

# Correlation between Inadequate Intake of Water and Prevalence of Renal Calculi – A Survey.

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## Abstract :-

### **Aim :-**

To do a survey on prevalence of renal calculi due to inadequate intake of water.

### **Objective :-**

About 20% of the population develop renal stones for which dehydration is the main risk factor.

### **Back Ground:-**

Dehydration leads to low volume of urine excretion and higher concentration of urinary compounds. since the urine excretion is low, the urine stays for a longer time in the bladder. This is the main cause for the formation of renal stones. People who live in tropical countries tend to lose water by perspiration which leads to a high prevalence of renal calculi. Other reasons also has to be explored.

### **Results:-**

From the results it is evident that the occurrence of renal calculi was associated with the people whose food is rich in tomatoes and non vegetarian food. The occurrence is also more for the people whose intake of water is inadequate.

**Keywords:** renal calculi, renal stone, dehydration, supersaturation, crystallisation, urinary pH.

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## INTRODUCTION :-

Kidney stones, one of the most painful of the urologic disorders, are not a product of modern life. Unfortunately, kidney stones are one of the most common disorders of the urinary tract. A large number of people are suffering from urinary stone problem all over the globe.

Kidney stones, which are solid crystals that form from dissolved minerals in urine, can be caused by both environmental and metabolic problems. Calcium oxalate and/or phosphate stones account for almost 70% of all renal stones observed in economically developed countries.

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Kidney stones are quite common and usually affect people who are between 30 and 60 years of age. They affect men more than women. It is estimated that renal colic (severe pain caused by a kidney stone) affects about 10-20% of men, and 3-5% of women.

In India, 12% of the population is expected to have urinary stones, out of which 50% may end up with loss of kidneys or renal damage. Recurrent stone formation is a common problem with all types of stones and therefore an important part of the medical care of patients with stone disease.

Diet may have a significant impact on the incidence of urinary stones. The incidence has been steadily increasing, paralleling the rise in other diseases associated with the so called 'Western diet'. Being obese (higher BMI) and experiencing weight gain have been associated with stone risk among men and women. Diet a intake may be important factors in the development of urinary stones.

Stone formation usually results from an imbalance between factors that promote urinary crystallisation, and those that inhibit crystal formation and growth. The main determinants of calcium oxalate (CaOx) supersaturation are oxalate and calcium concentration, while the latter associated to urinary pH determines calcium phosphate supersaturation. Urinary pH itself is the main determinant of uric acid supersaturation.

Approximately 80% of kidney stones contain calcium, and the majority of them are composed primarily of calcium oxalate. Although most calcium oxalate stones contain some calcium phosphate, only 5% have hydroxyapatite or as their main constituent and 10% contain some uric acid). Pure uric acid, cystine and infection stones are less common. Although composition of each stone correlates with supersaturation values in the urine, calculi are seldom found without an admixture of many salts and not every passed stone can be retrieved for chemical analysis. In addition, patients may present multiple stones and in case of persistence of small and unobstructive calculi after spontaneous elimination or surgical removal, the calculi might not present exactly the same mixture as the voided or removed ones.<sup>2</sup> Since the prevention is aimed to avert new stone formation and further growth of the remaining

calculi, evaluation of patients should be rather directed toward identifying urinary risk factors for stone formation or recurrence with the goal of devising appropriate, individualized therapy.

**MATERIALS AND METHODS:-**

A survey was conducted 100 patients suffering or suffered from renal calculi. A survey questionnaire was administered to them and the results were statistically analysed.

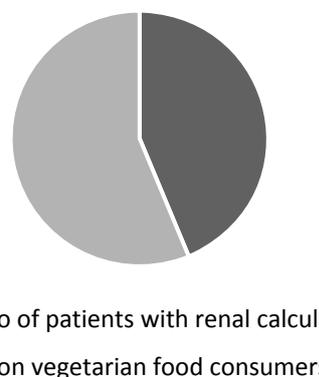
Survey questionnaire,

- What is your weight on scale?
- How much volume of water do you drink in a day?
- What other beverages you drink in a day?
- Do you have a habit of not drinking when you are out of your home?
- Do you have a habit of not drinking water during stressful times and exam times?
- Do you have a habit of drinking water before going to bed?
- Do you drink water every day when you get up in the morning?
- Are you exposed to sunlight regularly?
- Do you take non- veg food frequently?
- Do you take curd often?
- Do your diet rich in tomatoes?
- Have you undergone diagnosis for problems related to kidney stones?
- If yes what type of diagnosis?
- What type of pain do you experience during this problem?
- Did you consult your doctor?
- How much volume of water has your doctor advised to take?
- Are you following your doctor's advice?
- Have you got cured of your ailment?
- Do have recurrence of symptoms after some time?
- If yes what is the further treatment advised?

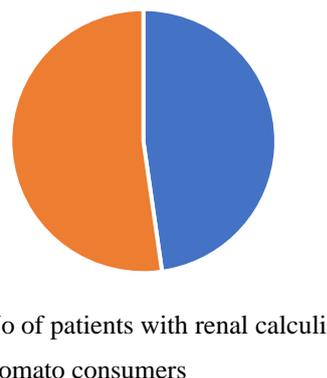
**RESULTS AND DISCUSSION:-**

From the study it is evident that the occurrence of renal calculi was associated with the people whose food was rich in tomatoes and non vegetarian food. Almost 66.3% of the calculi patients consumed tomatoes and 63% of them consumed non-vegetarian-food. 81.2% of the calculi patients were exposed to sun regularly. The occurrence was found to be prominent for 56.4% , whose intake of water is inadequate. 84.9% of them diagnosed calculi by a pelvic scan . 77.5% of the patients had severe pain during there ailment.74.4% of the individuals who suffered from renal calculi showed reoccurrence. The treatment advised in 79.3% of the cases was found to be laparoscopic surgery.

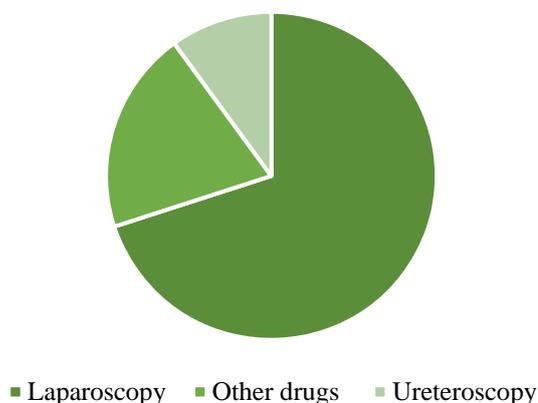
**Correlation between non vegetarian food consumers and prevalence of renal calculi**



**Correlation between tomato consumers and prevalence of renal calculi.**



**Treatment advised by Doctors**



**CONCLUSION:-**

In our study we found a significant relationship between dehydration and kidney stone. The increased incidence of renal stone disease in the tropics where the risk of stone formation is compounded by low urine volume. As living standard increase, particularly in the urban areas of the developing countries, the incidence of upper urinary tract stones is increasing. Hot climates usually expose people to more ultraviolet light, increasing vitamin D3 production. Increased calcium and oxalate excretion has been correlated with increased exposure time to sunlight. Global warming may increase the incidence of urinary stone disease.

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