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Epidemiological Characteristics of Risk Factors of Preurolitiasis and Urolitiasis in Farmers' Population

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ABSTRACT: The farmer population was isolated by the absolute selection, in the climatic conditions of the Fergana Valley (2551). Of these, 2478 (men – 1270 and women – 1208) were fully examined. Participation in the study was 96.6 percent. The prevalence of common risk factors in a farmer population using epidemiological, survey, biochemical, and instrumental methods are characterized by high rates and have gender–age characteristics. Risk factors vary sharply with age and increase. Farmers have developed inconsistent epidemiological conditions predisposing them to pre–urolithiasis and urolithiasis, and hence their correction leads to success in primary and secondary prevention.

KEYWORDS: Epidemiology, Farmer population, Gender–age characteristics, Healthy lifestyle, Prevention, Risk factors.

INTRODUCTION

Pre–urolithiasis (PUL), urolithiasis (UL), and urinary stone diseases, in general, are recorded as systemic non–communicable chronic diseases of metabolism with an increasing trend in all countries of the world [1,2,3,4]. Researchers are conducting scientific studies on the prevention of urolithiasis. Improving the regional metaphylaxis system and disease prevention is an urgent issue [5,6,7,3,8]. In Uzbekistan, non–communicable diseases (NCDs) risk factors are highly prevalent (89.0%) and pose a significant risk to public health (WHO, 2014). The main threat of these risk factors is that they lead to metabolic shifts and remain the direct causative agents of NCDs, including PUL and UL or urinary stone diseases [9, WHO, 2020]. Risk factors will be a priority in the formation of a healthy lifestyle, and according to experts – the share of a healthy lifestyle in a healthy state will not be less than 55.0% [10, 11]. Based on this, the epidemiology of risk factors for PUL and UL in the population of farmers operating in the Fergana Valley of Uzbekistan was studied and evaluated for the first time.

MATERIALS AND METHODS

The object of the study was the unorganised population of the Andijan region of the Fergana Valley, engaged in farming in the climatic conditions of Pakhtaabad. In its organization and implementation, the criteria developed and recommended in the international scientific community were used [CINDI, 1991, WHO, 2018, 2020]. ≤17–year–olds, 18–70–year–olds and 2551 elderly people living in 11 areas of the study area, engaged in farming, were selected using the absolute selection method. The population is mainly engaged in agricultural work on farms in vegetable growing, horticulture, viticulture and rice. Of those included in the one–time epidemiological survey list, 2,478 (males – 1,270 (51.2 percent) and females – 1,208 (48.8 percent) participated in the survey, and population participation activity was 96.6 percent (73 people for various reasons) up to 3 times, despite repeated invitations, did not participate in the study). The examination was carried out at the screening centre, which used epidemiological, survey, biochemical, and instrumental methods. The questionnaire was used to determine the risk factors for major chronic non–communicable diseases" (U.K. Kayumov, 2020). For epidemiological diagnosis used ECG, EchoCG, ultrasound (ultrasound), ultrasound scan (UTS) and anthropometric measurements. Biochemical indicators cholesterol, triglycerides, uric acid, micro–macro nutrients, protein metabolism indicators) were determined using the capabilities of clinical laboratories of regional medical institutions and evaluated according to international criteria. Urinary tract radiography, urography and renal tomography were performed under special instructions. Risk factors include alimentary factors, hypodynamics, chemotherapy, urostasis, hereditary predisposition, dysmetabolic disorders (hypercalcemia/uria, hyperphosphatemia/uria, hypomagnesemia, hyperoxaluria, hypershondorrhoids, socially diagnosed diseases) and demographic. The recommendations and criteria of the World Health

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Organization were used (WHO, 2018, 2019). As a result of the single–factor analysis, all influencing factors found to be of statistical significance were studied in the Mantel–Haenszel multivariate analysis and based on extrapolation. All detected risk ratios and 95% confidence intervals were compared at the logarithmic growth rate in the Forest plot diagrams.

RESULTS AND DISCUSSION

Table 1 presents an analysis of the results of a study of the epidemiological characterization of malnutrition factor (MNF) in the farming population.

Table 1. Epidemiological characterization of malnutrition risk factor in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	51	58.6	60	47.2	26	72.2	2	66.6	139	54.9
R	<0.005		> 0.005		<0.005		<0.005		> 0.005	
Female farmers	36	41.3	67	52.7	10	27.7	1	33.3	114	45.0
General population of farmers	87	34.3	127	50.2	36	14.2	3	1.1	253	31.6

Note: • Xi ^{2} = 0.05; • RR (risk ratio) = 1, 01; • R>0.05.

