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Factors That Can Affect the Occurrence Urinary Stones

M. Miftachul Ulum [1*]
Mujito [2]
Imam Sunarno [3]

[1,2,3] D3 Keperawatan Poltekkes Kemenkes Malang

Abstract

Urinary tract stones are the biggest health problem in the field of urology with typical symptoms of pain that can lead to complications in the kidneys. The formation of the stones in the urinary tract (kidneys, ureters, and uretra) due to the deposition of substances in abnormal amounts caused by internal and external factors. The purpose of this study was to determine the factors that can influence the occurrence of Urinary Tract Stones. This study uses a literature review. The Literature Review search uses a database with Google Scholar and keywords that are adjusted to the Medical Subject Heading (MeSH). Data analysis used quality analysis methodology with checklists. The results showed the factors that influence the occurrence of urinary tract stones, among others; heredity, age, gender (male), obesity (BMI> 25) and behavior (regulation of fluid intake <1500 ml per day, diet (consumption of high oxalate vegetables), and length of time to sit. Education to the public through health services regarding the factors that can affect the incidence of urinary tract stones needs to be implemented.

Keywords: *Factors, Urinary Tract Stones*

[1*]Corresponding author, email: miftachululumpromkes@gmail.com

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1. INTRODUCTION

The urinary system is an excretory system that plays a very important role in maintaining the homeostatic balance of electrolyte and water concentrations in the body. The urinary system consists of the kidneys, ureters, bladder and urethra (Purnomo, 2011). Kidney is an organ shaped like a bean with weight and size depending on age, gender in males is generally larger than in females, the presence or absence of a kidney on the other side. The function of the kidney itself is to filter and remove waste such as toxins, excess salt, and urea. Kidneys that cannot perform their functions properly can lead to kidney disease. Kidney diseases include kidney failure, chronic kidney failure, polycystic kidney disease, kidney stones and urinary tract stones

Urinary tract stones (BSK) is the process of stone formation in the urinary tract including the kidneys, ureters, bladder and urethra. Urinary tract stones (BSK) are the third most common disease in urology after urinary tract infections and benign prostate enlargement. Urinary tract stone formation can be classified based on its etiology, including: infection (magnesium ammonium phosphate, carbonate, ammonium urate), non-infectious (calcium oxalate, calcium phosphate, and uric acid), genetic disorders (cystine, xanthine) and the influence of drugs (Nur Rashid, 2018).

Urinary tract stone disease (BSK) has been known for centuries since the ancient Babylonian and Egyptian times (Lina, 2008). The discovery of stones in the bladder is not the same in different parts of the world, varies according to ethnic and geographical factors. The prevalence worldwide is on average 1-12% of the population suffering from urinary tract stones. In developed countries such as the United States, Europe, Australia, urinary tract stones are often found in the upper urinary tract, while in developing countries such as Thailand, India and including Indonesia, bladder stones are more common (Sulistyowati, 2013).

Urinary stone problems are still the most common cases in Indonesia among urological cases, although national urinary stone prevalence rates have not been obtained (Nur Rasyid, 2018). Men have a risk 4 times higher than women because in men the urinary tract is more complicated. In women it is 1-2 cm, while in men it can be up to 25 cm (Sulistyowati, 2013).

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Based on the above background, the researcher can formulate the problem as follows: "What are the factors that can affect the occurrence of urinary tract stones?".

2. RESEARCH METHODS

Literature review research. Literature search was carried out December 2020 - January 2021. The data sources obtained were in the form of National and International articles with predetermined themes.

The keywords in this literature review are adjusted to the title adapted to the Medical Subject Heading (MeSH). The strategy used to find articles is using PICOS Freemework.

Table 1.1 Format of PICOS "Factors that can affect the occurrence of Urinary Stones

Criteria	Inclution	Exclution
Population	Patients who experience health problems due to urinary tract stones	Patients who do not experience health problems due to urinary tract stones
Intervention	No Intervention	No intervention
Comparation	Using the control group in the selected study	No comparison intervention
Outcome	Factors that can affect the occurrence of urinary stones	Factors that do not affect the occurrence of urinary tract stones
Kind of Design and Study Publication	Quantitative/qualitative case studies, qualitative/quantitative descriptive analysis, descriptive qualitative/quantitative approaches, literature studies, analytical descriptive methods	No exception
Year of Publication	Literature used in the last 10 years	Literature that has not been used for more than 10 years
Language	Indonesian English	Beside Indonesian and English Language

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Based on the results of the Literature Review search through publications using keywords that have been adjusted using MeSH, the researchers found 5 journal articles according to these keywords.

