Research Article

A Retrospective Study on Prevalence and Risk Factors Associated with Kidney Stone in Vellore District, Tamil Nadu.

J.Sunitha[1], P.Thirunavukkarasu[2], S.Asha[1*]

[1]Department of Biochemistry, D.K.M. College for Women (Autonomous), Sainathapuram, Vellore, Vellore DT, Tamil Nadu, India.

[2]Department of Biotechnology, Dr.M.G.R. Educational &Research University, Maduravoyal, Chennai-95, India.

***Corresponding author's E-mail:** asha.sivaji@gmail.com

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ABSTRACT

The prevalence and incidence of kidney stone is reported to be increasing worldwide. Herein, we report the information regarding the stone incidence and prevalence from Vellore District, Tamil Nadu. The clinical survey was conducted among kidney stone patients of about 130. Out of them male 57.2% and female 28.6% were affected with stone in the age group of 10-30, 30-50 and 50-75. The location of stone was found mainly in kidney than other region like bladder and ureters. A total of 87.1% of stone size ranges from 5 to 8mm and 35.1% of stone size ranges above 8mm with highest in male and lowest in female. The other diseases linked to renal stones are diabetes mellitus 33.8%, hyper tension 28.6% and chickenpox 22.1% and typhoid 11.8%. Non- vegetarian are more prone to renal stone than vegetarian in the percentage of 111.8% and 55.9%, respectively. The smokers produce less stone formation compared to drinkers in the percentage of 6.5% and 11.7% respectively. Therefore it is concluded that males are more prone to kidney stone than females. The environmental climate in Vellore district also acts as a promoter for stone patients

Keywords: Kidney stones, Patients, Dietary factors, Risk factors, Gender, Climate.

INTRODUCTION

Quite common and most common painful disorders of the urinary tract are kidney stones. Unfortunately, a large number of peoples are affected by kidney stones all over the world. Kidney stones are solid crystals formed from minerals that are dissolved in urine. The major causes of kidney stones are environmental and metabolic problems. Among the peoples, men's are more prone to kidney stones than women. Even though in India, Tamil Nadu does not belong stone belt about 12% of the population are expected to have kidney stones in tropical and semi arid regions. Out of 12%, 50% of the patients with kidney stones loss there life due to the kidney damage or renal damage. Geographical factors like climate, and increased rates of hypertension, diabetes, obesity, gender, diet habits increases the risk of nephrolithiasis and also linked to increased stone formation. Global warming has a greater correlation between the number of stone formers and this supports the conclusion that global temperature has a greater impact on the stone development. This study was undertaken to assign the prevalence of kidney stones among patients in Vellore District, Tamil Nadu.

MATERIAL AND METHODS

Clinical Survey on Urolithiatic Patients

Sources of Data collection

The data was collected from the Hospital of Aarogya Clinic in Tollgate, Vellore, Tamil Nadu, and India.

Categories of Patients

A total of 130 patients with kidney stone were identified. Clinical data, including Age, Gender, stone location, stone size, reoccurrence, pre- exciting comorbidites (i,e, diabetes mellitus, hypertension, typhoid, chicken pox), habit (i,e. Smoking, Drinking), dietary habit (Vegetarian, Non- vegetarian) were also evaluated. In addition to this, patients were evaluated for clinical symptoms like pain in the lumbar region. The results were analyzed using MS-excel and were presented graphically.

RESULTS

Clinical study of renal stone

Table 1a: Distribution of patients according to gender

S.No	Gender	Number of patients	Percentage (%)
1	Male	44	57.2
2	Female	22	28.6

Table 1b: Distribution of patients according to age

S.No	Group (age)	Number of patients	Percentage (%)
1	10-30 range	29	37.7
2	30-50 range	66	85.5
3	50-75 range	27	35.1

Gender and Age

Total 130 patients were analyzed for renal calculi. Out of 130 patients, male were 107.9% and the female were

57.8% as shown in the table 1a. Table 1b shows the number of patients having stones in the age group ranging from 10- 75 years. The greater number of renal calculi was observed in the age group of 30-50 years in the percentage (85.5%), 10-30years patient (37.7%) and 50-75 years patient (35.5%).

