



EPIDEMIOLOGY OF UROLITHIASIS IN BHAGALPUR DIVISION

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Abstract: *There is an increase in urolithiasis cases in Bhagalpur division of Bihar province of India, has been studied over a period of 11 month June, 2021 to May 2022. About 150 urolithiasis patients has been studied from this division. A month wise data of urolithiasis patients have been recorded from hospitals (JLMNCH), Bhagalpur and local private nursing home and through personal interactions with patient from different Diagnostic Centres located in the Bhagalpur division. The data were collected with the help of structured questionnaire and interaction with patients comprising of different parameters like age, sex, region, site of calculi and various treatment that has been chosen by patients. Result revealed a gradual increase in the number of urolithiasis cases in Bhagalpur district. The occurrence of kidney stone among male and female is about 2:1. The maximum number of patients were clustered in the age group ranges between 31 -40. A predominant cases of upper urinary tract have been reported among males.*

Key Words: *Urolithiasis, Epidemiology, Urinary calculi, PCNL, UUT.*

1. INTRODUCTION :

Epidemiology is defined as the study of the distribution and determinants of disease. Epidemiology can help with the understanding and management of stone disease in several ways. Urolithiasis commonly known as nephrolithiasis or kidney stone, is a worldwide condition that has affected human since ancient times (Jamil *et. al.*, 2019; Tefekli *et. al.*, 2013). It is a significant urological disease comprising of 3 to 20% of the world population (Prakash *et. al.*, 2019; Trinchieri *et. al.*, 2008). Urolithiasis is a condition marked by the creation or presence of Calculi in the urinary tract (Hussain *et. al.*, 2019) (Ahmed *et. al.*, 2016). Several factors like age, sex, dietary habit, water-intake, environmental factor, geographical area, climate, genetics and obesity are the determinants of calculi formation (Kakkar *et. al.*, 2021). The prevalence of this disease increasing in India's Northern and Eastern region (Rao *at. et.*, 2018; Faridi *et. al.*, 2020). There is upsurge in the prevalence of urolithiasis in the North-west too (Durgawale *et. al.*, 2010). The incidence of urolithiasis is comparatively lower in southern part (Kumari *et. al.*, 2016).

The forgoing in mind we have recently investigated the incidence of urolithiasis disease in the Bhagalpur division of Bihar, India. There was no data on the different factors promoting renal calculi. In the present study the renal stone with relationship between the sex, age group, location of Calculi and the different treatment process on the basis of Calculi has been studied (Rao *et. al.*, 2019; Kakkar *et. al.*, 2021).

The existing surgical treatment of urolithiasis has been categorized into two types non-invasive (minimally invasive) and invasive. There is no cut in non-invasive were as all the surgical procedure comes under invasive like Extracorporeal Shockwave Lithotripsy (ESWL), Ureterscopy (URS), Percutaneous Nephrolithotomy (PCNL) and Retrograde Intrarenal Surgery (RIRS) are minimally invasive treatment strategies (Aghamir *et. al.*, 2021). Open surgery come under invasive which were rarely done.

ESWL (Extracorporeal Shock Wave Lithotripsy) is used where the stone size is small (below 20mm) (Lucena *etal.*2021). It is non-invasive procedure that breaks down stones in parts of the urinary system (Marhoon *et. al.*, 2013) as well as in the pancreas and in the bile ducts. The upper urinary tract calculi are commonly treated with ESWL according to size and location ((McClain *et. al.*, 2013; Butterweck *et. al.*, 2017). Percutaneous Nephrolithotomy (PCNL) is for the removal of larger stone fragments, for patients with a stone burden of >20 mm or stag horn calculi (Ganpule *et. al.*, 2016; Sebaey *et. al.*, 2022). PCNL is considered the standard of care, mirroring the successes of open surgery while decreasing the length of hospital stay. RIRS (Retrograde Intra Renal Surgery) remains a good alternative treatment



choice for lower calyx kidney stones from 2-3 cm with low complication rates, short hospital stay, less analgesic requirements, and stone-free rate close to mini-PCNL. But it is so costly and is time taken.

