

TO ASSESS THE PREVALENCE, DIAGNOSTIC TOOLS AND PRESCRIPTION TRENDS OF KIDNEY STONE IN SIALKOT

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ABSTRACT

Objective: This study provides a brief description regarding prevalence, diagnostic tools and medical treatment of kidney stones in Sialkot, Pakistan.

Method: The study was carried out in the Department of Urology, Amina Hospital Cantt, Sialkot. Data was recorded on questionnaires by interview of 50 patients of kidney stones involving 30 males, 17 females and 3 child by filling questionnaire after random collection of data in district Sialkot.

Result: The prevalence of kidney stones in Sialkot was 60% in males, 34% in females and 6% in child. The most recommended diagnostic test was ultrasound (96%) and percentages for rest of diagnostic tests were 58% urinalysis, 10% KUB X-Ray and 2% IVP. Renal profile were 92% urea, 56% uric acid, 92% creatinine, 38% sodium, 10% calcium and 30% chloride. From sample size of 50 patients, tamsulosin (80%) was highly recommended along with ciprofloxacin (68%), diclofenac sodium (64%), citro soda (56%), tripsin along with chymotrypsin combination (chymotrip forte) (44%), diclofenac sodium with misoprostol combination (osteotec) (22%), omeprazole (32%), nelbuphine (14%), distalgesic (8%), furosemide (6%), paracetamol (4%).

Conclusion: The kidney stones prevalence is more in male gender as compared to female gender with percentages of 60% in males and 34% in females along with 6% in child. The most prevalent diagnostic test was ultrasound (96%) and most recommended medicine was tamsulosin (80%).

Key words: kidney stones, flank pain, prevalence, diagnostic tools, tamsulosin

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INTRODUCTION

The presence of stones in the urinary tract or kidneys from a wide range of underlying disorders is termed as kidney stones [1]. Renal stones affects up to 5% of the whole population among all disorders, with a lifetime risk of passing a kidney stone of about 8-10% of population. The National Health and Nutrition Examination Survey (NHANES) has collected data related to kidney stones. The prevalence of kidney stones was 8.8% according them. In male gender, the prevalence of kidney stones was 10.6% as compared with 7.1% in females. Kidney stones were more prevalent among overweight than normal-weight personnel's [2]. Stones were approximately two fold as prevalent in the Southeast as in the Northwest among men and women [3]. Urinary tract symptoms include pain classic colicky loin radiating to groin area, hematuria, dysuria and systemic symptoms includes restless patient, frequently writhing in distress, nausea, emesis, or both (shared innervation of renal capsule

and intestines), fever and chills [4]. Kidney stones are categorized as calcium oxalate CaOX stones, struvite stones, uric acid stones and cysteine stones. Calcium oxalate, uric acid, cysteine crystals can scour the urinary tract and most probably cause bleeding [5]. The pathophysiological etiology for the calcium stone formation is complex showing diversity of presence and may include low urine volume, hypercalciuria, hyperuricosuria, hypocitraturia, hyperoxaluria, and idiosyncrasies in pH of patients urine [6]. The deposition of hydroxyapatite as sub-epithelial plaques or tubular deposits in the renal papillae also leads to the formation of kidney stone [7]. Bacterial infection also raises the probabilities of stones in which struvite stones have also been referred to as "infection stones" and "triple phosphate" stones. After the chemical analyses of the stones which demonstrated the presence of calcium, magnesium, ammonium, and phosphate (i.e., three cations and one anion), the term triple phosphate was subjected [8]. A series of factors are responsible for

the formation of stones like obesity (related with insulin resistance and compensatory hyperinsulinemia, metabolic derangements) and the larger body size (results in increased urinary excretion of uric acid and oxalate) [9]. Animal protein diet, when its electrolyte composition and quantity of protein were kept the same as for the vegetarian diet, conferred an amplified risk for uric acid stones [10]. Imaging investigations play a vital role in the management of patients with kidney stones and various imaging techniques are used to determine the presence along with location of kidney stones. The available techniques are plain x-ray of the abdomen, kidney ureter bladder x-ray (KUB x-ray), ultrasound scan, intravenous urogram (IVU), computed tomography (CT) and magnetic resonance imaging (MRI) [11]. KUB X-rays is x-ray of the kidneys, ureters, and bladder for detection of renal stones. Some additional methods are used such as percutaneous nephrolithotomy (PCN) and stone extraction using an especially designed ureteroscope (URS) and extracorporeal shock wave lithotripsy (ESWL) are intended for efficient diagnosis [12]. Comorbidity in stone formers as renal insufficiency, diabetes, gross obesity, pulmonary disease increases the risk of complications [13].

