

# Urinary Tract Stones Cases Profile at a B-type General Hospital, Gresik, East Java in March: May 2018

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## Abstract

**Introduction & objectives:** Urinary tract stones are associated with various risk factors, both endogenous and exogenous risk factors. The aim of this study is to investigate the demographic data of the outpatient clinic in Ibnu Sina General Hospital, a B-type hospital located in Gresik, East Java, Indonesia.

**Patients and Method:** This research was a descriptive study from medical records and questionnaires. A total of 118 patients was admitted to this research during March - May 2018. The variables used in this study were age group, sex, family history, water intake, and location of stones.

**Results:** The research show obtained result that the age group with the highest number of urinary tract stone cases is the age group of 45-64 years old (63,6%). Most of the patients were male (58,5%). The majority of the patients denied to having familial history of urinary tract stones (79,7%). The largest part of the patients didn't take >2,5L per-day (82,2%). Most of the stones were found in Upper Urinary Tract (81,4%).

**Conclusion:** From the results of the research the highest number of cases in each group was found to be in the age group of 45-64 years, male group, patients without any family history of urinary tract stone group, patients with water intake < 2.5L/day group, and patients whose stone located in the upper urinary tract group.

**Keywords:** *Urolithiasis, urinary tract stones, epidemiology, risk factor, east java, indonesia*

## Introduction

Urinary tract stones are a pathological condition because of the presence of hard masses such as stones that form along the urethra and can cause pain, bleeding, or infections of the urinary tract. If not treated properly, this obstruction can cause malfunction and permanent kidney structure damage, such as obstructive nephropathy, and if you have a urinary tract infection can cause urosepsis.<sup>1</sup>

Urinary tract stones are associated with various risk factors that must be recognized by everyone, both endogenous or exogenous risk factors. Usually there is a combination of endogenous and exogenous factors that lead to stone formation. Endogenous risk factors include age, sex, and family history. While exogenous risk factors include climatic conditions, nutrition, obesity, fluid intake, work, and medication.<sup>2</sup>

In Indonesia, the prevalence of urinary tract stone disease increases with age. The prevalence of urinary tract stones is 0.6%. The highest was in the age group of 55-64 years (1.3%) and it was higher in male (0.8%) compared to female (0.4%).<sup>3</sup>

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## Materials and Method

This is a descriptive research. Retrieval of patient

data was obtained from medical record and questionnaire filled by patients with urinary tract stones at the Outpatient Clinic of Ibnu Sina General Hospital during March - May 2018. All patients who fit the inclusion criteria were included in this study, the variables of this study were age, sex, history of stones in the family, amount of fluid intake, and location of the stone. From the inclusion criteria, 118 cases of patients with urinary tract stones were obtained.

### Results

This study is a retrospective study of patients with urinary tract stones in the Outpatient Installation of Ibnu Sina Gresik Hospital during March-May 2018. The patient's diagnosis is based on medical records.

The results showed that the age group with the

highest number of cases of urinary tract stones was the age group of 45-64 years, as many as 76 patients (63.6%) and the group with the least number was the age group 1-4 years and 5-14 years with 1 patient (0.8%) in each group. Based on the sex group (69 male patients and 49 female patients), the ratio of male compared to female was 1.4: 1 (58.5%: 41.5%). Patients who had family history of urinary tract stones were reported as many as 24 patients (20.3%), while 94 patients (79.7%) denied for having it. The group of patients with fluid intake > 2.5L per day was 21 patients (17.8%) and the remaining 97 patients consumed < 2.5L water per day. A total of 96 patients (81.4%) had urinary tract stones located in the upper urinary tract, 20 patients (16.9%) in the lower urinary tract, and 2 patients (1.7%) had stones both in the upper and lower urinary tract. The data is presented in Table 1.

**Table 1: Characteristic of Research Subject**

Criteria		Amount	Percentage (%)
Age (Year)	< 1	0	0
	1 – 4	1	0,8
	5 – 14	1	0,8
	15-24	2	1,7
	25-44	23	19,5
	45-64	76	63,6
	≥65	16	13,6
Sex	Male	69	58,5
	Female	49	41,5
History of Urinary Tract Stone within Family	Yes	24	20,3
	No	94	79,7
Fluid Intake ≥2,5 L/day	Yes	21	17,8
	No	97	82,2
Stone Location	Upper	96	81,4
	Both	2	1,7
	Lower	20	16,9

