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## Original Research Article

# Dietary and fluid intake habits in nephrolithiasis patients presented to Ayub Teaching Hospital, Abbottabad

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## ABSTRACT

**Background:** Nephrolithiasis is the 3rd most common clinical problem worldwide. The dietary and fluid intake factors play an important role in its causation. The present study was conducted to determine the dietary and fluid intake habits in patients presented with nephrolithiasis to Ayub Teaching Hospital, Abbottabad.
**Methods:** This cross-sectional study enrolled 140 patients by convenient sampling. The study was carried out at the Urology ward of Ayub Teaching Hospital, Abbottabad from June 2017 to June 2018. In this study, a self-maintained structured questionnaire was used to interview 140 patients admitted in both male and female urology ward of Ayub Teaching Hospital, Abbottabad. The questionnaire covered the fluid intake and dietary habits of patients with relevance to determinants such as the number of glasses per day, level of education, physical activity, the occupation of patients and source of drinking water. Data was collected through questionnaires and was analyzed using SPSS-23.
**Results:** Total of 140 patients were enrolled, 80 (57.1%) were males whereas 60 (42.9%) were females. Most of them, i.e. 116 (82.9%) were from rural areas, 132 (94.3%) belonged to poor socioeconomic status, 60 (42.9%) patients used the tap water for drinking and 80 (57.1%) had vegetables in their daily diet. Most 100 (71.4%) of them were illiterate, 92 (65.7%) working indoor and 60 (42.9%) drinking 5 to 10 glasses per day.
**Conclusions:** The study highlights the poor dietary and fluid intake habits of patients presenting with nephrolithiasis.

**Keywords:** Nephrolithiasis, Urolithiasis, Kidney stones

## INTRODUCTION

Nephrolithiasis is defined as the solid mass formed in the urinary tract. These masses (stones) are formed from the crystals that precipitate out of urine. The stones are also formed when the crystal forming substances (calcium, oxalate, uric acid) are either high in concentration or those substances preventing the stone formation is low in concentration.[1]

Nephrolithiasis is the 3rd most common clinical problem worldwide presenting up to 15% of the population in the western countries.[2,3] The incidence of stone formation is not uniform throughout the world as, changes are attributed to variation in dietary habits and socioeconomic conditions.[4] In Pakistan, for instance, one out of 73 admissions in a government hospital are found to be of nephrolithiasis.[5]

Kidney stones disease varies in frequency and stone type between different climates and racial groups. They are uncommon before the age of 20 years, however, their incidence rises between the age of 20 and 30 years and then remain constant until the age of 70 years after which the incidence falls again.[6,7] Men are at greater risk of developing kidney stones as they are two to four times

more common in men than women.[8] Although stones may be asymptomatic but the common symptoms include flank pain, nausea, vomiting, urinary tract obstruction and infections.[9]

The pathophysiology of the stone formation may be due to infections, hormonal influences, metabolic disturbances, diet factors or obstruction in the urinary system or increasing excretion of chemical components such as oxalate, calcium, carbonate, magnesium, phosphate and cysteine.[10]

There are five main types of kidneys stones: calcium oxalate, calcium phosphate, uric acid, struvite and cysteine stones. Among the total, with kidney stones, about 80% had calcium oxalate or calcium phosphate stones with most of the remaining patients having either struvite or uric acid stones.[11]

The dietary factors associated with increased stone risk include low fluid intake, low calcium intake and high fructose intake while there is mixed evidence for animal protein, increased sodium, increased sucrose, low magnesium.[12]

This study was carried out to determine the dietary and drinking habits in patients admitted with nephrolithiasis in the general population. The study will create awareness among the patients to modify and adapt their lifestyles to prevent the incidence of nephrolithiasis.

## METHODS

This was a cross-sectional study conducted at Urology Outpatient Department (OPD) and Urology Unit of Ayub Teaching Hospital, Abbottabad from June 2017 to June 2018. One hundred and forty (140) patients of both genders were included in the same population by using non-probability convenient sampling technique. Data were collected by filling preformed questionnaire including several variables of interest, through asking the questions given in questionnaire by interviewers. Informed consent was taken from all the subjects keeping ethical considerations and privacy of data in view.

Participants of any age and gender were included. Patients with acute symptoms were excluded. The data was analyzed using SPSS-23. Frequencies and percentages were calculated for qualitative variables, and Mean±SD were calculated for quantitative variables.

## RESULTS

A total of 140 patients were studied. The minimum age was 8 years while the maximum was 75 years with the mean of ±16.38. 80 (57.1%) were males while 60 (42.9%) were females. 56 (40.0%) drink 1 to 5 glasses per day, whereas 60 (42.9%), 16 (11.4%) and 8 (5.7%) drink 5 to 10, 11 to 15 and 16 to 20 glasses per day respectively. As far as daily activity is concerned, out of 140 patients, 48 (34.3%), 80 (57.1%) and 12 (8.6%) patients had physical activity of 1 to 5 hours, 6 to 10 hours and 11 to 15 hours respectively. Those who were included in 1 to 5 hours physical activity group consists of 12 (15.0%) males and 36 (60.0%) females. The 6 to 10 hours group includes mostly males 64 (80.0%) and 16 (26.7%) are females. There were only 4 (5.0%) male and 8 (13.3%) females included in 11 to 15 hours group. Some other results are shown in the tables.