3. RESULTS AND DISCUSSION

The average number of participants is more than two hundred individuals each study discusses the factors that can influence the occurrence of urinary tract stones. The highest study quality is for the factors that influence the occurrence of BSK and the lowest is for the description of knowledge about the occurrence of BSK. Studies according to this systematic review were conducted entirely in Indonesia with five journals (Martha K. Silalahi, 2020; Retno Sulistiyowati, 2013; Sianturi, d. 2017; Akmal, 2013; Sarwono, 2017).

Table 1.2 Summary of the literature on factors that can influence the occurrence of urinary stones

No	Writer Year Of Publication	Duration	Instrument or collection data method	Respondent	Factor that influence BSK	Signification	Conclussion
1.	Martha K. Silalahi Published September 2020	Data collection at 2019	• Instrumen: Questionaireand observation sheet • cross sectional design	32 respondents are patients with urinary tract stones	age, family history of urinary tract stones, gender, fluid intake, prolonged sitting at work and obesity	Frequency Distribution of Respondents in Urology Poly RSAU dr. Esnawan Space 1. Age Early seniors – Seniors (28) 87.5% 2. Gender Male (29) 90.6% 3. Family History No history (25) 78.1% 4. Fluid intake < 1500 ml (28) 87.5% 5. Sitting time at work > 4 hours/day (29) 90.6% 6. Obesity More than 25 (25) 87.5%	There is a relationship of factors associated with the incidence of urinary tract stones in poly urology. It can be concluded that age, gender, family history, fluid intake, length of time sitting at work and obesity have a significant relationship
2.	Retno Sulistiyo	Data Collecti	• Instrumen: observatio	45 male residents	analyzed the relationship	Distribution of the frequency of risk factors with the incidence	There is a relationship between

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	wati, Published October 2013	on at 2013	n sheet • Design cross sectional	aged over 40 years, length of stay 30 years or more	between total hardness levels, calcium levels, magnesium levels in water and length of stay, the amount of water consumed, the habit of cooking water before consumption, the habit of holding back urine (BAK), the habit of consuming vegetables, exercise habits, cholesterol levels, calcium intake and protein, and family history.	of urinary tract stone crystals in the residents of Mrisi Village, Responsiharjo District, Grobogan Regency 1. Length of stay (24) 70.4% 2. Consumption of vegetables >2x a day (21) 75% 3. Water hardness (15) 62.5% 4. Consumption of water with calcium content (13) 54.2% 5. Water consumption < 2 liters (7) 46.7% 6. Holding BAK (6) 75% 7. Family history (5) 62% 8. Consumption of eggs (3) 50% 9. Consumption of water with magnesium content (2) 50% 10. Boiling water (2) 100% 11. Never exercise (26) 60.5% 12. Take supplements (1) 100% 13. Consumption of milk (1) 100% 14. Abnormal cholesterol levels (-)	the respondent's length of stay and the habit of consuming high oxalate vegetables with the incidence of urinary tract stone crystals in the urine.
3.	Sianturi, Mega N Dian Y, Published October 2017	Data Collection at August 2017	• Instruments: questionnaire • Descriptive survey research method with cross-sectional design	50 BSK patients undergoing outpatient treatment	. BSK patient's knowledge about dietary consumption prevention behavior, water consumption, physical activity, avoiding holding BAK	Distribution of the frequency of BSK patients based on the level of knowledge of BSK recurrence prevention behavior 1. Diet Less (18) 36% Enough (31) 62% Good (1) 2% 2. Drinking Water Consumption Less (1) 2% Enough (15) 30% Good (34) 68%	There is a relationship between knowledge of BSK patients with BSK recurrence prevention behavior at H.Adam Malik Hospital Medan with a sufficient level.

