



# Nutritional Habits in Patients with Urinary Tract Stones Referred to Imam Reza Hospital in 2019

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Received 2019 December 17; Revised 2020 February 24; Accepted 2020 February 25.

## Abstract

**Background:** Urinary tract stones are the third most common urinary tract diseases after urinary tract infections and prostate pathological conditions. An accurate assessment for appropriate medical treatment and lifestyle changes is important in reducing the recurrence of urinary stones.

**Objectives:** The present study aimed to determine nutritional habits of patients with urinary tract stones referring to the Imam Reza Hospital.

**Methods:** This descriptive study was performed on 150 patients referred to the Urology Clinic who had been given a definite stone diagnosis. The data collection tool was a three-part questionnaire.

**Results:** The mean age of patients was 41.34 ( $\pm$  11.98) years. The history of kidney stones in the first-degree relatives of patients was 65.3%. One-third of the patients had fewer than 4 hours of physical activities. Forty per cent of patients drank 3 - 5 glasses of tea daily, 65.3% of them consumed at least one glass of carbonated drinks per week and a quarter of them added salt to food before tasting it.

**Conclusions:** Dietary habits of patients with urinary tract stones seems to be not appropriate prior to the diagnosis of the diseases. Therefore, the diet should be given more attention to prevent kidney stones.

**Keywords:** Nutritional Habits, Urinary Tract Stones, Physical Activities

## 1. Background

Kidney stones rank third among the diseases of the urinary tract and are one of the most important urological diseases for which many studies have been done to prevent and treat (1, 2). It is a multifactorial disease and genetic and environmental factors are involved (3). About 10 percent of the population experience urinary stones during their lifetime. Only 5% of the causes of stone formation are hereditary. Geographical conditions of life, climate and season, water consumption, diet and occupation and medication are external factors (4). It has been reported that nutritional factors are more involved in the formation of urinary stones (5). Dietary change in stone builders is a great help in drug and surgical treatment.

Calcium oxalate, uric acid, cysteine and struvite minerals are major constituents of most kidney stones. Calcium stones are more common in men and the average age of onset of symptoms is in the third decade. Approximately 60% of people who make one calcium stone will eventually make another within 10 years. In men, uric acid stones are

the most common and cysteine stones are the least common. Struvite stones are common and potentially dangerous and are mainly seen in women or patients who require chronic bladder catheterization (6). Calcium oxalate and calcium phosphate account for 75% to 85% of all stones and may exist together in one stone.

The association of urinary stones with diet has been well known, for example, oxalate-containing diet plays an important role in the formation of stones (7). It has been shown that diets with low liquids and high protein content with alcohol consumption have a risk of stone formation; but, high fluid diet reduces the risk of urinary stones (8, 9). Diets containing oxalate, calcium, protein, purine, sodium, and ascorbic acid also increase the risk of urinary stones, but a diet high in liquids and potassium reduces the risk of urinary stones (10).

Urinary tract stones are an important health problem that have a significant role in performing extensive surgical operations and kidney failure and can also be prevented by changing behavioral habits, such as eating (11-13).

## 2. Objectives

Therefore, the present study was designed and performed to determine the eating habits of patients with urinary tract stones referred to the hospital.

## 3. Methods

In this descriptive study, the study population consisted of patients referring to the urology clinic of Imam Reza Hospital with a definite diagnosis of stone during the year 2019. The study was permitted by the Review Board of the National Institute for Medical Research Development (ethic no.: IR.AJAUMS.REC.1397.101) and written informed consent was received from all subjects.

Patients with definitive diagnosis of stone who did not wish to participate in the study or completed less than 80% of the questionnaire, or with any malignant disease, renal failure, inflammatory bowel disease, hyperparathyroidism, sarcoidosis, and any specific diet (a vegetarian diet, a diet to lose weight or gain weight) were not included in the study.

Reliability of the questionnaire was determined by test-retest method. The questionnaire was completed once in 10 patients with kidney stones and again after 10 days, this procedure was repeated again and then using Pearson's correlation coefficient. Questionnaire reliability was determined ( $r = 0.8$ ).

The food items were divided into ten food groups under 121 items (meat and beans, eggs, dairy products, fruits, vegetables, fats, sugars, salts, additives and beverages). We asked all participants to declare the number consumed per week, month, or year, the usual amount of consumption each time for each food item, as well as the eating habits in the food frequency questionnaires (FFQ). Due to financial constraints, it was not possible to measure the serum level of some nutrients that could be useful in confirming proper nutritional behavior.

