

# Prevalence of Diabetes Mellitus in Patients with Renal Stones; A Single Center Experience

Mohammad Wasi Shoaib<sup>1</sup>, Muhammad Hamza Subhani<sup>2</sup>, Sultan Mahmood Khan<sup>3</sup>, Asif Rashid Alamgir<sup>4</sup>

<sup>1</sup> House Officer, Aziz Fatimah Medical & Dental College, Faisalabad Pakistan  
Contribution in the study

<sup>2</sup> House Officer, Independent Medical College, Faisalabad Pakistan  
Contribution in the study

<sup>3</sup> Assistant Professor, Department of Surgery, Aziz Fatima Medical & Dental College, Faisalabad Pakistan  
Data analysis

<sup>4</sup> Associate Professor, Department of Anesthesia, Aziz Fatima Medical & Dental College, Faisalabad Pakistan  
References, Write up

## CORRESPONDING AUTHOR

Dr. Mohammad Wasi Shoaib

House Officer, Aziz Fatimah Medical & Dental College, Faisalabad Pakistan  
Email: email@email.com

Submitted for Publication: 21-02-2023  
Accepted for Publication 25-03-2023

**How to Cite:** Shoaib MW, Subhani MH, Khan SM, Alamgir AR. Prevalence of Diabetes Mellitus in Patients with Renal Stones; A Single Center Experience. APMC 2023;17(1):11-13. DOI: 10.29054/APMC/2023.1450

## ABSTRACT

**Background:** Renal stone disease is highly prevalent worldwide and same is for diabetes mellitus. Co-occurrence of stone disease and renal stones have been investigated worldwide but data was lacking for our country. So, this study was conducted to determine the association of diabetes mellitus with kidney stones in patients undergoing surgical treatment. **Objective:** To determine the frequency of diabetes mellitus in patients with renal stone disease. **Study Design:** Cross sectional study. **Settings:** Department of Urology, Aziz Fatima Medical & Dental College, Faisalabad Pakistan. **Duration:** Six months from August 2022 to January 2023. **Methods:** 100 patients of either gender of age 20-50 years presenting in outdoor and indoor facility of with renal stones size up to 3cm on Ultrasound KUB (Kidney, Ureter, Bladder) Blood samples for random blood glucose were diabetes mellitus assessed. Data was analyzed by using SPSS V-23. Post stratification Chi square test was applied. P-value <0.05 was taken as significant. **Results:** 100 patients of either gender were included in the study from age 20-50 years with mean age 39 years  $\pm$  1.1 years. Among 100 patients, 41 were male and 59 were female patients. Frequency of diabetes mellitus was assessed and out of 100 patients, 68 (68%) patients were found to be diabetic. Gender association was seen with occurrence of stone disease and diabetes mellitus. Statistically higher incidence of diabetes mellitus was found with patients of renal stones disease in age group from 36-50 years. **Conclusion:** Diabetes mellitus is highly prevalent in patients with renal stones.

**Keywords:** Renal Stone, Diabetes mellitus.

## INTRODUCTION

Renal stone is a major disease being treated in Urology. Renal stones are highly prevalent in our country due to climate condition, dietary intake and water consumption and data suggests that prevalence of urolithiasis is as high as up to 6.4% in Asia.<sup>1</sup> Urinary stone disease is multifactorial and high occurrence of stone disease can be attributed to obesity, the metabolic syndrome, and type 2 diabetes along with other factors.<sup>2,3</sup>

The changes which have been responsible for increase in stone disease is secondary to modifications in dietary habits and life- style that occurred worldwide and is characterized by a high calorie intake and reduced physical activity.<sup>4,5</sup> Diabetes mellitus is having high incidence in our country and diabetes mellitus etiological factors are multifactorial. Two recent studies have revealed an increased prevalence of nephrolithiasis in

patients with diabetes mellitus (DM) as compared with patients without diabetes.<sup>6</sup> Various chemical composition of the stone are seen in diabetic patients but mostly calcium and uric acid stones are prevalent urinary stone disease in patients with diabetes.<sup>7</sup> Another study has shown that there is an association between diabetes and uric acid stone formation.<sup>8</sup> However data is lacking for our country to find out association of diabetes mellitus and stone disease, so this study was conducted to determine the association of diabetes mellitus with kidney stones in patients undergoing surgical treatment.