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						3. Physical Activity Less (19) 38% Enough (24) 48% Good (7) 14% 4. Avoiding the Habit of Holding BAK Less (18) 36% Enough (26) 52% Good (6) 12% 5. BSK recurrence prevention behavior	
						Less (0) 0% Enough (42) 84% Good (8) 16%	
4.	Akmal Publishe d at 2013	Data Collecti on a t 2009.		The number of samples is 62 people in the treatment room and	The relationship between length of time sitting and diet with the incidence of	Distribution of respondents based on diet & length of time sitting on the incidence of urinary stones at Wahidin Sudirohusodo Hospital Makassar in 2009 1. Long Sitting Time Old (37) 59.7% Not long (25) 40.3% 2. Diet Often (34) 54.8% Rarely (28) 45.2%	There is a relationship between the length of time sitting and diet with the incidence of
				outpatients	urinary tract		urinary tract stones at
					stones.		Wahidin Sudirohusodo Hospital Makassar.
5.	Sarwono			sample size	Analyzing the	The results of the analysis of risk factors for urinary tract stones in the village of Redisari, Rowokele sub-district, Kebumen	Based on the results

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						Regency 1. Drinking water intake (p value = 0.035) Significant 2. Habit of holding urine	
	Publishe	Data		80 people	risk factors for		of the study showed
	d 2017	collecti			urinary tract		that adults who drink
		on i n			stones, namely		less than 2 liters per
		January			Ca levels in		day are at risk of
		2017			drinking water,		developing urinary
					Intake of		tract disease
					drinking water, Habit of holding BAK, History of hypertension, History of UTI, and Consumption of supermen.	(p value = 0.234) Not significant 3. History of hypertension (p value = 0.389) Not significant 4. History of UTI (p value = 0.118) Not significant 5. Supplement consumption (p value = 0.933) Not significant 6. Ca content of drinking water (p value = -) Not significant	(Urolithiasis).

Factors Affecting Urinary Tract Stones

1. Age

Age is one of the factors that play a role in the occurrence of urinary tract stones because the metabolic process has begun to decline. It was proven from 32 respondents, 28 experienced urinary tract stones with a result of 87.5% (Martha K. Silalahi, 2020). It can be seen in the literature journal that the early elderly age group - the elderly are more likely to experience urinary tract stones. Most often found at the age of 30-50 years (Purnomo, 2011). The decrease in metabolic processes in the body due to age can cause weakness in the working system of the urinary tract.

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5. Behavior

1) Fluid Intake Regulation

Regulation of fluid intake is one of the factors that play a role in the occurrence of urinary tract stones, with a greater incidence in the < 1500 ml group, namely 96.4% (Martha K. Silalahi, 2020). In Retno Sulistiyowati's research (2013) men over 40 years of age, length of stay 30 years or more who consumed <2 liters of water 7 of 45 patients experienced urinary tract stones with a result of 46.7%. Supported by the level of knowledge of patients consuming drinking water to prevent recurrence of urinary tract stones with a total of 50 patients, 34 of whom were in the good category, 68% (Sianturi, d. 2017). People who drink less than 2 liters a day are at risk of developing urinary tract stones 2.112 times greater than people who drink enough (Sarwono, 2017). Lack of water intake and high levels of calcium minerals in the water consumed can increase the incidence of urinary tract stones (Purnomo, 2011). In addition, excessive alcohol consumption will trigger an increase in citrate in the urine, while soft drinks (soda drinks) can increase oxalate levels in the urine, causing urinary tract stones (Sja‟bani, 2014). Fluid intake that is less than the body's needs can slow the flow of urine so that people with dehydration are at risk of developing urinary tract stones.

2) Diet Pattern

Diet is one of the factors that play a role in the occurrence of urinary tract stones. People who diet often consume calcium, oxalate and potassium foods are more susceptible to urinary tract stones, it is known that 26 people (41.93%) in Akmal's research (2013) and 45.86% in Retno Sulistiyowati's (2013) study. Knowledge of dietary patterns, the majority are in the sufficient category, 62% of the total 50 patients (Sianturi, d. 2017). Food intakes that can cause stones are high in sodium (salt), oxalate which can be found in tea, instant coffee, soft drinks, cocoa, strawberries, citron, and green vegetables, especially spinach (Sja‟bani, 2014). In addition, fat, protein, sugar, unclean carbohydrates, ascorbic acid (vitamin C) can also stimulate stone formation (Purnomo, 2011). Regulating the diet is very necessary to prevent the onset of urinary tract stones

