

Characteristics of Urolithiasis Patients in the Undata General Hospital during 2019

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Abstract: ***Introduction:** Urolithiasis are a common health problem and can generally lead to increased morbidity. Of all urological cases, urolithiasis occupy the third position as the most common disease, after urinary tract infections and prostate diseases which occupy the first and second positions. The purpose of this study was to assess the characteristic of urolithiasis patients in Undata General Hospital including the prevalence, gender, age, and location of the stone. **Method:** Descriptive study with a retrospective cross-sectional approach to assess the entire population of urolithiasis (kidney, ureter and bladder stone) patients at urology outpatient clinic of Undata General Hospital. Data collected from medical records of urolithiasis patients, by searching medical record based on International Classification of Disease X (ICD X) code N20.0, N20.1 and N21.0 from February to December 2019, gender, age and stone location were documented. **Result:** The number of cases obtained was 2,392 cases (1,000 new cases and 1,392 pre-existing cases). The prevalence of patients with urolithiasis was 4.72% among patients admitted to Undata General Hospital outpatient clinic from February 2019 to December 2019. Urolithiasis patients at Undata General Hospital consisted of 67.3% male patients and 32.7% female patients. The highest number of urolithiasis was at age of 51 – 60 years old (28.7%) and then followed by age of 41 – 50 years old (28.6%). The most common site of urolithiasis in our study was kidney with a percentage of 54.9% and followed by ureter (38.2%) and bladder (6.9%) respectively. **Conclusion:** The number of outpatient clinic patients with urolithiasis at Undata General Hospital through February 2019 to December 2019 are 2,392 patients with prevalence of 4.72%. Based on gender. Male were mainly affected than women, with male to female ratio 2.05: 1. The peak prevalence of urolithiasis in this study was at age 50 – 59 years old, however a significant rise in prevalence of urolithiasis started to occur at 40 years old.*

Keywords: urolithiasis, characteristic, prevalence, age, location, gender.

1. Introductions

Urolithiasis are a common health problem and can generally lead to increased morbidity. In general, urolithiasis are stones formed by a buildup of crystals from several minerals such as calcium oxalate, calcium phosphate, cystine or uric acid. Of all urological cases, urolithiasis occupy the third position as the most common disease, after urinary tract infections and prostate diseases which occupy the first and second positions.¹

The epidemiology of urolithiasis varies widely in different countries. This can occur due to differences in race, food, weather factors, and other factors. In addition, changes in socioeconomic conditions have affected the incidence, prevalence, and distribution of patients based on age, sex, location of stones, and types of stones found. Previous epidemiological surveys stated that the prevalence and incidence of stones in the upper urinary tract in developing countries is around 4-20%.²

The prevalence and incidence of urolithiasis have changed in recent decades. The prevalence of urolithiasis in North America is around 7 - 13%, in Europe 5 - 9%, and in Asia 1 - 5%. China, the country with the largest population in the world, has experienced a consistent increase in the prevalence of kidney stone cases, from 4% to 6.4%.³ Moreover, a study in China stated that men are more susceptible to urolithiasis, with an incidence ratio of men to women 1.8: 1. However, based at the types of stones found,

it was found that infection stones were more common in women than men, with a ratio close to 2: 1.⁴ Research in Nepal also showed a male predominance of urolithiasis. The highest frequency of urinary tract stone cases was found at the age of 30-39 years.⁵ Research conducted in Minnesota showed a higher incidence of urolithiasis in men compared to women with a ratio of 1.73: 1, and the highest incidence was found at the average age - 44.8 years on average.⁶ On the other hand, the research conducted in Saudi Arabia, in the period 2007 to 2009, showed that the incidence of staghorn stones is higher in women than in men.⁷

In Indonesia, there is no definite data from cases of urolithiasis nationally. Urinary tract stone case data is still centered in teaching hospitals, especially in big cities in Indonesia. There is an increase in cases of urolithiasis at Cipto Mangunkusumo Hospital every year, this is evidenced by an increase in extracorporeal shock wave lithotripsy (ESWL) actions five times from 1997 to 2002.⁸

So far, at the Undata Regional General Hospital, there are no data that can describe the characteristics of patients with urolithiasis in recent years. Data regarding the characteristics of patients with urolithiasis can be used as a guide to the description of patients with urolithiasis during the 2019 period at the Undata Regional General Hospital. Based on the above explanation, the researcher is interested in conducting research on "Characteristics of Urolithiasis Patients at the Undata Regional General Hospital during 2019".

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2. Methods and Materials

The design of this study is a descriptive study with a retrospective cross-sectional approach. Population in this study is outpatient clinic patients at Undata General Hospital during February – December 2019. The sample including the entire urolithiasis (kidney, ureter and bladder stone) cases at urology outpatient clinic of Undata General Hospital during February – December 2019 with the total sampling method.