**Table 1: Number of times citrus foods were consumed in a week.**

| Citrus foods consumption | Frequency | Percentage (%) |
|---|---|---|
| **Never** | 12 | 34.3 |
| **One to two** | 11 | 31.4 |
| **Three to four** | 7 | 20.0 |
| **Five to six** | 1 | 2.9 |
| **Daily** | 4 | 11.4 |
| **Total** | 35 | 100.0 |

Out of 140 patients 60 (42.9%), 40 (28.6%) and 40 (28.6%) drink tap, well and spring water respectively. 112 (80.0%), 8 (5.7%), 4 (2.9%), 8 (5.7%), 4 (2.9%) and 4 (2.9%) patients mostly consumed tea, milk, soft drinks, juices, lassi and green tea respectively. Mostly patients consumed tea and mostly amongst them were uneducated 112 (80.0%), whereas 38 (20.0%) were educated. Majority of patients drink tea 112 (80%) whereas 8 (5.7%) drink milk, 4 (2.9%) drink soft drinks, 8 (5.7%) drink juices, 4 (2.9%) drink lassi and 4 (2.9%) drink green tea.

**Table 2: Occupation of the patient and its relation to food mostly consumed in a week.**

| Occupation of the patient | Food consumed in a week N (%) | | | | Total |
|---|---|---|---|---|---|
| | Meat | Vegetables | Pulses | Rice | |
| **Govt. employee** | 2 (66.7) | 1 (33.3) | 0 (0.0) | 0 (0.0) | 3 (100) |
| **Private employee** | 0 (0.0) | 3 (75) | 0 (0.0) | 2 (25) | 5 (100.0) |
| **Self-employee** | 2 (22.2) | 6 (66.7) | 0 (0.0) | 1 (11.1) | 9 (100.0) |
| **House wife** | 2 (16.7) | 9 (75) | 1 (8.3) | 0 (0.0) | 12 (100.0) |
| **Not applicable** | 3 (50.0) | 1 (16.7) | 1 (16.7) | 1 (16.7) | 6 (100.0) |
| **Total** | 9 (25.7) | 20 (57.1) | 2 (5.7) | 4 (11.4) | 35.0 (100) |

## DISCUSSION

Our results depicted the higher prevalence of nephrolithiasis in males (57.1%) than in females (42.9%). A similar study conducted in Iceland (4.3% in men and 3.0% in women) in Iran (6.1% in men and 5.3% in women) also concluded the same inference.[14] Similarly in another study higher rate of renal stone disease were reported in males than in females, with a ratio of three to one (3:1).[20]

According to our study, 82.9% patients were from rural area while only 17.1% were from urban areas The prevalence of kidney stones is higher in those who live in deserts, mountains or in rural areas.[21]

Our study also showed that 94.3% of the patients had low socioeconomic status. Kidney stones were more common in patients of low socioeconomic status.[20]

As far as dietary inclination is concerned, meat came in second (25.7%) in the staple foods' list of the patients, after vegetables (57.1%). The data shows that this difference is because of the amount of pesticides sprayed on the vegetables, containing all sorts of hazardous salts and chemicals. A diet rich in oxalates proves pivotal in stone formation. The more animal proteins are consumed, the greater is the risk for renal calculi and vice versa.[14]

One survey concluded that a high calcium diet together with a low meat diet actually reduces the risk of developing renal stones by 51%.[18] This is in accordance to our studies. A similar reduction in risk (11%) has been reported by tea, contradicting our results where 80% of the victims were tea takers. The frequent use of hard water in making of tea could be the reason for this data.[19]

Citrus juice prevents stone formation due to their high citrate content. This is exactly according to our results as only 5.7% of juice consumers were having stones.[22]

Dietary calcium has been found at the center of the discussion of nephrolithiasis. In our study 120(85.71%) patients presenting with kidney stones consumed milk on a daily basis in form of tea (80%) or pure milk (5.71%). There is contradicting evidence in literature found on this matter. A study conducted by Taylor et al showed positive association of formation of kidney stones with high calcium intake, while another study conducted by Curhan et al showed that low dietary calcium has been noticed to increase the incidence of kidney stones.[12, 23]

According to a study conducted in United States of America, incidence rates of 1 and 0.71 were observed in 45,619 men with lowest (<1275 mL/day) and highest (≥2500 mL/day) intake of water, respectively.[16] Our study is in accordance to their study. The more water flows through the urinary system, the lesser are the chances of stasis which disrupts the process of nephrolithiasis. [24] Our results favor this assumption. Hard tap water is also a risk factor.[17]

Our research also indicates that housewives (34.3%) and self-employed laborers (25.7%) suffered from dehydration due to their lifestyle, making them vulnerable to kidney stones. A research conducted in the New York City Marathon in 1971 showed that there was 3-5 times higher risk of renal stones among the runners and also in people living in warmer regions.[18]

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