Extracorporeal shockwave lithotripsy (ESWL) is a safe and effective method for surgical treatment and removal of most upper urinary tract stones but shows major complications including haemorrhage, septicaemia, steinstrasse formation and cardiac arrhythmias [14]. Patients are instructed to drink six to eight glasses of liquid daily. High sodium intake contribute to hypercalciuria in patients with calcium oxalate stones [15]. Low protein diets are commonly prescribed for patients with idiopathic calcium nephrolithiasis [16]. For stones measuring 10 mm or less, antispasmodics (calcium channel blockers and alpha blockers) relaxes the smooth muscle of ureters and accelerate stone passage by five to seven days [17]. For medical-expulsive therapy (MET), Corticosteroids, hormones, nonsteroidal anti-inflammatory agents (NSAIDs), calcium-channel blockers and α -adrenergic antagonist have been evaluated. The addition of a corticosteroid to tamsulosin in the MET of distal ureterolithiasis produces a more rapid stone expulsion [18]. Stones were significantly better treated with percutaneous nephrolithotomy as compared to extracorporeal shock wave lithotripsy (ESWL) with the largest observed divergence seen in stones >1 cm in diameter [19].

METHODOLOGY

Study Design

A prevalence study was done on sample size of 50 patients suffering from kidney stone which were selected randomly from different hospitals in order to

determine the percentage prevalence, percentage for various diagnostic tests and prescription trends within Sialkot or its Tehsils. Those hospitals were Amina hospital Cantt, Sialkot, Islam central Hospital, Sialkot and different private clinics of Sialkot. Similar study was conducted to determine chronic kidney disease (CKD) and kidney stones prevalence and its risk factors in children and adult population [20]. The study design that was followed, is given below:

Study Sample and its Recruitment

The study period was from February 2016 to September 2016. For the completion of our research work, total sample size of 50 patients of single stone or multiple stones including males and females of all age groups have participated. Interviews with patients and guidance from academic and community endourologists were considered. All of the patients have shown the history of kidney stones. Prevalence increases with age for both gender. Some of them were suffering from co-morbidity like acute renal failure, hypertension, diabetes, chronic respiratory infections and chronic kidney disease but apart of these, we have only considered kidney stone patients with or without comorbidity. Different hospitals and clinics were visited for data collection (patient profile, laboratory data etc). The patient consent form was signed by the patient to encourage their participation and willingness in our project.

Patient Selection

The patients of all age groups were selected randomly from any socio-economical society, demographic and regional variations. Limitation of our research work in selection of patients includes that patients were only be eligible if they were either resident of district Sialkot or its Tehsils i.e. Daska, Sambrial and Pasroor. To minimize selection bias within our research work, we report on all patients for whom there are treatment follow-up data, with no other criteria imposed [21]. Total 50 patients of all age groups were involved without differentiation of gender. There is no limitation of religion or ethnicity in our research work. The patients of all age groups were included either children or adults. There is no any age limit for the inclusion of patient in this study. Males and females are also included as they are the major part of the society.

Patient Consent

The selected patients of kidney stones were agreed for their participation in our research project. None of the patient was disagreed with any aspect of our research work. Consent forms were signed by the patient in English and in Urdu for legal approaches.

Family History of Patient

Kidney stones develop more frequently in individuals with a family history of kidney stones than in those without a family history, so patients with family

history was also considered in our research project. Reoccurrence was much more common in men with a personal history of stones at baseline in 1986 than in those without a history of stones [22].

Method of Data Collection

The study was carried out in the Department of Urology, Amina Hospital Cantt, Sialkot. Permission was first obtained from medical superintendent, Nadeem Cheema. The data for questionnaire were derived from the interview of patients of various hospitals and clinics of Sialkot. All of the patients were allowed to answer the questionnaire concerning their previous medical history of kidney stones (PMH), presenting complains (PC), history of presenting complains (HOPI), dietary habits (DH) and past surgical history related kidney stones (PNL, ESWL). In eligible households, all members having kidney stones were asked to complete a self-administered questionnaire on disease history, medication use, dietary habits, occupational exposures and other health-related matters [23].

