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DIETARY INTAKE AND FOOD HABITS AMONG SELECTED RENAL STONE PATIENTS

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ABSTRACT

The daily consumption of various nutrients as well as the dietary habits of 15 male and 15 female patients with renal stone were investigated (their age ranged from 20 to 50 years). The patients were interviewed about their intake through 24 hours dietary recall (3 days) and questionnaire regarding their food habits. Moreover, blood and urinary analysis were done for calcium, phosphorus, sodium, potassium, creatinine and uric acid.

Results regarding dietary intake showed that mean total protein, animal protein, phosphorus and sodium intake were higher among both males and females. On the other hand calcium and potassium intake by the patients (male / female) was lower than the recommended daily allowances (R.D.A.). while results of blood analysis showed that potassium and calcium for male and female, phosphorus (in female), sodium (in female), and creatinine (in male) were higher than the normal value. While mean blood analysis of uric acid (in male and female), sodium (in male), creatinine (in female) were lower than normal value. Mean value of urinary excretion for phosphorus and calcium (in all patients), potassium and creatinine (only in male) were higher than normal value but sodium and uric acid (in all patients), potassium and creatinine (in female) were lower than normal value. Therefore, the study indicates the important of dietary therapy in the manegement of renal stone patients. Diet should be modified particulary for dietary protein, calcium, sodium and phosphorus intake. Nutritional education program should be directed to individuals about the relationship between diet components and the development of renal stone.

INTRODUCTION

Kidney stone is a substantial health problem associated with significant pain and suffering, as well as economic costs. The majority of patients usually are on treatment of existing stones and only a small percentage is on prevention. Efforts to prevent or at least reduce the developing a kidney stone would be an important component of the care of patients at risk.

Dietary factors appear to play an important role in the formation of kidney stones [1-3]. It has been shown that dietary protein is the nutrient most closely related to the frequency of stone disease at several different demographic levels [2,4,5].

Several investigators [5,6] have reported that a large intake of animal protein and refined carbohydrates increase the amount of urinary calcium excretion and may lead to the formation of calcium stone. Since dietary habits may vary with social structure and degree of affluence, the aim of this study was to investigate the dietary habits and consumption of various nutrients in relation to renal stone disease.

MATERIALS AND METHODS

Patients

This study included a group of 30 patients with renal stone disease (15 males and 15 females), their age ranged from 20 to 50 years. The patients had been selected from individuals who attended local hospital (they had not previously been given any specific dietary advice).

Patients were interviewed regarding their socioeconomic status, educational level, dietary habits(using dietary history method) and dietary intakes (3 day food record by household measurement).

Nutritional status

A- Anthropometric measurements were collected and phase measurements included: weight (kg), height (cm) and body mass index (BMI) were calculated to evaluate patients nutritional status.

Body weight (wt.) was recorded using a beam scale. The patients were weighted to the nearest kilogram without shoes and in light clothes [7].

The height of each patient was measured using a measuring tape fixed to the wall without shoes to the nearest centimeter reading [8].

Body mass index (BMI) was calculated by the following equation:

BMI = weight (k gm) / height (m^2), according to **Garrow and Webster**[9]

B-Dietary history from the selected patients were recorded during the interviewing to obtain information about food items that the patients consume more often (Daily, weekly and seasonally)

C-Food intake study was carried out using 24 hours recall for 3 different days. Each patient was asked to give exact amount of each food items consumed during the previous 24 hours. The nutritive value of the food consumed was estimated using, Food Compositions Tables of the Nutrition Institute [10]. The main daily nutrients intake of the 3 days was compared with the recommended daily allowances (RDA)[11]. Nutrients intake as percentages of RDA were recorded.

Urinary analysis

Urine samples were collected for, twenty four hours, from each patients on the last day of the interviewing. The collected samples were analyzed with respect to components believed to be important the method of **Gindler and King** [12]. Sodium and potassium were determined in the urine samples by flame photometry. Urinary creatinine was measured according to **Pak et al.**[13] and uric acid was done according to **Caraway** [14], and phosphorus was measured according to **Gomori**[15]. The obtained

values will be compared to the normal value according to **Weinsier** [16].

