Original Research

EPIDEMIOLOGICAL STUDY OF RISK FACTORS OF RENAL STONES FORMATION AMONG PATIENTS ATTENDING IN BLOCK PHC–THANJAVUR DISTRICT

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ABSTRACT

Introduction: Urolithiasis is the third most common and painful disease in the globe, afflicting both men and women. The accumulation of a few minerals and crystalline elements in the renal calculi and urinary bladder are during the process of metabolism. The study's goals were to determine the frequency of risk variables for urinary stone patients. **Methods:** Across-sectional study had on urinary stone disease in Thanjavur and the surrounding areas. The study included 102 cases, 79 urinary stone patients, and 23 normal patients that all lived in the same area. **Results:** A total of 102 participants between the ages of 20 - 70 were studied. Thirty-eight percentages of urinary stone patients were over 60 years old. In this study, men accounted for 63 %. It was discovered that kidney stone patients were more prevalent in the age groups 41-70 (77%) and <40 (23%), which was statistically significant (15.5±20.51; p=0.01). Patients with lower education levels (56%) and patients from lower-income areas were found. The non-veg food intake status showed a higher proportion of kidney stone patients with control (68% vs. 13%), which was statistically significant (36.06±28.5; p = 0.005). **Conclusion:** This study confirms that the urinary stone formation may be due to the various environmental factors. The significant associated with the risk factors between control and urinary stone patients were found. The high burdens of urinary stone formation were observed and their associations of socio-demographic behavioral risk factor and the results have been discussed.

Keywords: Urinary stone; epidemiology, rural population, risk factors.

Introduction:

Urolithiasis is the third most prevalent and widespread disease, affecting a vast number of people of all ages and genders (Ghosh et al., 2009; Knoll, 2007). Urinary stone disease is a serious disabling issue that affects about 12% of the world's population. Disease frequency is increasing as a result of changing lifestyles, food choices, and global warming (Diana & George, 2013). Stone formation is influenced by both hereditary and environmental factors. Urolithiasis affects around 20% of the population in most industrialized countries (Marickar et al., 2009; Taylor et al., 2004). Urolithiasis affects roughly 2 million persons in India each year, with a lower incidence in southern India (Girija et al., 2007).Urinary stone composition in India differs from that in Western countries, with calcium oxalate being the most common component. Urinary stones can contain a variety of mineral combinations. The most painful and common urological problem of the urinary system is the formation of urinary stones (Davidson et al., 2005). The most prevalent urinary disease ailment, urinary calculi, is caused by a variety of reasons including metabolic disorders, dietary variables, bacterial infections, and environmental conditions (Kumar et al., 2006).

Male patients are usually more vulnerable than female patients. In a 5:2 ratio, men and women are impacted with urinary calculi illness at some point in their lives. Men between the ages of 40 to 70 are more likely to get kidney stones (Sharma & Filler, 2010). Silberstein et al., (2010) have reported that obesity and weight gain have been linked to a higher risk of stone development. There may be a relationship between fat tissue, insulin resistance, and urine composition. Larger bodies produce more calcium and uric acid, increasing the risk of kidney stones. Men with kidney stones were more than three times as likely as non-stone-formers to have a family history of stones.Kidney stone incidence appears to be rising in the general population, as does the medical expenditure associated with this disease (Stamatelou et al., 2003).

Risk factors connected with kidney stones are different among various populace gatherings and natural elements play a vital part in their pathogenesis (Parvin et al., 2021). Research on urological patients has shown that the rate of kidney stones can be related with sex, race, geo-realistic area, occupation, sweltering environment, positive family ancestry, unfortunate eating routine (over the top admission of caffeine, salt, dairy items, creature proteins and fat), smoking, liquor utilization, actual work, weight, low liquid admission, lack of hydration financial status (Sofia et al., 2016), training, water quality, high admission of nutrients D and C, hereditary foundation and comorbid metabolic problems (diabetes mellitus, hypertension, chronic kidney infection, and cardiovascular infection) (Safarinejad, 2007; Salmeh et al., 2012). Urolithiasis epidemiology varies depending on geographical location and historical time. The incidence and kind of lithiasis, as well as the location and composition of urinary stones, have changed as socioeconomic conditions have improved. Around 80% of stones in most developed countries are calcium salts, which are most typically calcium oxalate and less commonly calcium phosphate (apatite or brushite). Uric acid, struvite or carbonate apatite, cystine, and unusual stones make up the remaining 20% of stones (Daudon et al., 1995).The study's goals were to assess the prevalence of risk factors for urinary stone patients in rural areas of Tamilnadu, India.