The lifestyle occurrence of kidney stones can be estimated by questions i.e. “Have you ever been complaint of kidney pain, Does this pain is related to kidney stone, Does the pain radiates toward the groin region, Is there any burning in urination, Is there any blood clot in urine etc [24]. As the lower urinary tract symptoms such as dysuria, urgency, and frequency may occur once a stone enters the ureter [25]. All of these questions were very helpful in accurate diagnosis of disease. A Performa was designed for the questioning of the kidney stone patient (Figure 1A) and (Figure 1B) and also signed along with patient consent form. We have planned three groups, one for male, one for female and other one is for children to calculate the prevalence of kidney stones in Sialkot. Finally we have compared the results of these groups after performing calculations for prevalence. There was not any limitation of age and co-morbidities but the only restriction for selection of patient was to hold the specific disease or have any past history of stones which are cured or present complications of kidney stone. The percentage of medication prescribed, disease prevalence and diagnostic tools used for diagnostic purpose were also determined.

RESULTS

Prevalence Rate of Kidney Stones in Sialkot

This project was conducted to assess prevalence, diagnostic methods and medication prescribed for kidney stones in various hospitals and clinics of Sialkot. Our principle finding was to assess the prevalence rate and medication prescribed for kidney stones in district Sialkot and its tehsil. 50 patients of kidney stones were considered of different sexes and age from wide range of community of Sialkot. Out of

these 50 patients, 30 males (60%), 17 females (34%) and 3 children (6%) were suffering from the kidney stone as mentioned in Table 1.

Percentage of Diagnostic Tools for Diagnosis of Kidney Stones

Diagnostic evaluation was conducted on 50 patients with a single episode or multiple episodes of renal stone formation. Table 2 indicates the percentages for various diagnostic tools. In order to assess the diagnostic tools used for diagnosis or investigation of the kidney stones, volunteers in Sialkot having kidney stones enlisted were 30 male, 17 female and 3 child participants. Our results for diagnostic tools were ultrasound (n=48, 96%), KUB X-Ray (n=5, 10%), IVP (n=1, 2%), urinalysis (n=29, 58%), urea (n=46, 92%), uric acid (n=28, 56%), creatinine (n=46, 92%), sodium (n=19, 38%), calcium (n=5,10%) and chloride (n=15, 30%). The abdominal and pelvic ultrasonography (n=48, 96%) was highly recommended by the physician. The lesser recommendations were found for IVP (n=1, 2%).

Percentage of Prescription Trends for Kidney Stones

Prescription trends for the treatment of kidney stone may vary according to the size of stone within kidneys or urinary tract of single stone former or multiple stone former. According Table 3, medicines mostly prescribed in Sialkot for treatment of kidney stone from sample of 50 patients were tamsulosin (n=40, 80%), ciprofloxacin (n=34, 68%), diclofenac sodium (n=32, 64%), citro soda (n=28, 56%), chymotrip forte (n=22, 44%), omeprazole(n=16, 32%), osteotec (n=11, 22%), nelbuphine (n=7, 14%), distalgesic (n=4, 8%), furosemide (n=3, 6%) , paracetamol (n=2, 4%). Tamsulosin was highly recommended for kidney stones.

Table 1: Prevalence of kidney stones in Sialkot

Sr. No	Population	Total no. of patients	Sample size (n)	Prevalence (%)
1	Male	30	50	60%
2	Female	17	50	34%
3	Children	3	50	6%

Table 2: Percentage of diagnostic tests used in Sialkot for Kidney stone patients

Sr. No	Diagnostic test	Frequency (n)	Percentage (%)
1	urea	46	92
2	creatinine	46	92
3	uric acid	28	56
4	sodium	19	38
5	calcium	5	10
6	chloride	15	30
7	ultrasound	48	96
8	KUB X-Ray	5	10
9	IVP	1	2
10	Urinalysis	29	58

TO ASSESS THE PREVALENCE, DIAGNOSTIC TOOLS AND PRESCRIPTION TRENDS OF KIDNEY STONES (NEPHROLITHIASIS) IN SIALKOT

Patient name: _____ Age: _____
Gender: _____ D.O.A: _____
Consultant name: _____ Hospital: _____

