 and 5.

Table-1: Distribution of cases by age

Age (in years)	Frequency	%age
18-30	76	47.5
31-40	84	52.5
<b>Total</b>	<b>160</b>	<b>100.0</b>
<b>Mean<math>\pm</math>SD</b>	<b>30.78<math>\pm</math>6.55</b>	

Table2: Distribution of cases by parity

Parity	Frequency	%age
Primigravida	49	30.6
Multigravida	111	69.4
<b>Total</b>	<b>160</b>	<b>100.0</b>

Table3: Distribution of cases by efficacy

Option	Frequency	%age
Yes	130	81.3
No	30	18.8
<b>Total</b>	<b>160</b>	<b>100.0</b>

Table-4: Stratification with regard to age

Age	Efficacy		Total
	Yes	No	
18-30	63	13	76
31-40	67	17	84
<b>Total</b>	<b>130</b>	<b>30</b>	<b>160</b>

Chi square =0.257, P value=0.612

Table-5: Stratification with regard to parity

Parity	Efficacy		Total
	Yes	No	
Primigravida	37	12	49
Multigravida	93	18	111
<b>Total</b>	<b>130</b>	<b>30</b>	<b>160</b>

Chi square=1.527, P value0.216

## DISCUSSION

Treatment of recurrent urinary tract infections (UTIs) in women is one of the most difficult tasks for physicians to treat, affecting approximately 25% of women with isolated IUDs<sup>7</sup>. Urinary tract infection occurs when bacterial virulence increases and the host's defense mechanisms decrease, resulting in bacterial inoculation and colonization. Careful diagnosis and treatment often result in an effective outcome of infections. Understanding the pathogenesis of UTI and the role of host and bacterial factors results in better treatment of recurrent urinary tract infection<sup>8</sup>. By looking more closely at this process, we can improve our ability to identify high-risk patients and reduce morbidity.

The urinary tract is usually sterile, but bacteria from the perianal area can cause UTIs. Bacteria in the urinary tract can be asymptomatic or cause symptoms such as frequency and urgency. The infection can spread to the upper urinary tract and, if left untreated, can cause fever, chills, and side pain. The entry of bacteria into the bloodstream is associated with serious illness, including sepsis and death<sup>9</sup>.

As a component of cranberry juice—a conventional food that also is classified as a functional food—proanthocyanidin may decrease the risk of UTIs. The American cranberry (*Vacciniummacrocarpon*) came into use for UTI prevention in the 1920s when scientists noted that urine became more acidic after ingesting large quantities<sup>10</sup>. The UTI preventive mechanism of cranberry juice is due to the anti-adhesive properties of proanthocyanidins and fructose as they act against adhesive molecules of *E. coli*<sup>9</sup>. These combinations inhibit the adherence of *E. coli* to tissues, thereby preventing infection.

The first randomized, double-blind, placebo-controlled trial to investigate the clinical relevance of using cranberry juice for preventing recurrent UTIs appeared in 1994<sup>11</sup>. Significantly less bacteriuria with pyuria was found in the patients using cranberry cocktail versus those in the placebo group (odds ratio 0.42 [95% CI 0.23–0.76], P =0.004). This effect persisted when considering history of UTI for the 6 months preceding the study. A trend toward a reduction in bacteriuria occurred irrespective of pyuria; however, this did not attain statistical significance. The study also noted that time to benefit was between 1 and 2 months of regular ingestion.

In present study, effectiveness of cranberry juice in prevention of recurrence of urinary tract infection was observed 81.3%. Our results are comparable with the study of Barbosa-Cesnik et al (2011)<sup>5</sup>. They reported 80.7% efficacy of cranberry juice in prevention of recurrence of UTI.

Conflicting evidence exists about the clinical efficacy of cranberry juice for preventing recurrent UTI. Although some studies have found a statistically significant difference in bacteriuria associated with pyuria others have found no difference in development of symptomatic UTI compared with placebo. Differences in study outcomes may result from variation in the proanthocyanidin concentrations of the products used or from other uncontrolled factors (i.e., acidity) through which cranberry juice may impart a protective effect. Published evidence suggests that cranberry may benefit older women with recurrent UTIs caused by *E. coli*<sup>11</sup>.

In a 2008 Cochrane study, Jepson et al<sup>12</sup> reported that cranberry juice was effective in preventing characteristic IBD, especially in women with recurrent IBD.

The superior prophylactic effect of cornel products was noted with a dose of more than twice a day. According to in vitro data, more than twice a day may be a better choice, as the anti-adhesive effect of cranberry juice on fimbriated *E. coli* lasts approximately 8 hours after ingestion<sup>13</sup>.

## CONCLUSION

In conclusion, the results of this study prove that cranberry extract is associated with a better protective effect against recurrent urinary tract infections in our population.

**Conflict of interest:** Nil

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