The conclusion from the analysis of the table numbers is that the alimentary factor is determined by the frequency of MNF in the farming population and family members, in able–bodied men and women, at high levels.

Diagnostic criteria of MNF:

• insufficient consumption of fruits and vegetables (less than 400 g or 4–6 servings per day);

• intake of more than 5 g of table salt per day (adding salt to cooked food, the habit of frequent consumption of salt, starvation of canned and sausage products);

• excessive consumption of food, fat and carbohydrates (body mass index – TVI >25 kg/m ^{2});

• nutritional imbalances.

≥ In the 18–70–year–old farming population and their family members, MNF is recorded with a prevalence of 31.6 percent, in men – 54.9 percent, and in women – 45.0 percent (R>0.005). Differences in men and women in different age groups are observed as follows (Table 12): at the age of 18–30 years – with an increase of 34.3% and at the age of 31–49 years – to 50.2% (R<0.05), at the age of 50–69 years – 14.2 % (with a decrease to 36 percent, R<0.001) and at ≥70 years – 1.1 percent (with a decrease to almost 20.1 percent, R<0.001).

Depending on age, both male and female farmers have their own distribution of MNF: the prevalence is 58.6% and 41.3% (R<0.005) at the age of 18–30 years, 47.2% and 52.7% at the age of 31–49 years. (R> 0.005), at the age of 50–69 years – 72.2% and 27.7% (R <0.005), at the age of 70 – 66.6% and 33.3% (R<0.005).

According to a survey aimed at determining hypodynamics (Table 2), in the population of farmers over 18 years of age, this risk factor is observed with a frequency of 53.0%: in 18–30 years – 39.0%, in 31–49 years – 56.0% (R<0.05), in the age group of 50–69 years – 4.4% (with a decrease of almost 10 times, R <0.01) and in the age of 70 years – 0.00%.

In the male–female and female–female populations, the age–related hypodynamic factor is noted with a significant difference (mainly in males) (shown in Table 2).

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Table 2. Epidemiological characterization of hypodynamics as a risk factor in a farmer population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥ 70 years old		≥ 18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	116	69.0	142	59.0 ^{IT}	13	68.0 ^{IT}	0	0.0	271	63.0
R	<0.005		<0.005		<0.005		<0.005		<0.005	
Female farmers	51	30.0	97	40.0	6	31.0 ^{IT}	0	0	154	36.0
General population of farmers	167	39.0 ^{xxx}	239	56.0 ^{x}	19	4.4	0	0	425	53.0

Note: • Xi ^{2} = 107; • RR (risk ratio) = 1.8; • R> 2.7.

In particular, the table shows that hypodynamics occurs in 53.0% of farmers (18–30 years – 39.0%, 31–49 years – 56.0% and 50–69 years – 4.4%; R_1<0.001; R_2<0.05) and slightly contradictory data – not recorded in ≥70 years (0.00 percent). In male farmers, the prevalence is 1.9 times higher (63.0%) than in female farmers (36.0%) (R<0.005). Men and women aged 18–30 years – 69.0% and 30.0% (R<0.005), 31–49 years – 59.0% and 40.0% (R<0.005) and 50–69 years – 68, 0 % and 31.0 % (R<0.005).

The results of the study also confirmed that iatrogenic risk factors (chemicals), such as drug abuse (without medical supervision), were also present in the farmer–population group. The prevalence of this factor in the general population (≥18–70 years) is 68.0%. It is recorded with a prevalence of 57.0% in men and 42.0% in women (R<0.005). 6 1.6% in 70–year–olds, with a significantly higher frequency – in 18–30–year–olds (26.0%; R<0.001), 31–49–year–olds (50.0%; R<0.001) and 50–69 years (21.0 %, R<0.01).

Differences between males and females in terms of intake (abuse) of chemicals remain age–related (an analysis of such data is presented in Table 3).

Table 3. Description of the prevalence of chemical intake in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	90	61.0	147	53.0	75	64.0 ^{x}	5	55.0 ^{IT}	317	57.0
R	<0.005		> 0.005		<0.005		> 0.005		<0.005	
Female farmers	57	38.0	129	46.0 ^{x}	42	35.0 ^{IT}	4	44.0 ^{IT}	232	42.0
General population of farmers	147	26.0	276	50.0 ^{x}	117	21.0 ^{IT}	9	1.6 ^{xxx}	549	68.0

Note: • Xi ^{2} = 0.17; • RR (risk ratio) = 0.9; • R> 0.6.