## 4. Results

Of the 150 participants, the mean ( $\pm$  standard deviation) age of the subjects was 41.34 ( $\pm$  11.98) years.

The results showed that one-third of patients with kidney stones had less than 4 hours of physical activity per week and more than half of them were travelling by vehicle. Among them, 57.3% did not exercise at all. All the subjects drank purified water, 40% of patients drank 3 - 5 glasses of tea daily. In cold weather, 43.3% of patients drank only two glasses and less of water and 65.3% of patients used carbonated drinks at least one glass a week. Ninety

two percent of patients had heard about kidney stones from popular communication media. Nearly a quarter (24.7%) of patients added salt to food before eating, and 34% of them added salt when eating it.

## 5. Discussion

The most important environmental factor associated with kidney stones is diet (14). Although dietary changes can be effective in reducing the incidence of urinary tract stones (5, 14), the role of food sources in the formation of urinary stones has not been fully elucidated. The aim of this study was to investigate the consumption of nutrients and fluids in 150 patients suffering from urinary tract stones.

About 65% of the subjects had a history of kidney stones in their first-degree relatives. Many studies have shown that having a positive family history of urinary tract stones increases the likelihood of recurrence (15, 16).

High levels of protein, sodium, calcium and oxalate consumption can increase the risk of stone formation in people who are prone to kidney stones (17). It has been indicated that calcium restriction in patients with kidney stones is not recommended, but high-protein diets increase urinary calcium excretion and increase uric acid and increase the risk of urinary stone formation (18). Studies have shown that calcium supplementation is not a risk factor (19).

Different dietary habits, especially the consumption of dietary calcium, phosphorus, potassium, vitamins A, C, and D, are associated with increased urinary stones (20). Another study noted that the most important cause of kidney stones is diet (14). However, dietary changes have been identified to reduce the risk of developing urinary stones (5). Prospective studies have also reported the association between calcium intake and reduction of the risk of stone formation. This may be because calcium plays an important role in the oxalate uptake pathway, reducing calcium intake leading to increased oxalate uptake (14).

The results of this study showed that 40% of people drank 3 - 5 glasses of tea daily. In cold weather, 43.3% of the population consumed only two or fewer glasses of water, and 36.7% of them drank 3 - 5 glasses of hot water daily, and 65.3% of them used carbonated drinks at least one glass per week. Consuming bicarbonate-containing drinks increases but consuming coffee reduces the risk of the stone formation (21). A recent study showed that consumption of cola-containing drinks which are rich in phosphorous, increases oxalate secretion thereby increases the formation of urinary calcium oxalate stones (5).

The urinary tract stone is more common in professional cooks who work in warm environments and also in taxi drivers who drink little water (22). Increasing fluid intake reduces the concentration of compounds likely to precipitate in the urine, and in turn, reduces the amount of free crystalline particles in urine (23). In 2010, the European Food Safety Agency recommended that in men and in women the consumption of water must be about 2.5 and 2 liters per day respectively for urine osmolality to be maintained around 500 mOsm/L, and urine volume should be between 1.6 in women and 2 L in men (24). The most important preventive points in kidney stones are drinking enough water and fluids. Drinking enough fluids prevents stone formation by diluting urine. A decrease in dietary potassium increases urinary calcium secretion, which increases the risk of stenosis (25).

Vitamin A deficiency has been reported as one of the risk factors for urinary stones (26). Some animal studies have shown that vitamin A deficiency leads to the formation and growth of urinary stones (5, 27).

In some studies, high doses of vitamin C have been reported as a risk factor for the formation of urinary stones (5, 16, 21). Consuming a high dose of vitamin C (2 g/day) increases oxalate secretion in urine but low levels (up to 1500 mg/day) did not increase the risk of urinary tract formation (28). Unlike the above studies in prospective research, there was no association between vitamin C intake and the risk of untreated disease (16). Some reports indicated a significant decrease in urinary calcium oxalate levels following vitamin C intake (29).

### 5.1. Conclusions

Dietary habits of patients with urinary tract stones seem to be not appropriate prior to the diagnosis of the disease. Therefore, the diet should be given more attention to prevent kidney stones.

### Footnotes

**Authors' Contribution:** All authors contributed equally to the manuscript and all authors read and approved the final version of the manuscript for publication.

**Conflict of Interests:** There was no conflict of interests.

**Ethical Approval:** IR.AJAUMS.REC.1397.101.

**Funding/Support:** There was no funding/support.

**Patient Consent:** Written informed consent was received from all subjects.

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