Location of renal calculi

Out of 130 cases 26 % were unilateral affect in left kidney and 37.7% in right kidney. Bilateral stones were present in 23.4% of cases, 42.9% of calculi in gall bladder and 22.1% of calculi accounts in ureters. Table 2a shows the anatomical location of stone in patients.

Table 2a: Distribution of calculi according to location

S.No	Location	Number of patients	Percentage (%)
1	Left kidney	20	26
2	Right kidney	29	37.7
3	Bilateral kidney	18	23.4
4	Gall bladder	33	42.9
5	Ureters	17	22.1

Stone size about 5-8 mm

Among the total number of patients visited for the treatment of kidney stone is about 87.1% was reported to have 5-8mm size of the renal calculi. Among this 57.2% of male and 8.6% of female found to have renal calculi in the size range of 5-8 mm. Table 2b gives the details of stone in the range of 5-8mm.

Table 2b: Distribution the patient according to stone size (5-8mm)

S.No	Stone size (5-8mm)	Number of patients	Percentage (%)
1	Total	67	87.1
2	Male	44	57.2
3	Female	22	28.6

Stone size above 8mm

Studies have proved that 19.5% of males are affected with renal calculi, out of 35.1% of cases with stone size of 8 mm. while 13.0% of cases were found to be female. Table 2c gives the details of stone in the range of above 8mm.

Table 2c: Distribution the patient according to stone size above 8mm

S.No	Stone size above (8mm)	Number of patients	Percentage (%)
1	Total	27	35.1
2	Male	15	19.5
3	Female	10	13.0

Diseases associated with kidney stones

There exists a direct relationship between kidney stones risk with other diseases. Among the patients, about 33.8% (Total 26 patients) were affected with diabetes mellitus, 28.6% (22 patients) with hypertension, 22.1% with chicken pox (total 17 patients) and 11.7% with typhoid (Total 9 patients) (Table 3)

Table 3: Distribution of patients according to Pre- exciting comorbidites

S.No	Attribute	Number of patients	Percentage (%)
1	Diabetes mellitus	26	33.8
2	Hypertension	22	28.6
3	Chicken pox	17	22.1
4	Typhoid	9	11.7

Dietary habits

Non- vegetarians

There exist a direct relationship between non- vegetarian food habit with kidney stone formation and most of the people take calcium carbonate present in the bones. About 111.8% of the patients produce kidney stone out of 130patients.

Vegetarians

Vegetarian food habits also have direct relationship with kidney stone. Most of the people take calcium and oxalate rich food items. About 55.9% of vegetarians are affected with kidney stone in the total of 130 patients. Table 4 depicts the information about dietary habit of the kidney stone patients.

Table 4: Distribution of patients according to dietary habits

S.No	Attribute	Number of patients	Percentage (%)
1	Vegetarian	86	55.9
2	Non-vegetarian	43	111.8

Table 5: Distribution of patients according to personal habits

S.No	Attribute	Number of patients	Percentage (%)
1	Smoking	9	6.5
2	Alcohol	5	11.7

Habits

Smoking and drinking habits

The present data provide the information regarding smoking and drinking habits of 130 patients. The information provides less number of smoking patients. Nearly 6.5% of the data having smoking habit and 11.7%

of the patients has drinking habit. From this data it is evidenced that drinking habit is more prone to kidney stone formation than smoking habits. Table 5 provides the information about smoking and drinking habits of the kidney stone.

