

## Frequency of Urinary Tract Stone Disease in Sivas / Sarıyar Village: A Cross-Sectional, Regional Preliminary Research

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### ABSTRACT:

**Purpose:** This survey study was planned with the awareness that there is more urinary tract stone disease in Sivas / Sarıyar village and more patients went to hospitals' urology department. This study aimed to determine the prevalence of urinary tract stone disease and its relationship with age, gender, body weights and eating habits.

**Material and Methods:** This study is cross-sectional and regional preliminary research. Houses in the village were visited randomly and questions presented in the appendix were asked. In the survey study, the requirements of the Helsinki Agreement were followed. This survey study is the first research in the Sivas region.

**Results:** According to the evaluation of the survey there were 126 patients and 40 patients with stone findings (166 in total) in Sarıyar village. When the survey findings were evaluated, the incidence of stone was 10.40% in the Sarıyar village.

**Conclusion:** The high cost of interventional treatments has increased the interest in prophylactic treatment. Therefore, determining the frequency of stone disease has gained importance. According to the survey findings, the incidence of stone was found 10.4% in Sarıyar village. These results are higher than the researches reported in Turkey and the world. As a result, a more comprehensive research may be suggested in the region.

**Keywords:** Urolithiasis, Risk Factors, Incidence

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### INTRODUCTION

Urinary stone disease (USD); is a multifactorial event that depends on the interaction of environmental, anatomical and genetic factors (Turkish Urology Academy, 2015). The frequency of USD varies in different regions of the world. USD can negatively affect life of the patient and can occur at any age from birth to death and in both sexes. It may lead to kidney loss and / or failure when its untreated. One of the important features of USD is that it is more likely to reoccur (Turkish Public Health Agency, 2014). The interest in prophylactic treatment has increased because of the high cost of interventional treatments. Therefore, determining the frequency of

stone disease has gained more importance. Risk areas determined by epidemiological researches can be educated and started drug treatments. There are prevalence and incidence researches of stone disease in various countries (Curhan, 2007). Although our country is one of the regions where stone disease is common there is not enough prevalence study on this subject. There are researches made in some regions but the number of studies are not enough to determine the prevalence of Turkey (Uluocak et al., 2010; Akıncı et al., 1991). It is a known fact that disease and its treatment process is a great burden on the country's economy. Knowing the frequency of the disease can make it

easier to take precautions (Lotan, 2009). This survey study was planned with the awareness that there is more urinary tract stone disease in Sivas / Sariyar village and more patients went to hospitals' urology department.

## **MATERIAL and METHODS**

### **Purpose and Type of the Study**

This study is a cross-sectional, and regional preliminary research. The survey was conducted in Sivas / Sariyar village due to the high number of urinary stones and the number of hospital admissions that supported it. This study aimed to determine the prevalence of urinary tract stone disease and its relationship with age, gender, body weights and eating habits.

### **Sampling and participant**

This study was carried out in Sivas / Sariyar village. The population of the research consisted of people living in the village (n=320). The study sample included 161 patients (50.3%) who agreed to participate in the study.

### **Data Collection Tools**

Houses in the village were visited randomly and questions presented in the appendix were asked. Age, gender, eating habits (especially water, salt and red meat consumption) were asked to villagers. Daily salt consumption habits were divided into four groups: those who use salt-free diet products, those who do not use salt-free diet products, those who add salt to the food while cooking, and those who add salt to the plate. Height and weight were measured by the researcher. Chronic diseases and urinary system stone disease of the participants were questioned in the questionnaire. Body mass index BMI was calculated by the researchers.

### **Statistical Analysis**

Obtained data studied in SPSS (ver: 22.01 program). In the evaluation of the data, the chi-square kit was used in multi-eyed layouts in 2x2 layouts. and the level of error was taken as 0.05.

### **Ethical Approval**

In the survey study, the requirements of the Helsinki

Agreement were followed. Before data collection, ethics committee approval was gained from the Ethics Committee. The survey participants was received consent form.

## **RESULTS**

The population of Sariyar village is 1596, and the incidence of stones is 10.40%. According to the evaluation of the survey there were 126 patients, and 40 patients with stone findings (166 in total) in Sariyar village. Individuals' age included in the study was minimum 7, maximum 84 and the mean age was  $40.83 \pm 16.27$ . These individuals were 46.4% women and 53.6% men. 55.1% of individuals were married and 14.9% were single. According to the completed questionnaire, the literacy rate of the patients was determined as 24.05%. The rest graduated from 33.0% primary school, 24.5% middle school, 10.3% high school, 7.7% college. When their professions were examined 6.2% were civil servants, 20% were workers, 16.2% were farmers, 41.05% were housewives, 7.3% were students, 5.8% were in other professions. Individuals' income was 26.8% less than 500 ₺ (TL), 15.7% between 500-1000 ₺, 37% between 1001-2000 ₺, 11.9% between 2001-3000 ₺, 7.7% more than 3000 ₺. Individuals resided in 78.1% concrete houses, 21.9% masonry houses. 80.8% of the individuals were using mains water and 19.2% were using ready-made water.

