

Clinical and Laboratory Profiles of Patients with Urinary Tract Stones (Urolithiasis) at UKI General Hospital

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Abstract

Introduction: Urinary tract stones are a common urological condition characterized by the formation of stone masses from crystallized substances in the urine. Stone formation is influenced by various intrinsic and extrinsic factors and may occur in both the upper and lower urinary tract. **Objective:** This study aimed to determine the characteristics of patients with urinary tract stones at UKI General Hospital Jakarta during January 2020–December 2022. **Method:** This study used a descriptive analytic design. Data were obtained from the medical records of patients diagnosed with urinary tract stones at UKI General Hospital during the study period. **Result and Discussion:** A total of 102 patients with urinary tract stones were identified. Most patients were women, accounting for 60 patients (58.8%). The largest age group was 66–75 years, comprising 25 patients (24.5%). Comorbid conditions included hypertension in 29 patients (28.4%), obesity in 41 patients (40.1%), benign prostatic hyperplasia in 9 patients (8.8%), diabetes mellitus in 7 patients (6.8%), pregnancy in 4 patients (3.9%), and high cholesterol in 8 patients (7.8%). **Conclusions:** Patients with urinary tract stones at UKI General Hospital were predominantly women and aged 66–75 years. Hypertension and obesity were the most frequently observed associated conditions.

Introduction

Urinary tract stones, or urolithiasis, are a common urological disorder characterized by the formation of crystalline masses within the urinary tract (Suryantoro et al., 2025); (Rustandi et al., 2026). Stones may occur in the upper or lower urinary tract and can cause significant clinical manifestations, including pain, hematuria, urinary obstruction, and infection (Haryadi et al., 2020). The formation of urinary tract stones is a multifactorial process involving metabolic, genetic, anatomical, dietary, environmental, and lifestyle factors (Silalahi, 2020); (Maulana, 2021); (Hadibrata et al., 2022). The European Association of Urology reports that the prevalence of urinary stones varies substantially across geographical regions and populations, with estimates ranging from approximately 1% to 13%. Geographic, climatic, ethnic, dietary, and genetic factors contribute to these variations (European Association of Urology EAU, 2026).

The clinical importance of urinary tract stones extends beyond acute symptoms because obstruction and infection associated with stone disease may compromise renal function (Sinaga & Situmeang, 2024). Current urological guidelines also recognize an association between nephrolithiasis and chronic kidney disease, emphasizing the importance of identifying patients at increased risk and implementing appropriate preventive strategies (EAU, 2026); (Ali & Arianto, 2020). Lifestyle and metabolic factors are particularly relevant because obesity, diabetes mellitus, and metabolic syndrome have been associated with urinary stone formation and recurrence. Adequate fluid intake, maintenance of a normal body mass index, appropriate dietary habits, and physical activity are therefore important components of stone prevention (EAU, 2026); (Dewi et al., 2025); (Muammar et al., 2020); (Ruckle et al., 2020). In Indonesia, previous studies have demonstrated variations in the characteristics of patients with urinary tract stones. Haryadi et al. (2020), in a study of patients undergoing non-contrast computed tomography, found that urinary tract stones were more common among men and that the highest proportion occurred in the 46–55-year age group. Similarly, Silalahi (2020) reported that age, family history, sex, fluid intake, duration of sitting, and obesity were among the factors associated with urinary tract stone disease. Nurfitriani and Oka (2019) also reported a significant association between age and urinary tract stone disease, although obesity was not significantly associated with its occurrence in their study. These findings indicate that patient characteristics may differ according to population, geographical location, clinical setting, and study period.

The existing evidence, however, does not specifically describe the characteristics of urinary tract stone patients treated at UKI General Hospital Jakarta during the period from January 2020 to December 2022. The original study identified the absence of a specific database describing urinary tract stone patients at UKI General Hospital during this period, creating a local evidence gap regarding the demographic and clinical profile of affected patients. This information is important because local patient characteristics may differ from findings reported by other hospitals. In the present study, particular attention is given to age, sex, and several clinical conditions that may accompany urinary tract stones, including benign prostatic hyperplasia, urinary tract infection, diabetes mellitus, pregnancy, hypercholesterolemia, hypertension, and obesity. These variables are explicitly incorporated into the conceptual framework of the study.

Therefore, this study aimed to determine the characteristics of patients with urinary tract stones at UKI General Hospital Jakarta during January 2020–December 2022. Specifically, the study aimed to describe the number and distribution of patients according to age and sex and to identify the occurrence of diabetes mellitus, hypertension,

urinary tract infection, benign prostatic hyperplasia, obesity, pregnancy, and hypercholesterolemia among patients with urinary tract stones. The findings are expected to provide baseline clinical information for UKI General Hospital and support further research concerning risk factors, prevention, and management of urinary tract stone disease.

Method

This study used a descriptive cross-sectional design to describe the characteristics of patients with urinary tract stones at UKI General Hospital Jakarta from January 2020 to December 2022. Data were obtained from medical records of patients aged 17–75 years diagnosed by a urologist. Total sampling was used, including 102 eligible patients. Data were processed through editing, coding, tabulation, and cleaning, followed by univariate analysis and presentation using frequency distributions.