"Arbitrary" intake of drugs (chemicals) is detected in 61.0% and 38.0% of men and women aged 18–30 years (R <0.005), in 31–49 years – 53.0% and 46.0% (R <0.005), at the age of 50–69 years – 64.0% and 35.0% (R <0.005), at the age of 70 years – 55.0% and 44.0%, respectively (R <0.005).

The conclusion is that almost 68.0% of the population engaged in farming is not guaranteed from iatrogenic – the risk of taking the wrong drugs.

One of the main directions of primary prevention of urinary stone diseases is to study alcohol consumption and limit it to 30 ml of ethanol for men and 15 ml/day for women. The total amount of alcohol consumption per week should not exceed 140 g in men

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and 80 g in women. Otherwise, it is perceived as a risk factor and leads to the acute recurrence of many diseases, including acute urinary stone disease. Therefore, the frequency of alcohol consumption during the study was studied and evaluated in the farming population. The results obtained are shown in Table 4.

Statistical evaluation of the obtained data confirmed that alcohol consumption occurs with a prevalence of 34.0% in the general population of farmers (77.2% in men and 22.8% in women; P <0.005).

Table 4. Distribution of alcohol consumption in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Men	33	68.7	121	74.7^{IT}	54	90.0^{x}	2	100.0^{x}	210	77.2
Women	15	31.3^{x}	41	25.3	6	10.0	0	0.0	62	22.8
The general population of farmers	48	17.7	162	59.6^{xx}	60	22.0^{IT}	2	0.7^{xxx}	272	34.0

Note: • Xi ^{2} = 281; • RR (risk ratio) = 0.37; • R <0.05.

AIC differs at different ages. The highest frequency of alcohol consumption is detected at the age of 31–49 years (59.6%, R <0.01, very low alcohol consumption is observed at the age of ≥70 years (0.7%; R<0.001) and at the age of 18–30 years and at the age of 50–69 years. relatively low – 17.7 % and 22.0 %, respectively (R>0.05).

Depending on the age of male and female farmers, the incidence of AI is characterized as follows: 18–30 years – 68.7% and 31.3% (R<0.005), 31–49 years – 74.7% and 25.3% (R<0.005), 90.0 percent and 10.0 percent (R<0.005) at the age of 50–69 years, 100.0 percent and 0.00% (R<0.005) at the age of 70 years.

Further analysis is aimed at assessing the prevalence of hereditary predisposition to urinary stone disease as a risk factor (Table 5).

Table 5. Epidemiological characterization of hereditary predisposition as a risk factor in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	86	60.6^{x}	145	54.1	63	67.0^{x}	4	50.0	298	58.2
R	<0.005		> 0.05		<0.005		> 0.05		<0.005	
Female farmers	56	39.4	123	45.9^{x}	31	32.9	4	50.0^{x}	214	41.8
Farmer's general population	142	27.7	268	52.3^{x}	94	18.4^{x}	8	1.5^{xxx}	512	64.1

Note: • Xi ^{2} = 0.23; • RR=1.02 ; • R>0.05.

In the population of farmers with a genetic predisposition to urinary stone disease, as shown in Table 5, the prevalence is 64.1%, in male farmers – 58.2% and in female farmers – 41.8% (R<0.005). The age–related difference in the frequency of this risk factor is 50.8% (R<0.001).

A hereditary predisposition is detected in 18–30–year–olds with a prevalence of 27.7%, which is 24.6% higher (52.3%) than in 31–49 years (R<0.05), and 9.3% lower (18,4 percent) were recorded at the age of 50–69 years (R<0.05) and 25.2 percent with a low score (1.5 percent) and confirmed in ≥70 years (R<0.001).

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In men and women – 60.6 and 39.4% (R<0.005) at the age of 18–30 years, 54.1% and 45.9% (R>0.05) at the age of 31–49 years, –67 at the age of 50–69 years. 0 percent and 32.9 percent (R<0.005) and 5070 years –50.0 percent and 50.0 percent (R>0.05), the prevalence of hereditary predisposition is observed. This information will be of great help in planning preventive measures.

Epidemiological descriptions of dystonic disorders have also been studied and evaluated in the study, as they are recognized as risk factors that play a role in the origin of urinary stone diseases [12, 13, 14, 15, 16]. Table 6 shows the results of analyzes devoted to estimating the prevalence of hypercalcemia in the farming population.