### Discussion

Based on age group, the most cases were found in the 45-64 year age group as many as 76 patients (63.6%). the age group with the highest number of urinary tract stone cases in this study accordance with the study that was published in 2017 which states that the majority of cases of urinary tract stones are in the age group 40 years to 60 years and the number of cases which is rare in children.<sup>4</sup>

As in adults, the factors involved in the metabolic syndrome such as obesity also pose a risk of urinary tract stone formation in children.<sup>5</sup>

Changes in stone composition have also been reported, this may occur as a result of lifestyle changes according to age development. The choice of lifestyle and food involved in the metabolic syndrome complex is an important factor that contributes to this development.<sup>6</sup>

In terms of sex, the majority of cases were found in male as many as 69 patients (58.5%). This is consistent with many studies in developed and developing countries.<sup>7</sup>

It has been observed that women show a bimodal distribution of stone disease, demonstrating a second peak in the sixth decade of life corresponding to the onset of menopause and a fall in estrogen level. This finding and the lower incidence of stone disease in woman compared with men have been attributed to the protective effect of estrogen against stone formation in premenopause women, owing to enhanced renal calcium absorption and reduced bone resorption.<sup>8</sup>

Lower urinary saturation of calcium oxalate and brushrite was identified in women compared with men. Moreover, urinary calcium was lower in women than in men until beyond age 50, when it reached equivalence in the two groups.<sup>9</sup>

Patients who had family history of urinary kidney stone as many as 24 patient (20,3%). Urolithiasis was significantly associated with a positive family history of urinary tract stones.<sup>10</sup> Another study found that first-degree relatives of those with stones have twice as high a chance of stone disease.<sup>11</sup> Defects in urine acidification can be inherited and polygenic factors, as well as household diet and environmental factors, can play a role.<sup>12</sup>

Although the data above supports that there is a significant relationship between urinary tract stone patients and the history of this in the family, there is a discrepancy in the results of this study. This may be due to a recall bias by the patient, where the patient may be wrong in mentioning the presence or absence of a family history due to limited knowledge and memory of the patient.

Based on the amount of fluid intake, patients with fluid intake > 2,5L per day in cases of urinary tract stones were 21 patients (17,8%). The cut off figure 2,5L was adapted from EAU 11th edition as a measure of prevention of urinary tract stones in general. In another study of the 21.000 patients who were expected to be obedient to drink 2L / day of fluid, 11572 patients were found to be able to avoid first incidence of urinary tract stones.<sup>13</sup>

Dehydration is not only caused by fluid intake, but a balance between intake and output. Eventhough

the patient has been drinking enough fluid according to the recommended limits, the needs of each patient are different, varies according to individual's activity, exposure of sunlight, infection, diet, medication consumption, etc.<sup>14</sup>

Dehydration is a very important thing because higher temperatures are positively associated with stone prevalence.<sup>10</sup> Because the concentration of the amount of the crystallized solute is the most important matter which finally forms stone, thus the reduction in urine volume will strengthen the saturation of all solutes and increase the risk of all stone formation. In addition, oliguria also increases urinary stasis.<sup>15</sup>

Viewed from the location, urinary tract stones appeared to be located in upper, lower or both. The majority of stones' location were found at the upper urinary tract as many as 96 patients (81.4%). The results of this study are in accordance with the study that was published in 2015, with the results of the study that the upper urinary tract stones as the location of the most stones with 286 patients (82.4%) of a total of 347 patients. On the other hand, the location of the stone changes with age where the proportion of bladder stones increases, while the proportion of kidney stones decreases.<sup>16</sup>

Supersaturation which plays an important role in calcium oxalate stones, is deposition of stone material in a renal papillary calcium phosphate nidus. The calcium phosphate precipitate on the base of the thin membrane loop of Henle, erodes into the interstitium, and then accumulates in the subepithelial space of the renal papilla. A deposit from a subepithelial known as Randall's plaques eventually erodes through papillary urothelium. Calcium phosphate and calcium oxalate gradually deposit on the substrate to create a urinary tract stones.<sup>17</sup>

Benign prostate hyperplasia in the elderly causes a tendency towards obstruction. This might be a possible explanation for the high incidence of stones in the bladder in older people. Another thing that makes women at risk for lower urinary tract stones is the presence of other risk factors, such as changes in bladder function associated with relaxation of smooth muscle tone in the elderly, with reduced bladder emptying efficiency that supports urinary stagnation and stone.<sup>18</sup>

## Conclusions

From the results of the research the highest number

of cases in each group was found to be in the age group of 45-64 years, male group, patients without any family history of urinary tract stone group, patients with water intake < 2.5L/day group, and patients whose stone located in the upper urinary tract group.

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