Individuals' 24.1% had urinary stone treatment, 24.1% stated that they dropped stones and 19.2% stated that they had been diagnosed with kidney disease. 15.3% of individuals stated that they suffered from stone symptoms, 56.7% was pain and 43.3% was blood in the urine. The average body mass index of the 121 women who participated in the survey was 30.4. The mean body mass index of 140 men was 28.7. Chronic kidney disease was detected in 16 (%13) of 121 women, diabetes mellitus in 35 (%28,9) and hypertension in 57 (%47,1) women. Of the 140 men, 34 (%24,2) had chronic kidney disease, 42 (%30) had diabetes mellitus, and 61 (%43,5) had hypertension.

In this study made in Sariyar the incidence of stone density was 10.40%. In this survey research urinary stone disease treatment examined according to

gender and the difference was significant ( $p < 0.05$ ). Men had greater rates of urinary stone treatment (Table 1). The difference was found significant when examining the spontaneous stone passage status by gender ( $p < 0.05$ ) Men dropped more urinary Stones (Table 2).

The difference was significant ( $p < 0.05$ ) when examining the presence of kidney failure diagnosed by gender. Males have been diagnosed with greater rates of kidney disease. (Table3).

The difference found significant when the urinary stones were analysed according to income level ( $p < 0.05$ ). Individuals with income between 2001 and 3000 ₺ (TL) had more spontaneous stone passage (Table 4).

The difference was significant when urinary stones

analysed according to the amount of water consumed ( $p < 0.05$ ). The spontaneous stone passage rate increased as the amount of drinking water increased (Table 5).

The difference was found insignificant when the urinary stones were analysed by age groups ( $p > 0.05$ ). The stone drop rate increased when the age increased although the difference was insignificant. The difference between diagnosed renal disease and age groups was found insignificant ( $p > 0.05$ ). Although the difference was insignificant it was found that the rate of diagnosed kidney disease increased when the age increased (Table 6). No statistically significant difference was found when all parameters were compared with other questions.

**Table 1.** Urinary stone disease treatment according to gender

		Urinary stone disease treatment			
		Yes	No	Total	
Gender	♀	N	20	101	121
		%	16,5%	83,5%	100,0%
	♂	N	43	97	140
		%	30,7%	69,3%	100,0%
Total	N	63	198	261	
	%	24,1%	75,9%	100,0%	

**Table 2.** Urinary stone disease according to gender

		Urinary stone disease			
		Yes	No	Total	
Gender	♀	N	21	100	121
		%	17,4%	82,6%	100,0%
	♂	N	42	98	140
		%	30,0%	70,0%	100,0%
Total	N	63	198	261	
	%	24,1%	75,9%	100,0%	

**Table 3.** Kidney failure diagnosed by gender

		Kidney failure diagnosed			
		Yes	No	Total	
Gender	♀	N	16	105	121
		%	13,2%	86,8%	100,0%
	♂	N	34	106	140
		%	24,3%	75,7%	100,0%
Total	N	50	211	261	
	%	19,2%	80,8%	100,0%	

**Table 4.** Income level and urinary stone disease status

			Urinary stone disease		
			Yes	No	Total
Income level	500 ₺ <	n	14	56	70
		%	20,0%	80,0%	100,0%
	500₺-1000₺	n	12	29	41
		%	29,3%	70,7%	100,0%
	1001₺-2000₺	n	17	82	99
		%	17,2%	82,8%	100,0%
	2001₺-3000₺	n	15	16	31
		%	48,4%	51,6%	100,0%
	3000₺ >	n	5	15	20
		%	25,0%	75,0%	100,0%
Total	n	63	198	261	
	%	24,1%	75,9%	100,0%	

**Table 5.** Spontaneous stone passage and liquid intake

			Spontaneous stone passage		
			Yes	No	Total
Liquid intake	No	n	1	9	10
		%	10,0%	90,0%	100,0%
	1 liter	n	18	73	91
		%	19,8%	80,2%	100,0%
	2 liter	n	24	84	108
		%	22,2%	77,8%	100,0%
	3 liter	n	13	27	40
		%	32,5%	67,5%	100,0%
	> 3 liter	n	7	5	12
		%	58,3%	41,7%	100,0%
Total	n	5	198	261	
	%		75,9%	100,0%	

