

# PROFILE OF PATIENTS WITH UROLITHIASIS IN RSUP DR. M. DJAMIL IN 2022

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## ABSTRAK

**Introduction:** Urolithiasis or urinary stone refers to the stone formation along the urinary tract, from the kidney to the urethra. Urolithiasis prevalence is known to differ across continents and across the country. A study in Indonesia in 2013 reported a national prevalence of 0.6% and a regional prevalence 0.4% in West Sumatra. **Objective:** This study aimed to determine patients characteristics and provide an overview of stone distribution among patients with urolithiasis at RSUP Dr. M. Djamil Padang. **Material & Methods:** This study was a descriptive observational research with a cross-sectional design using medical record data of patients with urolithiasis in RSUP Dr. M. Djamil Padang during January - July 2022. A total sampling method was used to collect data from 273 patients. **Results:** This research showed that most of the patients were males (58.24%) and aged between 51 - 60 years old (34.43%). The stones found were more commonly located in the upper urinary tract, comprising the kidney (73.26%) and ureter (14.65%). **Conclusion:** This study concluded that male was more likely to develop urolithiasis than female, and so did people aged 51 - 60 years old compared to the other age range. The stone's location was more likely to occur in the kidney.

**Keywords:** Urolithiasis, patients characteristics, stone's location.

## ABSTRAK

**Pendahuluan:** Urolitiasis atau batu pada pembentukan batu di sepanjang saluran kemih, dari ginjal hingga uretra. Prevalensi urolitiasis diketahui berbeda di berbagai benua dan di berbagai negara. Sebuah studi di Indonesia pada tahun 2013 melaporkan prevalensi nasional sebesar 0.6% dan prevalensi regional sebesar 0.4% di Sumatera Barat. **Tujuan:** Penelitian ini bertujuan untuk mengetahui karakteristik dan gambaran lokasi batu pada pasien urolithiasis di RSUP Dr. M. Djamil Padang. **Bahan & Cara:** Penelitian ini bersifat deskriptif dengan pendekatan cross-sectional menggunakan data rekam medis pasien urolithiasis di RSUP Dr. M. Djamil Padang pada bulan Januari-Juli 2022. Metode total sampling digunakan pada penelitian ini dengan jumlah pasien 273 orang. **Hasil:** Pada tahun 2022, didapatkan sebagian besar pasien urolithiasis adalah pasien dengan jenis kelamin laki-laki (58.24%) dan paling banyak berada dalam kelompok usia 51 - 60 tahun (34.43%). Lokasi batu lebih banyak ditemukan di saluran kemih atas, yaitu ginjal (73.26%) dan ureter (14.65%). **Simpulan:** Laki-laki dan masyarakat kelompok usia 51 - 60 tahun lebih berisiko mengalami batu saluran kemih. Batu yang terbentuk lebih cenderung berada di ginjal.

**Kata kunci:** Urolitiasis, karakteristik pasien, lokasi batu.

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## INTRODUCTION

Urolithiasis or urinary stone refers to the stone formation along the urinary tract, from the kidney to the urethra.<sup>1</sup> This condition is caused by multiple internal and external factors, such as sex, age, and hydration status, all leading to the saturation

of urine. Urolithiasis prevalence is known to differ across the continents and across the country. Liu et al. in 2018 found prevalence of urolithiasis in Asia varying from 1-19.1%.<sup>2</sup> Another study in Indonesia in 2013 showed a national prevalence of 0.6% and a regional prevalence 0.4% for West Sumatra.<sup>3</sup> Patients with urolithiasis may eventually develop

chronic and even life-threatening complication, such as chronic kidney failure and urosepsis.<sup>4,5</sup> For that reason, risk factors of urolithiasis should be identified to accurately deliver health promotion and spread knowledge and awareness for the public.

Previous study regarding this concern has been done in Indonesia. Kurniawan et. al (2018) with his study in RSUD Dr. Soetomo Surabaya, showed male tendency in developing urolithiasis with the most common site in the kidney.<sup>6</sup> Amanda et al. (2020) also conducted an equivalent study in RSUP Dr. Mohammad Hoesin Palembang with the same result.<sup>7</sup> On the other side, Padang has a different geographical condition as a coastal city and different dietary habits to other areas mentioned above. Hence, this study was conducted to acquire city-specific data in hope to elucidate the population with higher risk of forming urinary stone in RSUP Dr. M. Djamil Padang.

**OBJECTIVE**

This study was conducted to have an overview of urolithiasis patients' characteristics and distribution of stone location in RSUP Dr. M. Djamil, a tertiary hospital in Padang, in 2022.

**MATERIAL & METHODS**

This study was a cross-sectional descriptive study utilizing sex, age, and stone's location from the patients' medical records. The patients included in the study were confirmed to have urolithiasis through available radiographic imaging and was treated in RSUP Dr. M. Djamil Padang. Data was collected from November to December 2023 at the medical record center of the hospital. The data available was only from January-July 2022 as the following months have not been systematically garnered. It was then presented using descriptive statistics in frequency and percentage.