Data collected from medical records of urolithiasis patients, by searching medical record based on International Classification of Disease X (ICD X) code N20.0, N20.1 and N21.0 at urology outpatient clinic of Undata General Hospital. Urolithiasis patient who does not have complete data on the medical record is excluded. Data on urolithiasis patients including medical record number, gender, age, and location of the stone. The data obtained were processed manually by Microsoft Excel, analyzed in a descriptive method, and presented in narrative and table.

3. Results

The total of outpatient clinic cases at Undata General Hospital from February 2019 to December 2019 were 50,613 cases. Based on the data, the mean of outpatient clinic cases were 4,601.18 each month. The highest number of outpatient clinic cases were in July, while the lowest number of outpatient clinic cases were in February.

Table 1: The distribution of outpatient clinic cases at Undata General Hospital from Februari to December 2019

Month	Number of Cases
February	3,865
March	4,823
April	4,917
May	5,020
June	3,920
July	5,711
August	4,448
September	4,433
October	4,914
November	4,376
December	4,187
Total	50,613

Meanwhile, the total cases at urology outpatient clinic were 6,512 cases. Based on the data, the mean cases were 592 each month. The highest number of cases were in July, while the lowest number of outpatient clinic cases were in February.

The total of urolithiasis cases at urology outpatient clinic were 2,392 cases (1,000 new cases and 1,392 pre-existing cases). Based on the data, the mean of urolithiasis cases at urology outpatient clinic were 217.45. The highest number of urolithiasis case were in October while the lowest number of urolithiasis cases were in February.

Table 2: The distribution of urology outpatient clinic cases at Undata General Hospital from February to December 2019

Month	Number of cases
February	436
March	592
April	534
May	578
June	442
July	730
August	719
September	553
October	720
November	688
December	520
Total	6,512

Table 3: The distribution of urolithiasis cases at urology outpatient clinic

Month	Number of Cases	New Cases	Pre-existing Cases
February	155	99	56
March	236	119	117
April	245	63	182
May	225	87	138
June	141	49	92
July	264	104	160
August	244	109	135
September	226	81	145
October	286	119	167
November	242	106	136
December	128	64	64
Total	2,392	1,000	1,392

In order to calculate the prevalence of urolithiasis at Undata General Hospital, the following formula was used.

$$Prevalence = \frac{\text{All new and pre-existing urolithiasis cases during given time period}}{\text{Population during time period}} \times 100\%$$

$$Prevalence = \frac{2,392}{50,613} \times 100\%$$

$$Prevalence = 4.72 \%$$

The prevalence of patients with urolithiasis was 4.72 % among patients admitted to Undata General Hospital outpatient clinic from February 2019 to December 2019.

Table 4: The distribution of urolithiasis cases based on location of stone and gender

Location of stone	Gender		Total
	Male	Female	
Kidney	353	196	549
Ureter	264	118	382
Bladder	56	13	69
Total	673	327	1,000

Based on table 4, it can be seen that urolithiasis patients were dominated by male. Urolithiasis patient at Undata General Hospital consisted of 67.3 % male patients and 32.7 % female patients with male to female ratio 2.05 : 1. The most common site of urolithiasis in our study was kidney with the percentage of 54.9% and followed by ureter (38.2%) and bladder (6.9%) respectively.

Table 5: The distribution of urolithiasis cases based on age

Age	Number of patients
≤ 20	52
21 – 30	70
31 – 40	159
41 – 50	286
51 – 60	287
> 60	146
Total	1,000

In this study we found that the highest number of urolithiasis were at age of 51 – 60 years old (28.7%) and then followed by age of 41 – 50 years old (28.6%) then age more than 60 years old (14.6%).

4. Discussions

This study aimed to describe the characteristics of urolithiasis patients in Indonesia, notably Central Sulawesi Province through studying the prevalence and understanding various characteristics (age, gender, and location of stone). At the current state, there is only one urologist available in Central Sulawesi Province, and Undata General Hospital is the main referral hospital in Central Sulawesi Province. Hence, the data on this study should be able to represent the characteristics of urolithiasis patients in Central Sulawesi Province.