2. MATERIAL AND METHOD :

A retrospective study was conducted from July 2021 to May 2022. A month wise data of urolithiasis cases reported and diagnosed during the period of work. Data were collected from government hospital, different private nursing homes and diagnostic centres located in the Bhagalpur district, as it is medically important and most of the patients prefer to get treatment here. The data were collected with the help of structured questionnaire and history of the patients. Different factors like age, sex, dietary habit, calculi location and calculi size were taken into accounts. Among 150 cases of urolithiasis were studied in which 103 patients were male and the rest 47 were female. The calculi were mostly observed in Upper Urinary Tract (UUT), which were predominantly observed in male. The maximum number of patient were clustered in the age group 25-45. A clear stone session were observed in summer. According to the characteristics of a calculi (size, number, location and composition), various treatment procedure have been adopted.

3. RESULT AND DISCUSSION :

Our survey report is based on data obtained from total 150 patients from the month of July, 2021 to May, 2022.

Table-1: Gender wise data of urolithiasis patients:

Sex	No of patients	Percentage
Male	103	68.66%
Female	47	31.33%

During our study period of 11 months from July, 2021 to May, 2021 we gathered a total of 237 patients. In our study out of 237 patients, 150 patients were diagnosed and treated for Urolithiasis. The rest were suffering with calculi in the gall bladder and prostrate. According to survey work among 150 urolithiasis patients; 103 patients were male (68.67%) and 47 patients were female (31.33%). Male to female ratio of urolithiasis was found to be 2:1 (Table-1) which is similar to the study of Sivakrishnan *et. al.*, 2017, Cassell III *et. al.*, 2020.

Heers *et. al.*, 2021 and Marak *et. al.*, 2013 also reported the same ratio of male and female patients. In contrary Shankar *et. al.*, 2017 reported 3:1 of male and female urolithiasis patients in Warissaliganj Nawada (Bihar) and Rao *et. al.*, 2018 in Purnia district (Bihar) also reported the same, may be due to environmental factors. But the present study data as far sex ratio is concerned varies from existing one. Study revealed that the prevalence of urolithiasis among male is two times more as compared to female, in contradiction with the prevalence of urolithiasis is more in female than in male (Chen *et. al.*, 2019).

The maximum number of urolithiasis patients have observed in age group 31 to 40 years, having 47 patients (31.33%). In 41 to 50 age group having 42 patients (28%), followed by 51 to 60 age group having 36 patients (24%). The age group 61-70 have 11 patients (7.33%) followed by age group 70-80 years having 2 patient (1.33%). The minimum number of patient have been observed under 71-80 age group, had only 3 patients (2%). Study demonstrated that the maximum number of patients were clustered in each group were 30 to 60 years (Table 2).

Sandilya *et. al.*, 2019 reported the prevalence of urolithiasis among age group 30-39 years. Prakash *et. al.*, 2019 observed it among 21-60 years. Durgawale *et. al.*, 2010 reported it among age group between 31-60 years. Marak *et. al.*, 2013 observed it among 25-44 years.

Table 2: Age verses urolithiasis patients:

Age group	No of Patients	Percentage
10-20	3	2
21-30	9	6
31-40	47	31.33
41-50	42	28
51-60	36	24
61-70	11	7.33
71 -80	02	1.33