Table 6. Epidemiological characterization of the prevalence of hypercalcemia in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmer	81	62.3	135	54.0^{IT}	70	63.6^{IT}	5	62.5^{IT}	291	58.4
R	<0.005		> 0.05		<0.005		<0.005		<0.005	
Female farmer	49	37.7	115	46.0^{x}	40	36.4^{IT}	3	37.5^{IT}	207	41.6
General population of farmers	130	26.1	250	50.2^{x}	110	22.1^{IT}	8	1.6^{xxx}	498	62.3

Note: • Xi ^{2} = 57.7; • RR (risk ratio) = 1.57; • R <0.05.

It was found (Table 6) that hypercalcemia is observed with a prevalence of 62.3% in the general population of farmers. Its frequency is – 58.4% in male farmers and – 41.6% in female farmers (R<0.005). Hypercalcemia occurs with a frequency of 1.6% in ≥70–year–olds or 24.5% less frequently than in 18–30–year–olds (R<0.001), in 31–49–year–olds – 50.2% (R<0.05) and 50 It is established with a prevalence of – 22.1 percent (R>0.05) in –69–year–olds.

Hypercalcemia is noted in all age groups with a significantly higher prevalence in men than in women:

- 18–30 years – 62.3% and 37.7%, ie 24.6% (P<0.005);
- 31–49 years – 54.0% and 46.0%, respectively, with a difference of 18.0% (R>0.05);
- 50–69 years – with a difference of 63.6% and 36.4%, ie 17.2% (R <0.005); ≥70 years – 62.5% and 37.5% or 26.1%, respectively (R<0.005).

Similar epidemiological descriptions are found in the studied population in relation to hyperphosphatemia (Table 7).

Hyperphosphatemia is detected at a frequency of 50.7% among the farming population; with a prevalence of – 61.7% in male farmers and – 38.3% in female farmers (R<0.005). Hypercalcemia is not detected in women and men over 70 years of age, 39.5% in the general population aged 18–30 years, –56.1% (R<0.05) at the age of 41–49 years and up to 4.4% at the age of 50–56 years. is established with a low distribution (R<0.001).

Table 7. Epidemiological characterization of the prevalence of hyperphosphatemia in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	107	66.9^{x}	131	57.7	12	66.7^{IT}	0	0.0	250	61.7
R	<0.005		<0.005		<0.005		<0.005		<0.005	
Female farmers	53	33.1	96	42.3^{x}	6	33.3^{IT}	0	0.0	155	38.3
General population of farmers	160	39.5	227	56.1	18	4.4^{xx}	0	0.0	405	50.7

Note: • XI ^{2} = 3.71; • RR (risk ratio) = 1.11; • R <0.05.

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The epidemiological description of hyperuricemia was also studied and evaluated as a risk factor in the study. The data obtained are summarized and analyzed in Table 8.

Table 8. Prevalence of hyperuricemia in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	111	64.5	137	58.8[IF]	12	70.6[x]	0	0.0	260	61.6
R	<0.005		<0.005		<0.005		<0.005		<0.005	
Female farmers	61	35.5	96	41.2[x]	5	29.4 [IT]	0	0.0	162	38.4
General population of farmers	172	40.8	233	55.2[x]	17	40[xxx]	0	0.0	422	52.8

Note: • Xi ^{2} = 5.87; • RR (risk ratio) = 1.15; • R <0.05.

The analysis shows that hyperuricemia is recorded with a prevalence of 52.8% in the general ≥ 18–70–year–old farming population; At the age of 18–30 years – 40.8%, at the age of 31–49 years – 55.2% (R<0.05) and at the age of 50–69 years – 4.0% (R<0.005). Over 70 years of age (0.0%) patients have not registered. With a high prevalence in men and women, hyperuricemia occurs in 18–30–year–olds (64.5% and 35.5%; R<0.005), 31–49 years (58.8% and 41.2%; <0.005) and 50–69 years, respectively, age (70.6 percent and 29.4 percent; R<0.005). Depending on age, hyperuricemia in women is characterized by an increase of 11.8% (R<0.05) and the same percentage in men (11.8%; R<0.05). Compared to the literature, this figure is significantly higher, and we think that future prospective studies will clarify this conclusion. Another aspect of hyperuricemia identified was that it was recorded in male farmers at a frequency 1.6 times (61.6 percent) higher than in women (38.4 percent) (R<0.005). Table 9 shows the prevalence of hypomagnesemia in the farming population.