The total of outpatient clinic cases admitted to Undata General Hospital from February 2019 to December 2019 are 50,613 cases, whereas the urology outpatient clinic cases contributes 12.86 % (6,512 cases) of that amount. Of all urology outpatient clinic cases, urolithiasis case contribute up to 36.73 % (2,392) cases which consist of 1,000 new case and 1,392 pre-existing case. The kidney is the most common location where urolithiasis can be found. Kidney stone contributes 54.9 % (549) patients of all urolithiasis patients, whereas ureter stone, and bladder stone contributes 38.2 % (382 patients) and 6.9 % (69 patients). Based on this data, the prevalence of urolithiasis at Undata General Hospital is 4.72 %, while the prevalence of kidney stone, ureter stone, and bladder stone were 3,26 %, 1,23 %, and 0,23 % respectively.

In a subsequent study, Sorokin et al. stated that the prevalence of urolithiasis was 1 – 5% in Asia.⁹ On the other hand, another study in China stated that the prevalence of urolithiasis was 7.96%.¹⁰ Varied prevalence were found in South Korea, where Choi and Yoon found that urolithiasis prevalence was 9.2% – 12.2% whilst Tae and Balpukov stated that urolithiasis prevalence was 11.5%.^{11,12} In an older study in Japan, it is stated that the prevalence of urolithiasis was 4.3% - 9%.¹³ A long-term study in Russia stated that the prevalence of urolithiasis was 2% - 3%.¹⁴ A study conducted by Memon et al. found that the prevalence of urolithiasis was 16% in Pakistan.¹⁵ Other study that conducted in Saudi Arabia and Iran stated that the prevalence of urolithiasis was 19.1% and 5.7%.^{16,17}

This varied prevalence can be found due to varied lifestyle, dietary habits, climate or living environment on each country.^{3,18} Hot dry climate, which can be found in most area in West Asia, possibly augment the rate of evaporation

of body fluid through the skin and subsequently results in concentrated urine, which is a risk factor for stone formation.³ In addition, Low fluid intake is a major risk factor for urolithiasis. In South Korea and Iraq, soldiers are obliged to drink enough water, hence the prevalence of urolithiasis among soldier is decreasing.¹⁹

Climatic and geographical factors are both had an important role in urolithiasis prevalence. Notably, ambient temperature, seasons, sunshine duration, humidity, and rainfall are included. In general, countries in the tropical and subtropical areas have a higher prevalence of urolithiasis than that in temperate and frigid zones.³ Indonesia has a tropical climate, hence the prevalence of urolithiasis should be higher than countries that have a temperate and frigid season. In this study, the prevalence of urolithiasis is higher than in Russia (4.72% vs 2 - 3%).¹⁴ On the contrary, Indonesia, notably Central Sulawesi, has a higher average temperature than South Korea (25 – 28 °C vs 21 – 25°C), the prevalence of urolithiasis in this study is lower than South Korea (4.72% vs 9.2% – 11.22%).^{11,12,20}

Another factor that may affect the prevalence of urolithiasis is socioeconomic status. As mentioned before, although the average temperature in Indonesia is higher than in South Korea, the prevalence in this study is lower than in South Korea. The reason for it may be that non-communicable diseases (mainly metabolic diseases) tend to have a high prevalence in a country that has high calories intake (mostly in developed countries). On the other hand, people who live in the economically less-developed areas have less access to advanced medical examinations like computed tomography.³ In this study, males are predominantly found in urolithiasis patients. The total of male patients were 673 (67.3%) while females are 327 (32.7%). The ratio of male to female in this study is 2.05:1. Most studies showed that males are predominantly found in urolithiasis patients, Chen et al. stated that the male to female ratio of urolithiasis patient are 1.1:1.¹⁰ Subsequent study also stated similar result in male to female ratio (1.9:1).¹⁴ In most countries males are found to predominantly urolithiasis patients. In general, males are more likely to have excessive alcohol and coffee. Furthermore, testosterone can augment stone formation, while estrogen tends to inhibit the formation of stones by regulating the synthesis of 1,25-dihydroxy-vitamin D.³ Urolithiasis can be found at almost all ages. In this study, we found that the peak prevalence of urolithiasis is at age of 51-60 years old. In general, based on data in this study, there is a significant rise in the prevalence of urolithiasis after the age of 40 years old. Another study also found a similar result, peak prevalence is at 50 – 59 years old.²¹ Recent study in South Korea found that the peak prevalence is at 60 – 69 years old.¹² Another study, Safarinejad stated that the peak prevalence of urolithiasis in Iran is at 40 – 69 years old.²²

5. Conclusions

To conclude, the number of outpatient clinic cases with urolithiasis at Undata General Hospital through February 2019 to December 2019 are 2,392 cases (1,000 new cases and 1392 pre-existing case) with prevalence of 4.72%. Based on gender. Male were mainly affected than women,

with male to female ratio 2.05 : 1. The peak prevalence of urolithiasis in this study were at 50 – 59 years old, however significant rise in prevalence of urolithiasis started to occur at 40 years old.

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