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The Prevalence and Characteristic of Urinary Stone Disease in General Hospital of The Peripheral Area

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Introduction. Urinary stone disease (USD) refers to the formation of urinary calculi in the urinary system. The prevalence rates for urinary stones from 1% to 13% in different regions across the globe. The aim of this study is to determine the prevalence of USD patients who seek treatment at Tobelo Regional Hospital for the period of 2019-2023

Methods. A descriptive retrospective study based on medical records for the period of 2019-2023 conducted at Tobelo Regional General Hospital. The research subjects were all patients diagnosed with USD and had complete medical records.

Results. A total of 320 individuals were studied. The prevalence rate of USD in our study population was commonly higher in men (56%) and in the age group of 40–59 years old (53%). Mostly found in private-employee groups (54%). Most were located in the kidney (83%). Stone diameter with a size > 1 cm was found in 103 cases (32%), and 33 of them were > 2 cm in size.

Conclusions. USD cases are dominated by men rather than women, occurring mostly in the 40-59 years of age. Nephrolithiasis is the most common type of USD found in this study. Hospital facility improvements and high quality medical professionals may help the USD screening process to meet a prompt treatment.

Keywords: indonesia, urinary stone disease, urolithiasis

Introduction

Urolithiasis, often known as urinary tract stones, is a condition in which stones develop in the urinary tract [1]. In different parts of the world, the prevalence of urolithiasis varies from 1% to 13%, and it develops in both men and women at a 3:1 ratio [2]. Numerous factors contribute to this, such as alterations in dietary practices, climatic conditions, socioeconomic conditions, and comorbidities [3-6].

The aging process and population expansion, which are most prevalent in the 40–60 age range [7-8], could possibly be the reason for this increase. Due to prolonged mucosal injury, large bladder stones bigger than 4 cm raise the risk of SCC (squamous cell cancer) [9-10]. Although SCC accounts for less than 5% of bladder cancer cases, the outcome is poor. The majority of patients pass away within a period of three years, with a 33–48% 5-year survival rate [11].

In Indonesia, urolithiasis remains the most prevalent event among all urological cases; nevertheless, national prevalence data are lacking, particularly in regions where the majority of the population resides in rural areas [2]. The purpose of this study is to determine the frequency of urolithiasis patients seeking care at Tobelo Regional General Hospital (RSUD), one of the Indonesian regions where the majority of people reside in rural areas, between July 2019 and August 2023.

Methods

This study used a retrospective descriptive method by taking data from the medical records of patients with urolithiasis in the period of July 2019 – August 2023 at Tobelo Regional Hospital. The research subjects were all patients who were diagnosed with urolithiasis and had complete medical record data at Tobelo District Hospital, North Halmahera, with ICD codes N20.0, N20.1, and N21.0 based on the International Classification of Diseases, Tenth Revision, Clinical-Modification (ICD-10-CM). This research has received proper permission from Tobelo Regional Hospital to conduct this study.

Results and Discussion

According to the inclusion criteria, 320 participants were recruited for the study at Tobelo Regional Hospital (Table 1-3).

Table 1. Demographic distribution of urolithiasis incidence at Tobelo Regional Hospital between 2019 and 2023

Variable	Case (n)	Percentage (%)
Gender		
Men	180	56
Women	140	44
Age		
<20 years old	10	3
20 – 39 years old	63	20
40 – 59 years old	169	53
60 – 79 years old	76	24
>80 years old	2	1
Occupation		
Housewife	89	28
Students	13	4
PNS/TNI/POLRI	44	14
Private Sector	174	54
Location		
Kidney	265	83
Ureter	16	5
Bladder	39	12

Table 2. The distribution of urolithiasis characteristics in Tobelo Regional Hospital between 2019 and 2023

Stone Size	<1cm	1-2cm	>2cm
Kidney	200	59	6
Ureter	14	2	0
Bladder*	3	9	27

* Table 3

Table 3. Distribution of operated and non-operated bladder stones at Tobelo Regional Hospital in 2019-2023

Location of Stones	Operated	Non-Operated
Bladder	27	12

In this study, we discovered that the prevalence of urolithiasis was higher in men (56%) than in women (44%), with a ratio of (1.15:1). This is consistent with research conducted by Zhang L in 2022, which indicated that the prevalence of urolithiasis primarily occurs in men [3]. Overall, urolithiasis is more common in men, with a 3:1 ratio [2]. This might occur because men consume larger quantities of alcohol, coffee, and meat than women. In addition, testosterone can cause stone development, whereas estrogen can prevent stone formation by regulating 1,25-dihydroxyvitamin D production. Male anatomy, which allows for prostate expansion and urethral obstruction, can also increase the chance of stone formation, particularly in the bladder [12].

We discovered 53% of urolithiasis cases in the age range of 40 to 59 years, which was associated with the highest frequency of numerous characteristics, including work, nutrition, and lifestyle [7]. In this study, the private sector workers had the highest incidence (54%). This is consistent with Liu Y's (2018) study, which found that incidences of urolithiasis rise in those who work outdoors or are exposed to high temperatures, such as steel workers, flight attendants, farmers or gardeners, miners, diggers, or drivers [12].

According to the stone location group, 83% of cases were found in the kidney. According to Schwartz (2000), bladder stones account for 5% of total urolithiasis, with the majority being secondary stones that migrate from the kidney [13-14].

Stones larger than 1 cm in diameter were identified in 103 cases (32%), with 33 measuring more than 2 cm. An urologist considers the size of the stone while deciding whether to use conservative therapy or procedures such as open surgery, percutaneous nephrolithotomy (PNL), retrograde intrarenal surgery (RIRS), and shock wave lithotripsy (SWL) [2]. As shown in Table 2, the examination used to evaluate the characteristics of urolithiasis in this study was ultrasonography (USG) as the primary imaging modality since it is secure, simple to recur, and affordable. Ultrasound can detect stones in the pelvis, calyces, and ureteropelvic junction (UPJ) [15-16]. If an ultrasound examination fails to provide the necessary information, a non-contrast computed tomography (CT-Scan) scan is performed as a common diagnostic procedure. Non-contrast CT scans have sensitivity and specificity close to 100% [17]. However, due to inadequate facilities, no non-contrast CT scan was performed. This study didn't include stone types because urine analysis in order to classify stone types was not performed. We also do not conduct anatomical pathological examinations on patients with bladder

stones, which is one of the hazards associated with SCC of the urinary bladder, due to insufficient resources and facilities.

Conclusion

Urolithiasis cases are dominated by men rather than women (1.15:1), occurring mostly in the 40-59 years of age. The stones are mostly located in the kidneys. Improving hospital facilities and expert health workers such as urological surgeons may optimize the urolithiasis screening process, ensuring that every patient receives appropriate treatment. However, the unavailability of additional population data such as Body Mass Index (BMI) and prior medical history is limiting the identification of additional risk variables.

Conflict of interest

The authors declare no conflict of interest.

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