Result and Discussion

1. Result

A total of 102 patients with urinary tract stones were identified at UKI General Hospital during January 2020–December 2022. The patients ranged in age from 17 to 78 years. Based on the study findings, urinary tract stones were more commonly observed in male patients than female patients.

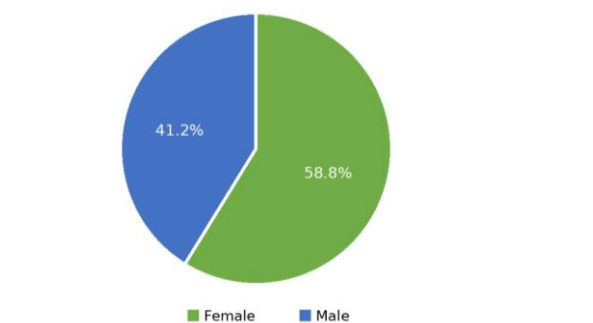


Figure 1. Number of urinary stone patients by gender

As shown in Figure 1. above, the majority of patients with urinary tract stones at UKI General Hospital between January 2020 and December 2022 were women, totaling 60 cases (58.8%), while there were 42 male patients (41.2%).

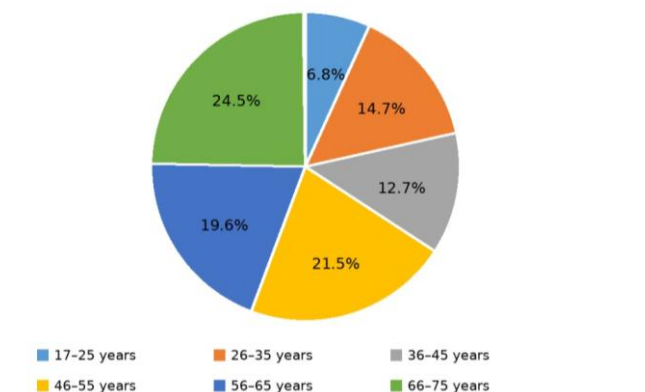


Figure 2. Number of patients with urinary tract stones by age

The patients with urinary tract stones were divided into six age groups: 17–25 years, 26–35 years, 36–45 years, 46–55 years, 56–65 years, and 66–75 years. The age distribution varied considerably among the patients. The largest proportion was found in the 66–75-year age group, with 25 patients (24.5%), while the smallest proportion was observed in the 17–25-year age group, with 7 patients (6.8%).

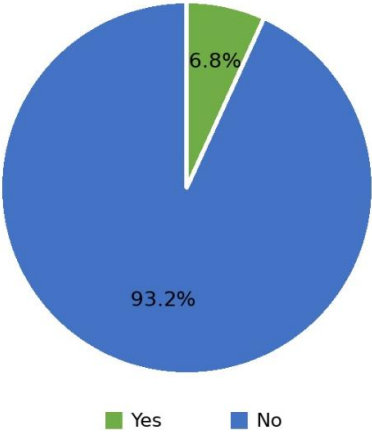


Figure 3. Number of patients with urinary tract stones by age

Figure 3. shows that 9 patients (8.8%) with urinary tract stones at UKI General Hospital during 2020–2022 had benign prostatic hyperplasia, while 93 patients (91.2%) with urinary tract stones did not have benign prostatic hyperplasia.

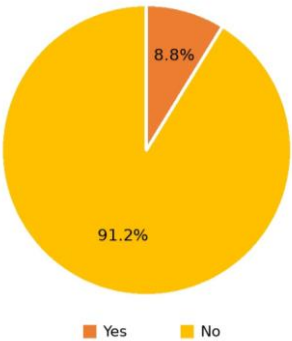


Figure 4. Number of patients with urinary tract stones based on the occurrence of urinary tract infections.

Figure 4. above shows that, among patients with urinary tract stones at RSU UKI between 2020 and 2022, 7 patients (6.8%) had a urinary tract infection, while 95 patients (93.2%) did not.

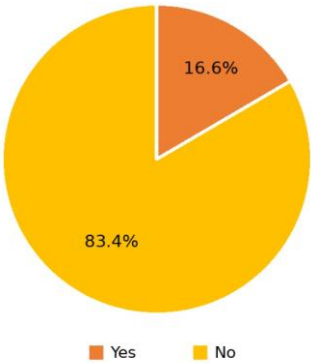


Figure 5. Number of patients with urinary tract stones based on the occurrence of diabetes mellitus

In this study, the operational definition of diabetes mellitus was a blood glucose level of ≥ 140 mg/dL. As shown in Figure 4.5, 17 patients (16.6%) with urinary tract stones at UKI General Hospital during 2020–2022 had diabetes mellitus, while 85 patients (83.4%) did not have diabetes mellitus.



Figure 6. Number of pregnant patients with urinary tract stones

As shown in Figure 6. above, the number of pregnant patients with urinary tract stones was small specifically 4 patients (3.9%) whereas there were 98 patients (96.1%) with urinary tract stones who were not pregnant.