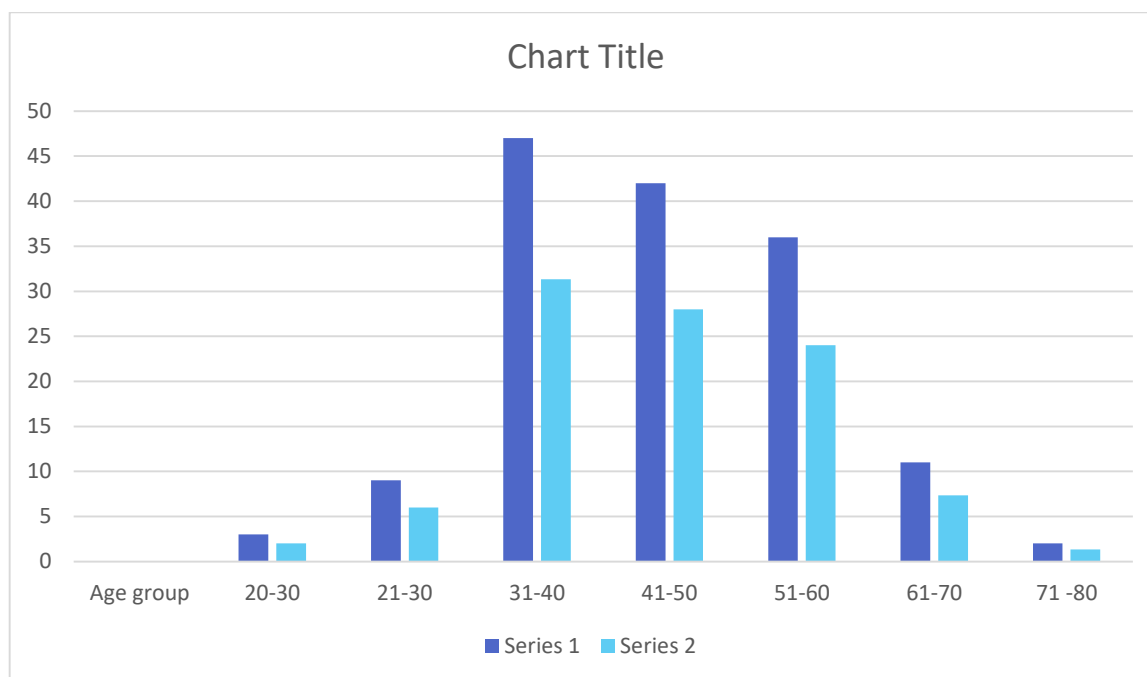
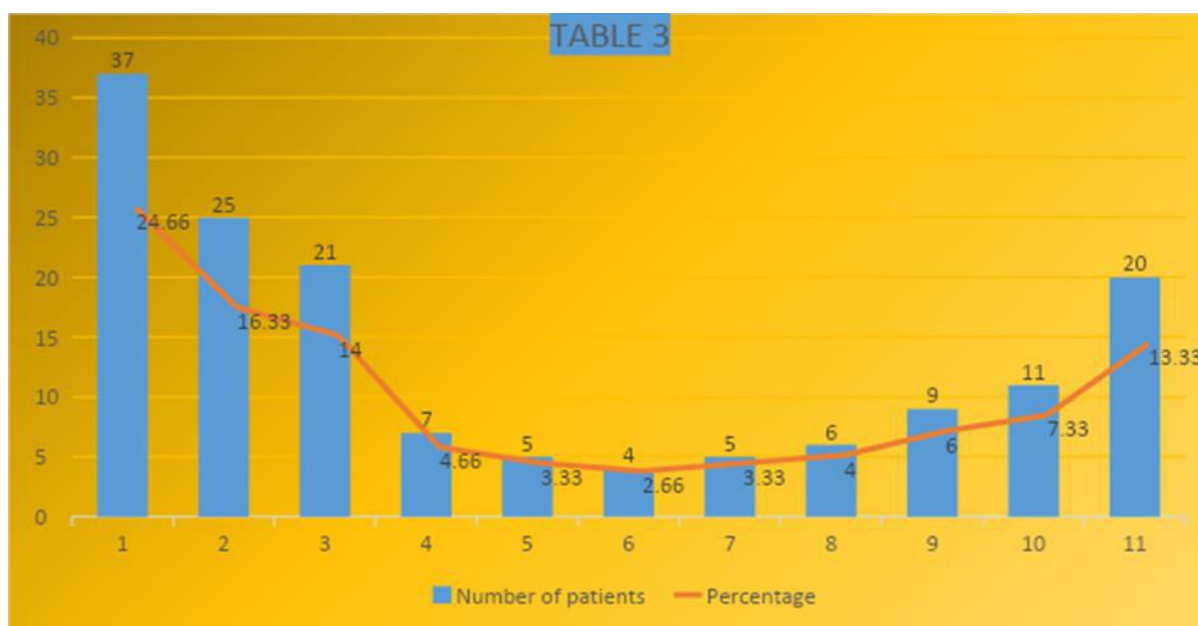


Figure : Graphical Presentation of Relation between age group and no of urolithiasis patients

Present study also revealed that there is a close association of urolithiasis cases in relation to seasons. In the summer season it appears that a clear ‘stone season’ exists in this area. The maximum cases of urolithiasis had been reported in July (24.66%) while minimum in December (3.33%) [Table-3]. It was also observed by Liu *et. al.*, 2018. It is supposed to be due to decreased urine production because of dehydration and insufficient water intake. The summer is a time for flip-flops, iced drinks with soda and carbonate, and other outdoor activities (Saldana *et. al.*, 2012) Given the overwhelming data from many study designs around the world, it appears undeniable that climate, whether measured by temperature, humidity, or sunlight, plays a role in the development of urinary calculi (Sandilya *et. al.*, 2019).