Blood analysis

Blood samples were collected to be analyzed for calcium according to the methods described by **Pesce and Kaplan**,[17]. Sodium and potassium were determined using the atomic absorption spectrophotometer, Unicum Sp 1900, according to the A.O.A.C. method [18]. Phosphorus measured according to A.O.A.C. [19]. Uric acid determined as described by **Caraway** [20]. And creatinine according to **Bohmer** [21]. The obtained values will be compared to the normal value according to **Weinsier** [16].

Statistical analysis

Description statistics mean , standard deviation , frequencies and percentage were calculated. Also, person correlation coefficients (r) analysis was done SAS [22].

RESULTS AND DISCUSSION

Frequency and percentage distribution of renal stone patients (male/female) according to their social status level of education, occupation, family history and concerning renal stone formation are present in table 1. Most patients were married (86.66% and 80% of male and female, respectively). Results concerning education status among patients revealed that 6.6%, 79.99% and 13.34% of male were artless, had moderates education and had higher education, respectively. While among female patients 20% were artless, 66.68% had moderate education and 13.34% had higher education. Most patients (93% of male and 53.33% of female) were working . Results on table (1) show also that 13.34% of male and 26.66% of female had family history of renal stone disease. When patients were asked if they follow any special dietary treatment, all of them indicated that they did not. From hospital medical record with regard to type of stone, it was found that 33.33% of male and 40% of female had alkaline stone, while 66.66% and 60% of male and female respectively had acidic stone. About frequency of urination, 53.27% of male and 20% of female had urination less than 4 times/ day, while 46.67% of male and 80% of female had urination more than 4 times/ day. On daily basis 33.33% of male and 73.34% of females did not practice any physical activities .When patients were asked if they suffer from other diseases or symptoms, 20% of males and females indicated that they suffer from hypertension. Most patients (86.66 of males and females usually drink tea or coffee daily. Results about water and fluid consumption among patients showed that 12.12% and 33.36% of male and female respectively, drank less than 4 cups/ day, while 86.66% and 66.66% of males and females respectively drank more than 4 cups/ day. From this table one could conclude that these tea and coffee drinking could play a role in stone formation. These two drinks contain xanthines which are precipitated and lead to renal stone.

Table (2) show pattern of consumption of selected food items among renal stones patients under the study. Milk and milk products as source of protein and calcium were consumed on a daily bases by 86.66% of both male and female patients. While 73.34 and 86.66% of males and females, respectively consumed meat daily. It is clear that milk and milk products as well as meat are important nutritional factors in stone formation. As uric acid is the end product of proteins in these products .

Egg was consumed weekly by 66.66% of males and 60% of females. Legumes on the other hand were consumed weekly by 66.66% of male patients and 86.66% of females patients. With regard to the consumption of vegetables, most patients consumed okra (66.66% of males and 86.66% of females), cabbage (73.34% of males and 86.66% of females) and spinach (66.66% of males and 93% of females) seasonally. Results about consumption of fruits among patients showed that plum, and peach were consumed seasonally by most patients. On daily basis pickles were consumed by 40% of male patients and 80% of female patients.

Table (3) shows mean weights (kg) and hights (cm) of renal stone patients (males and females). The mean values of weight (kg) were 73.73 $\pm$ 11.89 and 62.26 $\pm$ 16.5, respectively for male and female subjects, while mean heights (cm) 72.80 $\pm$ 6.74 and 160.06 $\pm$ 6.69, respectively. While mean body mass index (BMI) for male and female were 24.38 $\pm$ 3.32 and 23.76 $\pm$ 5.02., respectively. Distribution of patient (male/ female) according to their nutritional status based on BMI are presented in table (4). According to this table showed that 46.6% of males and 26.6% of females had normal body weight, while obesity (Grade I) was prevalent among 40% of both males and females and obesity (Grade II) represented only 13.3% among female and 6.6% among male patients. The result indicated that most patients (male / female) did not suffer from obesity.