3) Long sitting time

Long sitting is one of the factors that play a role in the occurrence of urinary tract stones. The incidence of urinary tract stones caused by sitting time >4 hours/day is 93.1%. The results

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showed that the occurrence of urinary tract stones was caused by habits and conditions of sitting for too long, namely 25 people (Akmal, 2013). The theory states that patients who sit for too long will experience the release of bone calcium into the blood, which will lead to spurring of stone hypercalcemia due to the process of supersaturation of stone-forming materials in the renal tubules which will change the low saturation stable zone into a high saturation zone. Sitting time while working >4 hours/day of 32 patients 29 of them experienced urinary tract stones with 90.6% results in the study (Martha K. Silalahi, 2020). This explains that as often as possible you must mobilize to prevent sitting too long which is one of the factors for the accumulation of urinary tract stones.

4) Habit of holding back defecation

The patient's knowledge in avoiding the habit of holding urine to prevent the recurrence of urinary tract stones is mostly in the sufficient category of 52% (Sianturi, d. 2017). The habit of holding back urine causes urinary tract stones with a result of 29.2% (Sarwono, 2017). The habit of holding back urine will cause a urinary tract infection which can lead to the deposition of urinary tract stone crystals. Although this has a small effect on stone formation, it must also be handled with care.

DISCUSSION

Urinary tract stones are still the biggest health problem in the field of urology with typical symptoms of pain that can lead to complications such as kidney failure. Diseases that arise due to the deposition of substances in abnormal amounts can be caused by various factors, both internal and external. Various symptoms and complications that can arise from urinary tract stones make many researchers interested in conducting research, especially about what factors can affect the occurrence of urinary tract stones. Based on the five literatures that have been reviewed, the results obtained according to Martha K. Silalahi (2020) there is a significant relationship between age, gender, family history, fluid intake, length of sitting at work and obesity with the incidence of urinary tract stones. Sarwono (2017) said that adults with water consumption of less than 2 liters per day are at risk of developing urinary tract disease (Urolithiasis). Supported by Akmal (2013) that there is a relationship between length of time sitting and diet with the incidence of urinary tract stones. In line with the research of Retno Sulistiyowati (2013), there are two risk factors that show a significant relationship with the

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incidence of urinary tract stone crystals in urine sediment, namely: length of stay and habits. Living in an area with high lime content will have kidney calcification as much as 52%, while in patients with hypertension 83% (Sarwono, 2017). Sianturi's research (2017) adds that the average respondent has sufficient knowledge about the behavior of preventing the recurrence of urinary tract stones.

The rate of recurrence of urinary tract stones is an average of 7% per year or approximately 50% in 10 years (Purnomo, 2011). As an effort to prevent the recurrence of urinary tract stone disease caused by these influencing factors. The community is expected to be able to pay attention to risk factors to know more about preventive measures or avoid the recurrence of urinary tract stones by modifying patterns and lifestyles. Increasing daily water consumption can dilute the urine so that it can prevent stone formation. Consumption of water in one day at least 8 glasses or the equivalent of 2-3 liters. Consume foods that are low in sodium and purines such as fish, vegetables and reduce animal protein (red meat) to reduce oxalate in the urine and the risk of stone formation in the urinary tract. According to Akmal (2013), people whose jobs are sitting and less mobile are more prone to urinary tract stones than people whose jobs are a lot of movement or physical work. Physical activity is highly recommended with balanced fluid intake.

Health workers are also expected to be able to provide health education regarding risk factors that can affect the incidence of urinary tract stones, so that patients and the community have broad knowledge and receive support from their families to avoid risk factors such as age, heredity, gender, obesity, fluid intake, diet. , and long sitting.

4. CONCLUSION

Based on a review of research results on factors that influence the occurrence of urinary tract stones, it shows that most of the research journals analyzed show the factors that influence the occurrence of urinary tract stones are age, heredity, gender (male), obesity (BMI > 25), and behavior (regulating fluid intake of less than 1500 ml per day, dietary patterns (consumption of vegetables high in oxalate), and length of time sitting. Connected with research in a literature review study, it shows that there are factors that influence the occurrence of urinary tract stones.

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5. SUGGESTION .

The results of this literature review are an update of health science information that commonly occurs among the community, especially the urinary system and further researchers can develop and follow up on the latest research so that it is used as a guide in providing education to the community.

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