Table 9. Prevalence of hypomagnesemia in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	105	66.9	131	38.2	17	68.0	0	0.0	253	62.2
R	> 0.005		> 0.005		> 0.005		-		> 0.005	
Female farmers	52	33.1	94	41.8	8	32.0	0	0.0	154	37.8
General population of farmers	157	38.6	225	55.3[x]	25	6.1[xxx]	0	0.0	407	50.9

Note : • Xi ^{2} = 5.87; • RR (risk ratio) = 1.15; • R <0.05.

Hypomagnesemia is recorded in 50.9% of farmers aged 18–70 years, in 62.2% of men and 37.8% of women (R>0.005). It is mainly detected in the age group of 18–69 years and is not observed in people over 70 years of age (0.00%). The prevalence of hypomagnesemia is 55.3% in 31–49 year olds (R<0.05), 1.4 times and 9.1 times lower in 18–30 year olds (38.6%; R<0.05).) and 50–68 years (6.1 percent, R<0.001).

In men and women, the prevalence rates are as follows: 18–30 years – 66.9% and 33.1% (R>0.005), 41–49 years – 58.2% and 41.8% (R>0.005) and 50– At age 69 – 68.0 percent and 32.0 percent (R>0.005).

The results of the study showed that hypercylindruria was associated with a high prevalence among the farming population (Table 10).

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Table 10. Epidemiological characterization of hypercylindruria in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	86	60.1	145	54.1	75	64.1	3	42.9	309	57.8
R	> 0.05		> 0.05		> 0.05		> 0.05		> 0.05	
Female farmers	57	39.9	123	45.9	42	35.9	4	57.1	226	42.2
General population of farmers	143	26.7	268	50.1	117	21.9	7	1.3	535	66.9

Note: • Xi ^{2} = 2.06; • RR (risk ratio) = 1.09; • R> 0.05.

It was confirmed that hypercylindruria is detected in the population of male and female farmers of different age groups with a difference: at the age of 18–30 years – 60.1% and 39.9% (R>0.05), at the age of 31–49 years – 54.1% and 45.9% (R<0.05), 50.19 years – 64.1 and and 35.9% (R> 0.05), ≥70 years – 42.9% and 57.1% (R<0.05), ≥18–70 years – 57.8% and 42.2% (R>0.05).

In the total farmer population (≥18–70 years), hypercylindruria is recorded with a prevalence of 66.9 percent. In particular, 26.7% at the age of 18–30 years, 50.1% at the age of 31–49 years (R<0.05), 21.9% at the age of 50–69 years (R>0.05) and 28% at the age of 70 years. With a sharp decrease to 1.3% (R<0.001), it is confirmed compared to the first age group.

Epidemiological common risk factors play a "decisive role" in the development of non–communicable diseases. Therefore, the prevalence of overweight, one of the leaders among them, was studied and evaluated in the farming population. Such analyzes are described in Table 11.

Table 11. Description of the prevalence of excess body weight in the farming population

Inspection groups	Age groups									
	18-30 years old		31-49 years old		50-69 years old		≥70 years old		≥18-70 years old	
	Absolute	%	Absolute	%	Absolute	%	Absolute	%	Absolute	%
Male farmers	47	63.5	155	61.0^{IT}	91	68.4^{IT}	3	60.0^{IT}	296	63.5
R	> 0.005		> 0.005		> 0.005		> 0.005		> 0.005	
Female farmers	27	36.5	99	38.9^{IT}	42	31.6^{IT}	2	40.0^{IT}	170	36.45
General population of farmers	74	15.9	254	54.5^{x}	133	23.5^{IT}	5	1.1^{xxx}	466	58.3

Note: • Xi ^{2} = 30.5; • RR (risk ratio) = 0.72; • R<0.05.

An analysis of the table numbers shows that the prevalence of overweight, an alimentary–related risk factor, occurs with a prevalence of 58.3% in the general population of examined farmers (≥18–70 years) (63.5% in males and 36.45% in females, R>0.005). The highest age was 31–49 years (54.5 %, R<0.05), the lowest was 50–69 years (23.5 %, R<0.05) and 18–30 years (15.9 %, R<0.05), significantly lower (1.1 %; R <0.001) is observed at ≥70 years.

In different age groups of male farmers and female farmers, respectively, overweight differs and is recorded as follows: 18–30 years – 63.5% and 36.5% (R>0.005), 31–49 years – 61.0% and 38.9 % (R>0.005), 68.4 % and 31.6 % (R>0.005) at the age of 50–69 years, 60.0 percent and 40.0 % (R> 0.005) at the age of 70 years.

As a result of these and other common risk factors mentioned above, unfavourable epidemiological conditions are predisposing to urolithiasis, as in other urine stone diseases, and therefore their correction leads to the success of primary and secondary prevention.

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