Mean daily intake of energy and nutrients of renal stone patients are represented in table (5), while distributions of the patients according to their intake are presented in table (6). Generally mean total protein intake was higher among both males and females (142.24% and 140.35%of RDA. respectively). Protein intake from animal sources was considered to be higher and represented 74.04 and 78.80%of RDA for male and female, respectively. Total protein intake, animal protein intake and animal protein ratio were significantly higher for patients with stones in both men and women [5]. These observations agree with the results of the present study. Another study [23] showed that a diet rich in protein increases urinary calcium excretion and decreases urinary citric acid excretion, and that alkali loading conversely normalizes urinary

Zagazig J. Pharm. Sci., June 2000
Vol. 9 , No. 1, pp. 43 - 50

Table (1): Frequency and percent distribution of study groups according to their social status, level of education, occupation and family history and some knowledge concerning renal stone formation.

Parameters	Male (15)		Female (15)	
	No	%	No	%
* Social status:				
- Married	13	86.66	12	80
- Unmarried	2	13.34	3	20
* Education status:				
- Artless	1	6.6	3	20
- Moderate	12	79.99	10	66.68
- Higher	2	13.34	2	13.34
* Working status:				
- Working	14	93	8	53.33
- Not working	1	6.6	7	46.67
* Family history of renal stone:				
- Yes	2	13.34	4	26.66
- No	13	86.66	11	73.34
* Type of stone:				
- Alkaline	5	33.33	6	40
- Acidic	10	66.66	9	60
* If the patient follows any special dietary treatment:				
- Yes	-	-	-	-
- No	15	100	15	100
* Frequency of urination / day:				
- Less than4 times	8	53.27	3	20
- More than4 times	7	46.67	12	80
* If the patient practice any physical exercise:				
- Yes	7	46.67	1	6.6
- No	5	33.33	11	73.34
- Sometime	3	20	3	20
* If the patient suffers from other diseases or symptoms:				
- Hyper tension	3	20	3	20
- Liver disease	-	-	1	6.6
- diabetes	1	6.6	2	13.34
* Type of fluid usually taken daily other than water:				
- Tea or coffee	13	86.66	13	86.66
- Fruit Juices	2	13.34	2	13.34
* Amount of fluid drinking / day:				
less than 4 cups	2	13.34	5	33.26
more than 4 cups	13	86.66	10	66.66

excretion of calcium and citric acid, which are the risk factors in stone formation. Results in table 6 show that the number of patients who exceeded their daily intakes of total protein represented 73.3 % of males and 86.6 % of females, and this results agree with the result of other investigators [5].

Mean phosphorus intakes (mg) represented 144.98 % of RDA for males and 132.47 % for females as stated in table (5). Mean calcium intake by the patients was lower than the requirement it represented 65.71 % and 44.31 % of RDA for male and female respectively. The present results agree with the result of other investigators[5] who reported that dietary calcium intakes were significantly lower for patients with stones in men and women patients. On the other hand phosphorus intake was higher among 93% in male and 73.3 % in females. And the amount of phosphorus intake was larger than the requirements for male and female (144.98,132.47 %, respectively).

Dietary phosphorus increases the endogenous secretion of calcium into the gut. Lastly, calcium absorption diminishes in both sexes in the seventh decade of life because of lower renal synthesis of calcitriol and intestinal resistance to calcitriol, which contributes to the genesis of senile osteoporosis [24].

The present results showed that the amount of sodium (mg) intake by the patients was larger than the requirements, mean intake of sodium represented 151.37 % and 107.18 % of RDA for males and females, respectively. According to table (6) 100 % of male and 60 % of female their daily intake exceeded the recommended daily intake. Increasing sodium intake within the range of usual dietary intake is associated with increased urinary calcium loss [25,26]. Also evidence support a primary role for modification of diet, particularly diet protein and sodium intake, in

Table (2): Pattern and consumption of selected food items among patients under the study.

Food items	Male (15)		Female (15)	
	No	%	No	%
* