

## TREATMENT OF RECURRENT URINARY TRACT INFECTION BY 538NM (GREEN COLOUR) ELECTROMAGNETIC RADIATION

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**ABSTRACT:** The study objective was to conduct a randomized, placebo controlled clinical trial to assess the treatment option of recurrent urinary tract infections (RUTIs) by color therapy, an alternative treatment recently emerging with serious scientific background. Sixty pregnant female patients with the history of RUTIs were enrolled in Mansoorah Al-Khidmat Teaching Hospital, Lahore (Pakistan) between 17<sup>th</sup> October to 27<sup>th</sup> October, 2015. Chromotherapy was adopted as the method of treatment for RUTIs for one group (n=30), using the method of hydrochromotherapy. Green Chromotized water was given to the patients. The remaining patients (n=30) were given placebo treatment. At the end of three-week study, the patients free of UTI was significantly lower in chromotherapy group as compared to placebo (p<0.001 by Log-Rank test). It was concluded that 538 nm radiations can be used for treating RUTIs in the presence of anti-microbial resistance.

**Keywords:** Colour therapy, visible range radiation therapy and Recurrent Urinary Tract Infection.

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### INTRODUCTION

Urinary tract infections (UTIs) have been classified as the most common diseases encountered in clinical practice and are primarily caused by *Escherichia coli*, a gram negative bacterium (Murugan *et al.*, 2012; Chakupurakal *et al.*, 2010). During pregnancy, they have become the most encountered bacterial infections (Cunningham and Lucas, 1994). Conventional therapy for recurrent urinary tract infections (RUTIs) currently comprise of repeat treatment with standardized antibiotic therapy or antibiotic prophylaxis. However, some of the side effects of antibiotics include fungal infections and the emergence of antibiotic resistant micro-organisms (Holmes *et al.*, 2016), complicating the situation in pregnancy. The growing pattern of antibiotic resistance in *E. coli* borne diseases immediately signifies the problem of anti-microbial resistance (Mukherjee *et al.*, 2013). This brings us to the search for an alternative therapy that can effectively be used to treat *E. coli* borne diseases.

An alternative treatment to antibiotics is chromotherapy for UTI susceptible women. Phototherapy and visible range radiation therapy/ colour therapy are old therapeutic systems used successfully for treating diseases but are recently emerging as a viable therapeutic technique in the field of energy/vibrational medicine with important implications particularly in the regimen of bacteria borne diseases, with serious scientific background (Azeemi, 1999; Azeemi and Raza, 2005). Works on chromotized water as an efficient medium for Colour therapy have been the key towards using Colour

therapy to treat various health conditions (Azeemi, Raza, *et al.*, 2008).

Visible electromagnetic radiations are the generators of electrical impulses and magnetic currents or fields of energy that are prime activators of the biochemical and hormonal processes (Klotsche, 1993). Previously, Visible range electromagnetic radiations have also been shown to profoundly affect parasitic growth (Azeemi *et al.*, 2011).

There is a documented evidence regarding the treatment of UTI by 538nm visible range electromagnetic radiation through water as a medium (Azeemi, 1999). Our previous report investigated the *in vitro* effects of visible range radiations on *E. coli* (Azeemi *et al.*, 2017) and after successful inhibition of *E. coli* with 538 nm (Green Colour), suggested clinical trials to further verify this mode of treatment. Thus, in this report, we conduct randomized controlled clinical trials. We aimed to understand the effect of visible range electromagnetic radiations in Recurrent UTIs.

### MATERIALS AND METHODS

**Sample preparation:** Procedure for preparing water through the principles of hydrochromotherapy was as follows: Transparent glass bottles each with 1 litre capacity were wrapped with 538nm (green) filter sheets (purity: 15%; transmission: 37%). Bottles were filled with 750mL of distilled water. On a piece of wood (non-conducting surface), these bottles were placed in sunlight for 6 hours to facilitate the preparation process.

Methodology for chromotized water sample preparation was adopted from (Azeemi, 1999).

**Patients and study design:** Eighty pregnant female patients complaining of urine micturition from the past 2-7 days were enrolled in Mansoorah Al-Khidmat Teaching Hospital, Lahore (Pakistan) at the Department of Obstetrics and Gynecology between 17<sup>th</sup> October to 27<sup>th</sup> October. All the patients with ages between 25 and 35 and had 3 or more UTI episodes during the last year and were between 3-8 months of gestation. Antimicrobial prophylaxis was not being taken by them. No women with anatomical abnormalities or medical disorders during the pregnancy such as Hepatitis, Hypertension, Diabetes were considered for the study. None of the patients were suffering from any other disease. Laboratory diagnosis confirmed 62 out of 80 patients with *E. coli* borne UTI. An *E. coli* caused UTI was defined by the symptoms e.g. increased frequency, dysuria and flank pain etc. and a culture of a morning mid-stream urine specimen with more than  $10^5$  CFU of *E. coli* per milliliter (Manges *et al.*, 2001). Out of the 62 patients with *E. coli* borne UTI, 60 patients were selected and randomised by 1:1 into two groups; (n=30) to chromotherapy group or to placebo, (n=30). The simple randomisation was done using a generated list of random numbers by a computer software.

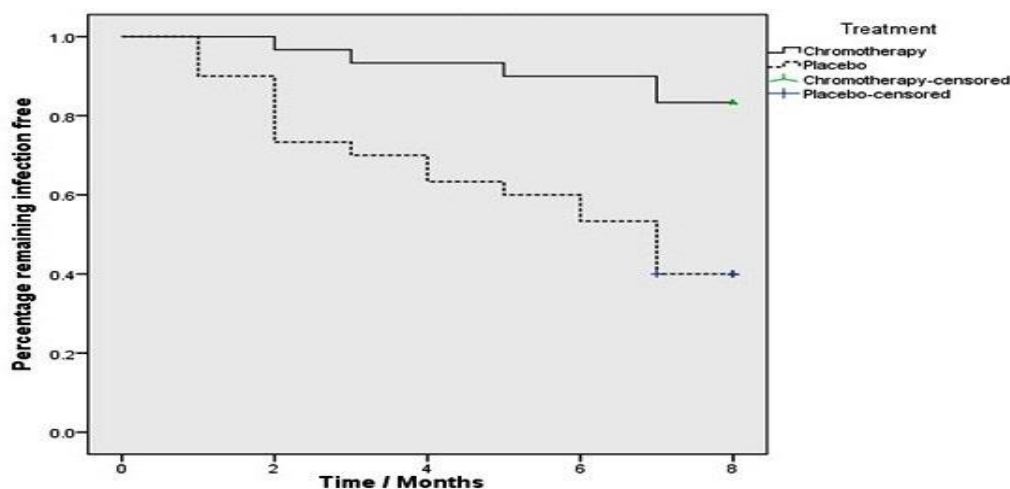
With the complete written consent of patients, Chromotherapy was adopted as the method of treatment for Recurrent UTIs for one group (n=30), using Hydrochromotherapy (the procedure that uses chromotized water as the medium). This method was chosen considering the simplicity as well as the quick absorption of the chromotized water. Chromotherapy group was advised to take 90 ml (3 oz.) of green (538

nm) chromotized water thrice a day one hour after each meal for three weeks. The placebo group was given simple mineral water for an equal amount i.e. three weeks.

Standard antimicrobials were used to treat UTI. The Urine sample collected had to be bacteria free before the women were scheduled for chromotherapy or placebo treatment. Whenever a participant had symptoms suggestive of UTI (increased frequency, dysuria, urgency, nocturia, hematuria, flank pain or fever), a clean morning midstream urine sample was obtained. All the analysis' were performed at the clinical microbiology laboratory in Mansoorah Hospital, Lahore. Standard procedures were used to culture the samples immediately, and the criterion for infection was  $>10^5$  CFU/ml. Only the cultures with bacterial growth  $>(10^5$  CFU/ml) were recorded as events. Kaplan-Meier Analysis was carried out using SPSS Version 20 (Fig.1).

## RESULTS

During the period of eight months, five (16.7%) women in the chromotherapy group and 18 (60%) in the placebo group had at least one episode of UTI, out of total 23 episodes of UTI. Cumulative proportion of the patients remaining free of urinary tract infection as clearly indicated by Kaplan Meier Analysis was significantly lower in the chromotherapy than in the placebo group ( $p<0.001$  by Log-Rank test). 95% confidence interval for chromotherapy group is 7.0-8.0 and 4.5-6 for placebo. This is the clear indication of the successful prevention of urinary tract infections through visible range electromagnetic radiations.



**Figure-1: Kaplan Meier Analysis showing the Cumulative rate of first recurrence of urinary tract infection during the 8 months follow up in women receiving chromotherapy or placebo for three weeks. The difference between the two groups was significant ( $P<0.001$ ) after 8 months of follow-up). This shows that cumulative proportion of the patients remaining free of urinary tract infection as clearly indicated by Kaplan Meier Analysis was significantly lower in the chromotherapy than in the placebo group.**

## DISCUSSION

Electromagnetic energy fields including microwaves, radio-frequencies, and the visible electromagnetic radiations, have been shown to greatly impact every characteristic of biological regulation. Cell division, DNA, RNA, protein synthesis and nerve conduction, are all affected by specific frequencies of electromagnetic radiation (Candace Pert and Oschman, 2000). There is sufficient evidence in the photo-biological literature on the effects of long wavelength ultraviolet and near visible range radiations on *Escherichia Coli* (Eisenstark, 1987; Hollaender, 1943). Visible light lasers acting as bactericidal agents have proven useful in removing bacterial biofilms (Nandakumar *et al.*, 2006).

Recurrent UTIs are major therapeutic concerns especially in pregnancy where antibiotic resistance is a major problem. Not only is the increase in resistance of Gram-negative bacteria faster than in Gram-positive bacteria, but also there are fewer new and developmental antibiotics active against Gram-negative bacteria (Wise and Piddock, 2010). Several of alternative therapies have emerged for RUTIs including cranberry juice for UTI susceptible women (Burleigh *et al.*, 2013; Hisano *et al.*, 2012). However, Visible Range Radiation therapy / Color Therapy is recently emerging as a viable therapeutic technique in the field of energy/vibrational medicine (Benchea *et al.*, 2015; Elkina *et al.*, 2013; Gul *et al.*, 2015), with important implications particularly in the regimen of bacteria borne diseases. In our previous report, we investigated the *in vitro* effects of visible range radiations on *E. coli* (Azeemi *et al.*, 2017) and the analysis of the SEM images of irradiated *E. coli* samples showed that the most profound inhibitory effects on *E. coli* amongst every applied radiation in the visible region were that of 538nm Visible Range Radiation (Green) which proved to be bactericidal.

Previously, a conjecture describing charged quantization phenomena in water samples that were chromotized, was also developed pertaining to hydrochromotherapy, which conjectured that quantum mechanical dipole moment of water molecules after the absorbance of different visible range electromagnetic radiations in the irradiated water samples may lead to the charge quantization phenomena. The water molecules which acquire vibrational energies produce a geometrical shape *i.e.*, heptagon, pentagon, hexagon, and nanogon with molecules having same frequency of any visible color (resonant states) (Azeemi, S. Mohsin Raza, *et al.*, 2008). These geometrical structures in chromotized water are responsible to influence the migration rate of the ions, salts, etc. within intra macromolecule cells. This may constitute as one of the primary reasons Hydrochromotherapy helps in getting a relief from

various diseases (Azeemi, Raza, *et al.*, 2008; Mayer and Bhikha, 2014).

One of the advantages of visible light is, that instead of mercury arc lamps, simple color filter sheets under bright sun / full spectrum light bulb could be used, which are commercially available and therefore cost-efficient concerning the visible light spectrum. Due to the simplicity of the whole procedure and the quick absorption of chromotized water, this method was adopted for pregnant patients. This is absolutely non-teratogenic, without any risk of adverse reactions or side-effects. As the results show, there was a persistent and clear difference in the occurrence of urinary tract infection between the Chromotherapy and placebo.

**Conclusion:** It was concluded that 538 nm radiations can be used for treating recurrent UTIs in pregnancy against resistant *E.coli*.

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