Methods

A total of 102 patients of were studied in the Thanjavur area looked at the prevalence of risk variables for urinary stone patients. The research was carried out in the rural field practice area of block PHC Thanjavur, Tamilnadu, India. This research took place for six months, from November 2021 to April 2022. A cross-sectional quantitative design was used by the researcher. This study included 23 seemingly healthy participants (15 men and 8 females) who were clinically examined by expert doctors as controls. Those individuals were chosen at random from the general population. The following was the epidemiological distribution of those subjects: All subjects enrolled in this study, including their residence (15 urban and 8 rural areas), marital status (12 married and 11 single), economic status (4 good, 9 medium, and 10 low levels), and educational level (4 high educations, 19 low educations).

Details of the survey included age, sex, marital status, family financial status, educational status, residence region (urban/rural), smoking habit, food habit, and past history of kidney stone and heredity of kidney stone infection. These subtleties were gotten by clinical officials working the separate emergency clinics and preceding review assent was acquired from all study subjects. The controls were volunteers, comparable financial and segment attributes. The workers were from a similar segment locale without any set of experiences of kidney stone disease. The strategy for talking was painstakingly normalized with the goal that the expected data could be gotten and deciphered in a uniform manner. To some extent filled in poll from the members were rejected from this review. A similar survey was utilized for the two cases and controls.

Statistical Analysis

The statistical analysis was carried out using the SPSS 20.0 software program. The average and standard deviations were calculated. Analysis of variance was used to examine the data (ANOVA). Statistical significance was defined as a probability level (p-value) of less than 0.05. All values were reported as Means±SD. To examine the differences between one group (urinary stone patients) and another, the ANOVA test was used (Healthy people).

Results

The study comprised 102 patients with urinary stones (aged 45±18.7 years), with ages ranging from 20 to 70 years. Thirty eight percentages of urinary stone patients were over 60 years old. Males accounted for 63% of the sample, while females accounted for 37%. In terms of where they lived, 20 (28%) were urban patients and 52 (72%) were rural patients. Males outnumbered females by 78% to 22% among 23 healthy persons. Patients with kidney stones were seen in 72% of urban areas and 28% of rural areas. Table 1 shows the prevalence of kidney stone patients and a control study in response to various parameters. In rural areas account for 15 of the 23 healthy persons, while urban areas account for eight. The distribution of urinary stone patients is based on education, with 35 patients having a high level of education and 44 having a low level of education. Four of the 23

healthy people have a high education level, whereas the other 19 have a low education level. It reveals the marital status-based distribution of urinary stone patients. There are 55 married patients and 24 unmarried patients. Twelve of the 23 healthy persons are married, while 11 are single. It depicts the socioeconomic distribution of urinary stone patients. The 30 patients have good stones, 22 have medium stones, and 27 have low stones. 4 persons are good, 9 are Medium, and 10 are Low out of 23 healthy people. The bulk of patients (78%) used tap water, whereas only 22% used bore well water. There are 50 smokers and 29 non-smokers among the patients. They show the distribution of urinary stone patients dependent on whether or not they use alcohol. There are 25 daily drinkers among the 79 patients, 38 weekly drinkers among the 38, and 16 monthly drinkers among the patients.

Table 1: Factors associated with the prevalence of urinary stone patients and control study.