DISCUSSION

Clinical study

The bearing in mind, the observation of present study the major risk factor that contribute to the stone formation including some importance epidemiological factor like (age, gender, and dietary factor) and geographical distribution determine prevalence of stone formation. All these play important role in initial for stone formation.[1]

In our present study, renal calculi were more common in men and compare to women. Out of 130 patients 57.2% were male and 28.6% were female. This result is comparable to the studies made by Rajput *et al.*, 2002[2] who found the male to female ratio is 4:1. Arian and Malik 1997[3] also estimated similar male to female ratio as similar to our result. Similarly Khan *et al.*, 2004[4]; Nazir *et al*., 2007[5] also reported the same incidents.

The higher incidence of calculi in men than females may be due to the fact that androgen increases, while estrogen decreases urinary oxalate excretion and kidney calcium oxalate deposition. The increased oxalate deposition put result from too much intake of oxalate rich diet and likely occurs in the people having tubular epithelial injury and lack of urinary inhibitor.

Age

In our study prevalence of renal stone was highest for age group of 30-50 years in the range of 85.5%, 10-30 years of range experience a renal stone formation in the range of 37.7%. A less common stone formation was seen in the age group above 50-75 years in the range of 35.1%. This result was comparable to the study conducted by Rajput *et al* 2002[2]. Similarly Arian *et al*., 1997[3] found men in the age of 29 years for renal stone, while Ahmed *et al.,* 1999[6] reported a maximum incidence of renal stone in the age group of 30-50years.

Location of renal stone

In the present study the anatomical distribution of stone was more in unilateral than bilateral renal stone formation which are in agreements with other studies reported by Buchholz *et al*., 2003.[7]

On comparison, urinary stone diseases are mostly affected the kidney (63.7%), than the gall bladder (23.4%) and ureters (22.1%) respectively. This result is in accordance with Jan *et al*., 2008; Khalil *et al*., 1998[8-9] who's findings also reported to have stone diseases more in kidney than ureters and bladder. This result also agrees with finding of Memon *et al.,* 2014.[10]

Kidney stone with other disease

A high frequency of Diabetes mellitus and hypertension was associated with kidney stone formation. Type 2 diabetes mellitus may increases the risk of kidney stone formation, characterized by insulin resistance. Type 2 diabetes patients have high acidic urine that can lead to uric acid stone formation. But Taylor *et al*., 2005[11] reported an independently associated nephrolithiasis history with that of diabetes mellitus history.

Hypertension is one of major causes of renal stone development. Hypertensive men had greater risk of developing kidney stone than normal tensive men.[12]

Cuppuccio *et al*., 1999[13] proposed that renal stone associated with other medical condition like hypertension, Cardiovasular diseases and Diabetes mellitus. This is similar to our study.

Dietary habits

Diet plays an important role in the development of kidney stone. Diet rich in animal protein (meat, chicken, fish, dairy and poultry) releases too much amount of calcium and citrate in the urine. Intake of animal protein also increases glomerular filtration rate and thus, this contribute to an increased urinary excretion of calcium, oxalate and uric acid.[14]

In this study we could establish a significant relationship between high intakes of animal protein with kidney stone. This report is associated with Curhan *et al*., 1998 [15]whose study also shown to have a positive association with animal protein intake and stone. Curhan *et al*., 1997; Curhan *et al*., 2004[16-17] produced a negative correlation between animal, protein intake and kidney stone. Those people consume large amount of meat are at a high chances of reoccurrence.

Oxalate rich food items like green beans, tomato, nuts, chocolates, and tea increases risk of kidney stone. The present report described that vegetarian are at lower risk for stone formation in contrast to non-vegetarian.

Smoking and drinking habits

The present data has also provided the information regarding smoking and drinking habits of the kidney stone patients. The information provides less number of people with these habits. Nearly 16% of the patients have smoking habit and 32% of the people have drinking habit. Hence smoking may not affect kidney but intake of alcohol may produce adverse effects on the kidney.[18]

CONCLUSION

From the present study, it was found that the major risk factors that contribute to the stone formation and its re occurrence are Age, Gender, and other disease, habits (Vegetarian and Non-Vegetarian) and personal habits (Smoking and Alcohol).

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