1. History:-

i. Present complaints (PC): _____

ii. History of present illness (HOPI): _____

iii. Past medical history (PMH): _____

iv. Family history (FH): _____

v. Dietary history: _____

2. Questioning:-

i. What is the site and duration of pain? _____

ii. Does pain radiates to groin area? _____

iii. Do you feel burning upon urination? _____

iv. Do you feel blood in urine? _____

v. Is there passage of any type of stone in urine? _____

vi. Have you ever been complaint of kidney pain? _____

3. Prevalence of kidney stones:-

Female Male Children

1. Diagnostic tools:-

RENAL PROFILE			RENAL PROFILE		
Parameter	Result	Normal value	Parameter	Result	Normal value
Urea			Sodium		
Creatinine			Calcium		
Uric acid			Chloride		

IMAGING TEST		URINALYSIS		
Parameter	Result	Parameter	Result	Normal value
Ultrasound		Color		
KUB X-Ray		pH		
Spiral CT		WBCs/RBCs		
IV Pyelogram		Protien		
MRI		Sugar/ Ketone		

2. Characteristics of kidney Stone:-

Anatomical Position: _____ Size of Stone: _____

Type of stone:

Cysteine stones	Uric acid stones	Calcium stones	Struvite stones	Miscellaneous stones
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3. Treatment:-

i. Non-pharmacological treatment:-

- Water intake: _____
- Diet plan: _____

ii. Pharmacological treatment:-

Sr. No	Medications		Dose	Frequency	Indications
	Generics	Brands			
1					
2					
3					
4					
5					

7. Follow up:-

Date				
Sign				

Patient sign _____ Student sign: _____

A

B

Figure 1: Patient profile and compliance form

Table 3: Total percentage of prescribed medicines used in Sialkot for the treatment of kidney stones

Medicine	Frequency (n)	Drug percentage in 50 prescriptions (%)
Tamsulosin	40	80
Ciprofloxacin	34	68
Diclofenac sodium	32	64
Citro soda	28	56
Chymotrip forte	22	44
Omeprazole	16	32
Osteotect	11	22
Nelbuphine	7	14
Distalgesic	4	8
Furosemide	3	6
Paracetamol	2	4

DISCUSSION

Prevalence Rate of Kidney Stone in Sialkot

Figure 2 showed the maximum number of male patients were subjected to kidney stones as compared to females. There was the highest incidence of onset of the kidney stone disease during the fifth decade [26]. The results showed male predominance for calcium oxalate and uric acid, a female

preponderance for calcium phosphate and struvite stones, and an increasing prevalence of uric acid stones with age in both genders [27]. Young male and female are more prior to be infected by gram negative bacteria and cause septicemia which leads to formation of infectious stones named struvite stones. As the males are in direct contact with environment and dehydrated so there are more chances for formation of kidney stones. Within individual races, men still have a higher disease burden when compared with women from the same race [28].

Percentage of Diagnostic Tools for Diagnosis of Kidney Stones

Figure 3 indicates that ultrasound was recommended for diagnosis of kidney stones as it provides more accurate evaluation of stone location. The localization system for stones is described in connection with a dry table shock wave lithotripter, and uses a conventional ultrasound imaging system but wherein the ultrasound transducer has been modified to enable its location in space to be readily determined automatically [29]. An ultrasound B-scan

probe has proved to be worthwhile in the intraoperative localization of renal calculi [30]. Comparison of recurrent stone formers with a single stone episode had just as similar mild to severe biochemical abnormalities or laboratory results, such as hypercalciuria and exaggerated calciuric response to oral calcium load in absorptive hypercalciuria, high fasting urinary calcium and cyclic adenosine monophosphate in renal hypercalciuria, hyperuricosuria in hyperuricosuria calcium oxalate nephrolithiasis and low urine volume [23].

Percentage of Prescription Trends for Kidney Stones

Figure 4 showed tamsulosin was highly recommended for kidney stones as it is believed that it is used for benign prostatic hyperplasia (BPH) and to help with the passage of kidney stones. Tamsulosin

appears to be effective only for stones over 4 mm and less than 10 mm in size. Tamsulosin therapy, as an adjunctive medical therapy after extracorporeal shock wave lithotripsy (ESWL), is more effective than lithotripsy alone for treatment of patients with large renal stones and equally safe [31].

CONCLUSION

According to our research work during the time duration of year 2016-2017, the prevalence of kidney stones in district Sialkot of Pakistan is more in male gender as compared to female gender. The percentage prevalence is 60% in males and 34% in females along with 6% in child. Our research work indicates that the most prevalent diagnostic test is ultrasound (96%) and most recommended medicine is tamsulosin (80%) for the treatment of kidney stones.