**RESULTS**

All 273 patients' data during the study period were collected. Most of the patients were male (159 patients; 58.24%) and aged between 51 - 60 years old (94 patients; 34.43%). On the other side, there were only 3 patients (1.10%) aged 15 years old and less. The mean age was 50.51±0,81 years old with the median age slightly higher, 52 years old. The eldest patient was 86 years old, while the youngest was just one year old.

**Table 1.** Sex characteristics of the population.

Sex	Frequency (n)	Percentage (%)
Male	159	58.24
Female	114	41.76
<b>Total</b>	<b>273</b>	<b>100.00</b>

**Table 2.** Stone distribution across the age group

Age Group	Stone Location				Total
	Kidney	Ureter	Bladder	Urethra	
≤15	1	0	1	1	3
16-30	12	0	1	1	14
31-40	30	7	3	4	44
41-50	52	5	1	1	59
51-60	70	15	4	5	94
61-70	31	8	6	3	48
>70	4	5	1	1	11
<b>Total</b>	<b>200</b>	<b>40</b>	<b>17</b>	<b>16</b>	<b>273</b>

The kidney was the most common site for urinary stone (200 patients; 73.26%). This condition persisted across all the age groups, unless for the youngest and the oldest age groups. The distribution of stone location was consistently decreasing from kidney, ureter, bladder, until urethra.

**DISCUSSION**

Based on this study, male is more prone to develop urolithiasis than female. This tendency aligns with previous study in China by Xu et al. (2022) and in Indonesia by Novianrini et al. (2015).<sup>8,9</sup> Anatomically speaking, male urinary tract is significantly longer, especially for their urethra. Hence, urine lasts longer in the urinary system and increases the possibility for stone formation. On top of that, the prostate gland occupying below the urinary bladder, may develop into benign prostatic hyperplasia (BPH) for 50-80% of male elderly.<sup>10</sup> BPH will further obstruct the outflow of urine from the bladder and increase the chance of developing bladder stone. This condition may explain for more male bladder stone patients.

Another contributing factor is testosterone hormone, which is much more abundant in male. This hormone produced by Leydig cell in testicle is circulating up until 20 times of that in female. Testosterone is known to press osteopontin and increase oxalate excretion to urine.<sup>11</sup> This hyperoxaluria condition may lead to oxalate stone which is the most commonly found stone

composition epidemiologically.

Urolithiasis is more commonly found in older patients, particularly on the sixth decade of life, based on this study. This is due to lower cognitive function, such as dementia, that may have occurred so that patients forget to have enough water intake.<sup>12</sup> Lower mobility and limited movement also make hydration a harder task to solve than it is for younger people. Other than that, salt intake should be given more attention as the elderly has undergone physiological change of lower glomerular filtration rate.

Comorbidities, such as type 2 diabetes mellitus with its insulin resistance, may also lead to urinary stone formation. The first explanation for this is a dehydration condition secondary to hyperglycosuria.<sup>13</sup> The second one is due to change in more basic urine pH which helps forming calcium oxalate and uric acid stone. The last one is through lower citrate production. As citrate is known to inhibit stone formation by aggregating with calcium in urine and preventing nucleation and crystallization, the low concentration of citrate can lead to stone formation.<sup>14</sup>

The consumption of drugs, such as antibiotics, particularly for a long period of time, is also found to cause drug-induced stones. An antibiotic drug is secreted in high concentration in urine.<sup>15</sup> That way, prolonged consumption of this drug, if not compensated with more water intake, can also lead to urolithiasis. Unfortunately, due to the limitation of medical record, patients' comorbidities and medical history are not available in this study.

This study found that the most common site for urinary stone is in the kidney. The kidney is the only blood-filtrating organ throughout the urinary system, while the latter organ will collect urine and accommodate the passage for it to be excreted. Hence, the accumulation of stone-forming-composition most likely first developed here, such as calcium and oxalate.

If a kidney stone is small enough in diameter, it may pass through the ureteropelvic junction to the ureter. Based on its transversal diameter, the stone may obstruct the ureter, leading to ureteric stone. Peristaltic movement of the ureter may help the stone to pass through, but it may backfire as the patients can feel intermittent colic pain. This explains for the high frequency of ureteric stone, but not as high as kidney stone.

Unlike ureteric stone, bladder stone can

primarily develop inside the urinary bladder, which means it did not migrate from the kidney. The risk for bladder stone formation increases in male with their prostate gland and further increases in BPH patients.<sup>16</sup>

Lastly, the urethra is the least common site for urinary stone. It usually is a migrating stone from the prior urinary organs. The migration of stone to the urethra is more common in older age because of lower urinary peak flow rate, which is consistent with this study's finding.<sup>17</sup>

## CONCLUSION

Urolithiasis patients in RSUP Dr. M. Djamil Padang in 2022 were commonly male and in their sixth decade of life. This prevalence was due to differences of male and female biological condition and physiological change of aging. Most of the urinary stones were located in the kidney and consistently decreased as the organ got further down the tract.

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