Parameters	Urinary stone patients (n=79)		Normal patients (n=23)		Mean ± SD	'p' value
	Number	%	Number	%		
Gender						
Male	50	63	18	78	15.5±20.51	0.001^S
Female	29	37	5	22	8±7.07	
Age in years						
20-30	8	10	8	35	--	
31-40	10	13	6	26	8±2.83	0.001^S
41-50	18	23	5	22	11.5±9.19	
51-60	13	16	3	13	8±7.07	
61-70	30	38	1	4	15.5±20.51	
Residence						
Rural	52	72	15	65	32.5±24.75	0.025^S
Urban	20	28	8	35	18.5±14.85	
Education						
High education levels	35	44	4	17	19.5±21.92	0.000^S
Low education levels	44	56	19	83	31.5±17.68	
Marital status						
Married	55	70	12	52	33.5±30.41	0.027^S
Unmarried	24	30	11	48	17.5±9.19	
Economic status						
Good	27	34	4	17	17±18.38	0.009^S
Medium	22	28	9	39	15.5±9.19	
Low	30	38	10	44	18.5±12.02	
Genetics of stone disease						
Yes	12	15	Nil	Nil	--	---

No	67	85	Nil	Nil	--	
Drinking Water						
tap water	62	78	06	26	39.59±34	
bore well	17	22	17	74	--	
Food habit						0.005[S]
Vegetarian	25	32	20	87	22.5±3.53	
Non-Veg	54	68	03	13	36.06±28.5	
Smoking habit						
Smoker	50	63	Nil	Nil	--	
Non smoker	29	37	Nil	Nil		
Alcohol intake						
Daily drinkers	25	32	Nil	Nil		
Weekly drinkers	38	48	Nil	Nil	--	--
Monthly drinkers	16	20	Nil	Nil		

S- Significant; NS-Not Significant. p<0.05 level of significant.

Discussion

It observed that the urinary stone infection were higher in the age group of >60 (38%) and lower <20 (10%) which was statistically significant (15.5±20.51; p=0.001) (Huang et al., 2013; Parvin et al., 2021). The majority of male 63% than female were representing 37% of the sample which was statistically significant (15.5±20.51; p=0.001) (Stamatiou et al., 2006). The rural urinary stones patients were (32.5±24.75; p=0.025) in higher than urban area (18.5±14.85; p=0.025) as compared with the healthy people, which is further compared with the control values (Yanagawa et al., 2007). The education status showed a higher proportion of stone patients with control (44% vs. 17%; 19.5±21.92; p = 0.000) and a lower proportion (56% vs. 83%; 31.5±17.68) were observed (Wang et al., 2017). The married patients (33.5±30.41; p=0.027) were infected with urinary stone diseases than unmarried (17.5±9.19; p=0.027) as compared with the control study (Sas et al., 2010). The good economic status of stone patients with control (38% vs. 17%; 17±18.38; p = 0.009) and a lower status of (34% vs. 44%; 18.5±12.02) were presented (Daudom et al., 2004). The non-veg food intake status showed a higher proportion of kidney stone patients with control (68% vs. 13%; 36.06±28.5; p = 0.005) and veg food intake status showed a lower proportion of kidney stone patients with control (32% vs. 87%; 22.5±3.53; p=0.005) were observed. The non-veg food intake is associated with a higher risk of stone formation. The value of 63% (50/79) smokers and 37% (29/79) non-smokers had urinary stone infection (Prakash et al., 2019; Merlin et al., 2019). Daily drinkers (32%) were two times more likely than monthly drinkers (20%) to have urinary stone infection. High fluid intake is associated with a lower risk of developing kidney stones in men and women (Prakash et al., 2019). Between urinary stone patients and controls, a probability level (p-value) of larger than 0.05 is considered statistically insignificant. When compared to healthy people, investigations of risk factors for urinary stone patients have dominated.

Conclusion

In conclusion, the prevalence of urinary stone disease increases among various risk factors due to gender, age, diet, environmental factors, geographical location, climate and lifestyle. The prevention of growth of risk factors for urinary stone diseases can be achieved by rising health awareness programs focusing essentially on reducing alcohol consumption, restrict sodium, reduce protein intake and metabolic risk factors. The most important dietary recommendations for calcium stone risk are to increase fluid intake. The high burden of urinary stone formation were observed and their association of socio-demographic behavioral risk factors.

Conflicts of Interest

The author declares no conflicts of interest.

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