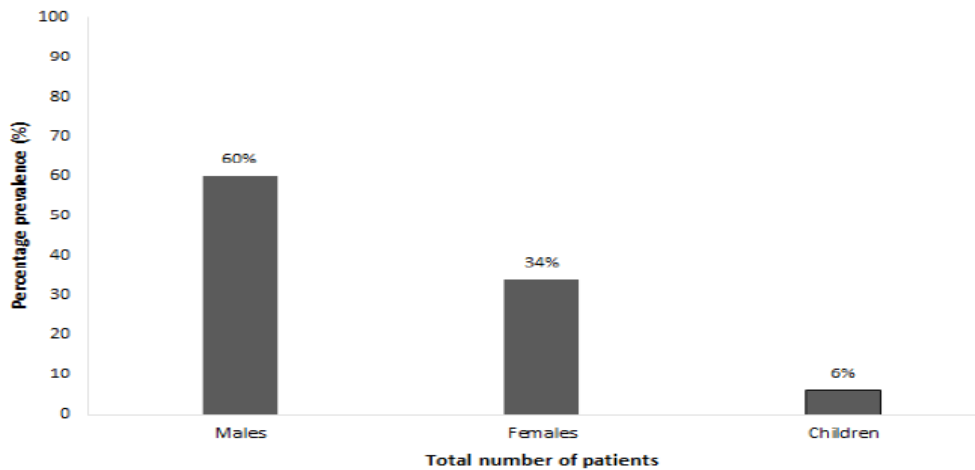


Figure 2: Prevalence of kidney stones in Sialkot

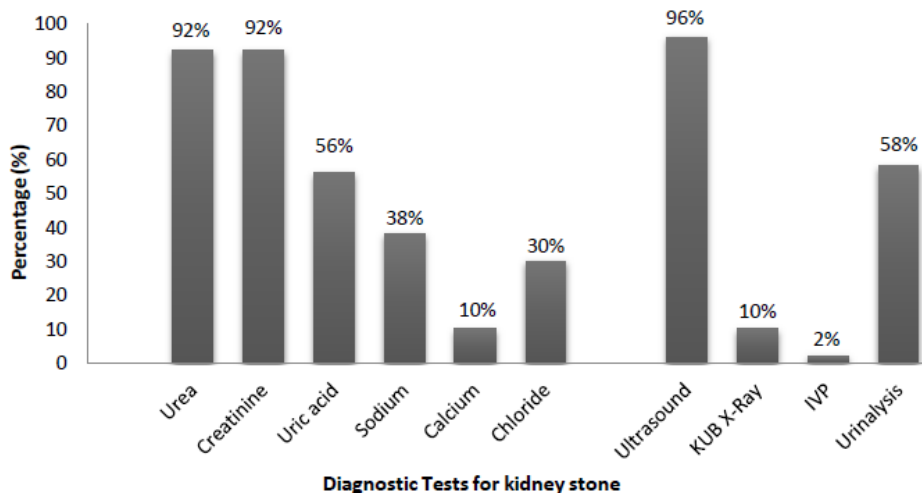


Figure3: Percentage of diagnostic tools used in Sialkot for diagnosis of kidney stones

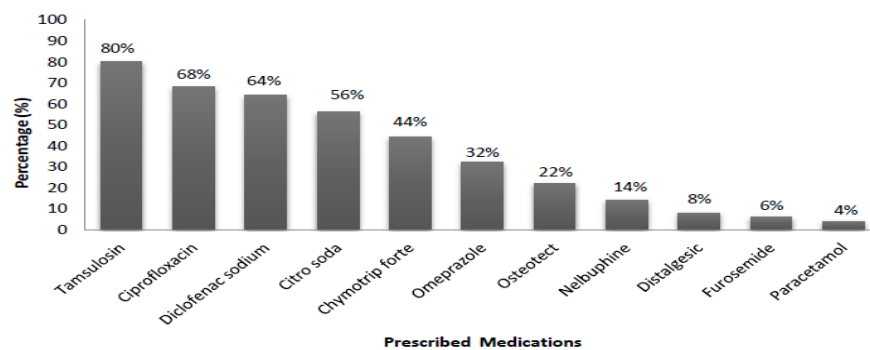


Figure 4: Percentage of total medicines prescribed in patients suffering from kidney stones in Sialkot

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