**Tables 6.** Age, urinary stone disease, and spontaneous stone passage relationship

		Urinary stone disease					Spontaneous stone passage			
		Yes	No	Total			Yes	No	Total	
Age	0-10	n	4	7	11	0-10	n	4	7	11
		%	36,4%	63,6%	100,0%		%	36,4%	63,6%	100,0%
	11-20	n	0	21	21	11-20	n	2	19	21
		%	0,0%	100,0%	100,0%		%	9,5%	90,5%	100,0%
	21-30	n	7	38	45	21-30	n	10	35	45
		%	15,6%	84,4%	100,0%		%	22,2%	77,8%	100,0%
	31-40	n	10	46	56	31-40	n	14	42	56
		%	17,9%	82,1%	100,0%		%	25,0%	75,0%	100,0%
	41-50	n	9	32	41	41-50	n	12	29	41
		%	22,0%	78,0%	100,0%		%	29,3%	70,7%	100,0%
51+	n	20	67	87	51+	n	21	66	87	
	%	23,0%	77,0%	100,0%		%	24,1%	75,9%	100,0%	
Total	n	50	211	261	Total	n	63	198	261	
	%	19,2%	80,8%	100,0%		%	24,1%	75,9%	100,0%	

## DISCUSSION

In this study conducted in Sarıyar, the incidence of stone density was found to be 10.40%. The treatment of urinary system stone disease was examined by gender and the difference was found to be significant. Men had higher rates of urinary stone treatment. When the spontaneous stone passage status by gender was examined, more urinary stones were dropped in men. Males have been diagnosed with greater rates of kidney disease. The spontaneous stone passage rate increased as the amount of drinking water increased. USD is a common health problem especially in developed countries, its prevalence varies according to age, gender, race and geography. Increasing in the incidence and prevalence of urinary stones reported globally. In addition, it was also reported that global warming would affect these trends (Romero et al. 2010). The data obtained in epidemiological studies on stone disease showed that the prevalence of stone disease ranged between 3.5-18.5% (Trinchieri et al., 2000). The prevalence of stone disease is reported 2-8% in the USA (Indridason et al., 2006). In studies conducted in other countries, prevalence in Argentina was found 4% (Pinduli et al., 20016), in China (8%♂, 5%♀) (Peng et al. 2003), in Korea 3.5% (Kim et al., 2002), in Taiwan 9.6% (Lee et al., 2002), in Iran 5.7% (Safarinejad, 2007). The prevalence of stone disease was reported 4.7% in Germany (Hesse et al., 200) and 4.3% in Iceland (Indridason et al., 2006). Akıncı et al. (1991) found the incidence 2.2% and urolithiasis prevalence 14.8% in Turkey which they made in 14 cities with 1,500 people. In the same research, male to female ratio was determined as 1.5/1. Researchers had determined that urinary system stones are most common between the ages of 20-40. Uluocak et al. (2010) reported prevalence of urinary stone disease 11.42% in Tokat. In another study made in central Anatolian region prevalence of urinary stone disease found 5.7% (Tefekli et al., 2005). The high incidence of USD in the region is thought to be due to the fact that the community consists of relatives, they may have similar genetic characteristics, similar living conditions and similar dietary habits in the same geography. Contrary to popular belief, these patients with higher USD rates in this region may require invasive surgical

procedures in the future. Due to the fact that the late results of invasive methods such as ESWL, RIRS and PCNL are not known clearly and they create additional costs for the country's economy, necessary measures should be taken in this region before it is too late. However, at the present time prevalence of stone increased, regardless of gender and race. The reason for this increase may be due to changes in nutritional habits, diabetes and obesity which are becoming more common problems. With increasing in the prevalence, the cost allocated to the stone disease treatment and loss of workforce in the diagnosis-treatment process constitutes the socioeconomic side of the problem.

As a result, stone disease is an important public health problem in our country. The main purpose of modern medicine is to inform the society against diseases and to decrease risk rates. Poor eating habits and low fluid intakes are risk factors for stone disease. The society needs education on these issues. We think that health education policies needs to be regulated to improve the socioeconomic level. Avoiding fast-food, consuming plenty of water and fluids, exercising, using less salt and regulating meat carbohydrate intake can be considered as "preventive changes". Herbal treatment initiated by unauthorized people, often harms more than benefit. Certain drug treatments under the supervision of a doctor may also prevent stone formation. Early diagnosis with equally intervalled health checks is important. In order to lead health policies, more epidemiological studies are needed in a larger population, which includes more information about the disease.

## CONCLUSION

This research was carried out in Sivas Sarıyar village with a population of 1596. These findings are consistent with the results of other studies. A high number of patients have been identified in men. 166 of these people were identified as urinary stone patients. When the survey findings evaluated, the incidence of stone was 10.4% in the Sarıyar village. These results are higher than the researches reported in Turkey and the world. As a result, a more comprehensive research can be suggested in the region.

## Conflict of Interest

The authors declare that they have no conflict of interest.

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