Figure 7. Number of patients with urinary tract stones (BSK) presenting with high cholesterol levels

Based on Figure 7. above, it can be seen that 8 patients (7.8%) with urinary tract stones had a history of hypercholesterolemia, while 94 patients (92.2%) with urinary tract stones did not have hypercholesterolemia.

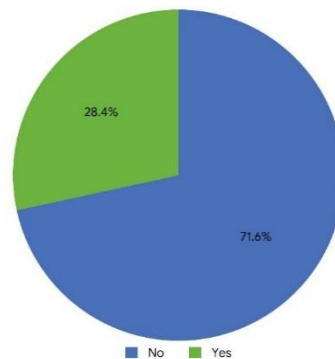


Figure 8. Number of patients with urinary tract stones (BSK) presenting with hypertension

In this study, the operational definition of hypertension was based on JNC 8, which defines hypertension as a blood pressure of $\geq 140/90$ mmHg. As shown in Figure 4.7 above, there were 29 patients (28.4%) with urinary tract stones who had hypertension, while 73 patients (71.6%) with urinary tract stones did not have hypertension.

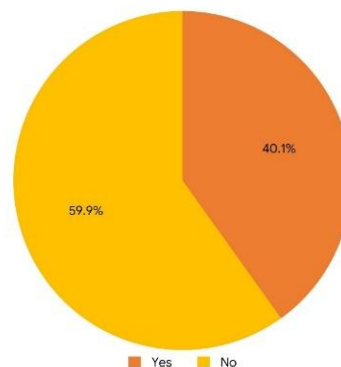


Figure 9. Number of patients with urinary tract stones based on obesity status

From the diagram, it can be seen that there were 41 obese patients (40.1%) and 61 non-obese patients (59.9%) with urinary tract stones.

2. Discussion

The characteristics of the study subjects were patients with urinary tract stones (UTS). Among 102 patients, females predominated, with 60 patients (58.8%), compared with 42 males (41.2%). However, this finding differs from previous studies, which generally report a higher incidence of UTS among males. This difference may be related to urinary calcium and citrate levels, sex hormones, and anatomical differences in the urinary tract. The highest incidence in this study was found among patients aged 66–75 years, while the lowest was observed in the 17–25-year age group. Although UTS is more common in certain age groups, it can occur at any age, including among young individuals. Urinary tract obstruction is one of the important factors associated with UTS because it can cause urinary stasis, infection, changes in urinary pH, and urinary supersaturation. This condition is particularly relevant among individuals over 50 years

of age, with benign prostatic hyperplasia (BPH) being one of the most common causes of obstruction. In this study, 9 male patients (8.8%) with UTS also had BPH. Aging is associated with various changes in urinary tract function, including decreased urinary control and prostate enlargement. These changes may contribute to urinary obstruction and subsequently increase the risk of urinary stone formation.

Urinary tract infection (UTI) was also identified among patients with UTS, with 7 patients (6.8%) affected. Persistent infection caused by urease-producing bacteria may contribute to the formation of infection stones, such as struvite and carbonate apatite, and may complicate treatment. Previous research has also demonstrated a significant association between UTI, urinary pH, proteinuria, and UTS. Another factor identified in this study was cholesterol, with 8 patients (7.8%) having hypercholesterolemia. Increased urinary cholesterol may interact with calcium oxalate and calcium phosphate crystals and potentially contribute to stone formation.

Obesity was another important factor identified in this study, affecting 41 patients (40.1%). Obesity may increase the risk of uric acid stone formation through decreased urinary pH resulting from reduced ammonia excretion and increased endogenous acid production. In addition, inadequate fluid intake and excessive consumption of sodium and animal protein may promote stone formation by increasing urinary calcium and uric acid excretion while reducing citrate excretion. Hypertension was found in 29 patients (28.4%). Although hypertension does not directly cause kidney stones, it may contribute to renal abnormalities, altered calcium metabolism, hypocitraturia, and increased urinary calcium excretion, thereby increasing the risk of UTS.

Other factors associated with UTS in this study were pregnancy and diabetes mellitus (DM). Four pregnant women among the 60 female patients had UTS. Stone formation during pregnancy may be associated with urinary tract dilation, ureteral obstruction by the gravid uterus, progesterone-induced smooth muscle relaxation, and infection. In addition, 17 patients had DM. Long-standing and poorly controlled diabetes may contribute to stone formation through urinary tract dysfunction, autonomic neuropathy, incomplete bladder emptying, and metabolic changes involving calcium, phosphate, and citrate. Overall, the findings indicate that UTS is associated with multiple factors, including age, urinary obstruction, infection, cholesterol, obesity, hypertension, pregnancy, and DM.

Conclusion

That among 102 patients with urinary tract stones at UKI General Hospital during January 2020–December 2022, most were female (58.8%) and most frequently aged 66–75 years (24.5%). Among the clinical characteristics examined, obesity and hypertension were markedly more prevalent than the other conditions assessed, whereas pregnancy was the least common. This profile offers baseline demographic and clinical information on urinary tract stone patients at UKI General Hospital that may support further research on risk factors, prevention, and management of the disease at this institution

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