Table 3: Month wise presentation of urolithiasis cases in Bhagalpur.

Year	Month	Number of patients	Percentage
2021	July	37	24.66
2021	Aug	25	16.66
2021	Sep	21	14
2021	Oct	7	4.66
2021	Nov	5	3.33
2021	Dec	4	2.66
2022	Jan	5	3.33
2022	Feb	6	4
2022	Mar	9	6
2022	Apr	11	7.33
2022	May	20	13.33



Out of 103 male patients, 75 were suffering from calculi in the Upper Urinary Tract (UTI) and rest 28 were with Lower Urinary Tract (LUT). While in 47 female patients, it was observed that 27 were suffering with upper urinary tract and 20 of lower urinary tract infection. Study showed that the calculi occurred more in the upper part of urinary tract than in the lower part. It clearly showed that the predominant case of upper urinary tract were observed in male (Rao et. al., 2006).

Table 4: Urinary tract location wise distribution of patients.

Sex	UUT	LUT	Total
Male	75	28	103
Female	27	20	47

Table 5: Distribution of urolithiasis patients according to dietary habits:

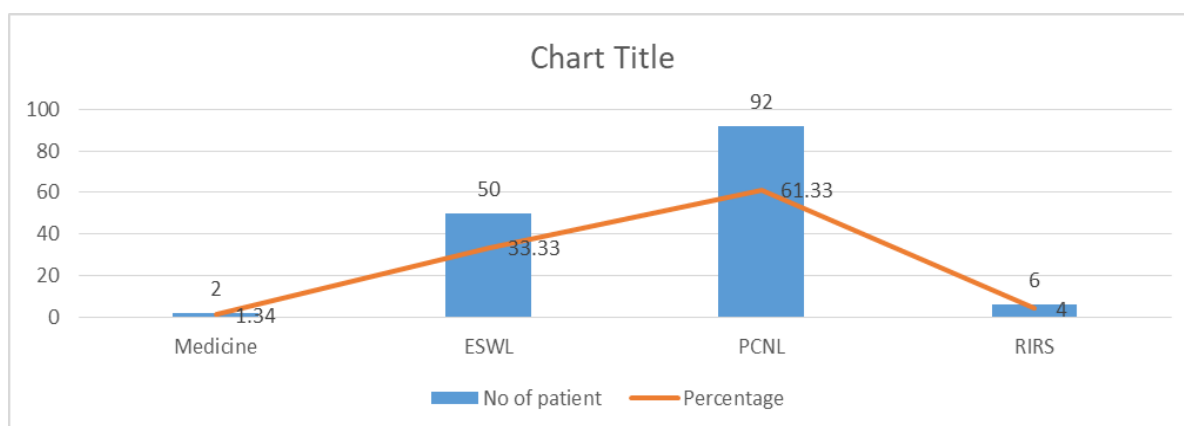
Diet	Number of patients	Percentage
Non Vegetarian	115	76.66
vegetarian	35	23.33

There is a link between non-vegetarian eating habits and the production of kidney stones apart from vegetarian eating habits. Because of its high purine content, a diet strong in animal protein is causative factor for kidney stone. Its catabolism produces uric acid, which may raise the risk of kidney stones. The majority of humans consume calcium carbonate, which is found in bones also promote calculi formation (Sunitha et. al., 2018; Sandilya et. al., 2019).

Out of 150 cases of patients, 2 were given medicinal treatment (1.33%), 52 through ESWL (34.66%), 79 through PCNL (52.66%), 4 through RIRS technique (2.66%) and rest 13 with Uteroscopy (8.66%). Our study depicts that 82 calculi were collected from 75 patients from these different sources.

Table-6: Treatment wise distribution of patients.

Treatment	No of patient	percentage
Medicine	2	1.33
ESWL	52	34.66
PCNL	79	52.66
RIRS	4	2.66
URS	13	8.66



4. CONCLUSION :

Study review conveys information about the prevalence of urolithiasis cases among Bhagalpur division. The result suggests that prevalence rate varies considerably according to age, sex, obesity, dietary habit, environmental factors, climate and life style.

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