The objective of the study was to determine the frequency of diabetes mellitus in patients with renal stone disease

## METHODS

This was cross sectional study conducted at Department of Urology, Aziz Fatima Medical & Dental College,

Faisalabad Pakistan. The duration of study was 6 months from August 2022 to January 2023.

Sample size of 100 patients was taken by using non-probability consecutive sampling technique.

Patients of either gender of age 20-50 years presenting in outdoor and indoor facility of with renal stones size up to 3cm on Ultrasound KUB (Kidney, Ureter, Bladder) were included in the study.

Patients with history of hypertension, diverticulitis, inflammatory bowel syndrome, typhoid disease, parathyroid disease, Renal insufficiency (Serum Creatinine >1.5 mg/dL), history of use of diuretics, steroids, malignancy, hormone replacement therapy, pregnant females, use of calcium supplements >100 mg / day were excluded from the study.

After taking approval from Evaluation Review Committee patients were enrolled for study according to inclusion and exclusion criteria, presenting in indoor and outdoor facility for treatment of renal stones in Department of Urology, Independent Medical University, Faisalabad. Informed consent was taken from all the patients. Blood samples for random blood glucose were sent to Bio-chemical Laboratory Independent Medical University, Faisalabad and diabetes mellitus was assessed.

Data was analyzed by using SPSS V-23. Mean and standard deviation was calculated for all quantitative variables like age and stone disease. Frequency and percentage was calculated for all qualitative variables like gender and diabetes mellitus. Effect modifiers like age, gender and size of stone was controlled by stratification. Post stratification Chi square test was applied. P-value <0.05 was taken as significant.

## RESULTS

100 patients of either gender were included in the study from age 20-50 years with mean age 39 years  $\pm$  1.1 years. Among 100 patients, 41 were male and 59 were female patients. Age to gender distribution was done. (Table 1)

**Table 1: Age to gender distribution**

Age Groups	Male	Female	Total
20-35 Years	28	37	65
36-50 Years	13	22	35
Total	41	59	100

Frequency of diabetes mellitus was assessed and out of 100 patients, 68 (68%) patients were found to be diabetic. Gender association was seen with occurrence of stone disease and diabetes mellitus. (Table 2)

**Table 2: Gender distribution and diabetes mellitus**

Gender	Diabetic patients	Non-Diabetic patients	P value
Male (n= 41)	27	14	0.000
Female (n= 59)	41	18	0.000
Total	68	32	

Statistically higher incidence of diabetes mellitus was found with patients of renal stones disease in age group from 36-50 years.

## DISCUSSION

Renal stone is a very prevalent disease with higher proportion of patients worldwide<sup>9</sup> with different etiological factors for different parts of world.<sup>10</sup> Renal stones vary in composition with different composition attributes to different etiological factors.<sup>11,12</sup> Diabetes mellitus is a common disease found across the globe and according to World Health Organization data, more than 422 million adults globally were suffering from DM in 2014 and a continuous rise in DM prevalence is expected.<sup>13</sup>

Type 2 diabetes mellitus is characterized by insulin resistance, a metabolic derangement that increase the risk of kidney stone formation.<sup>14</sup> Insulin resistance is associated with defects in renal ammonium production and stone formers with diabetes have higher tendency to produce acidic urine as compared to renal stone formers without diabetes.<sup>15,16</sup>

Previous studies have shown that higher incidence of diabetes has been found among patients with renal stones and a study showed that kidney stones were significantly associated with 33% higher risks of incident diabetes mellitus (RR: 1.18; 95% CI, 1.07-1.29) with females with DM (RR: 1.29; 95% CI, 1.08-1.55) were more likely to develop kidney stones than diabetic male patients (RR: 0.91; 95% CI, 0.75-1.10). Our study shows the same that renal stone and diabetes are commonly found among 68 patients out of 100 and female patients with renal stones were more diabetic as compared to male.

## CONCLUSION

Diabetes mellitus is highly prevalent in patients with renal stones.

## LIMITATIONS

It is a single center study with less number of patients.

## SUGGESTIONS / RECOMMENDATIONS

Patients with renal stones must be evaluated for occurrence of diabetes mellitus and prompt treatment of

both morbidities should be considered and adequate treatment of diabetes mellitus may decrease recurrence of urinary stone.

### CONFLICT OF INTEREST / DISCLOSURE

None.

### ACKNOWLEDGEMENTS

We acknowledge the help of administration of the institution for their facilitation during the study.

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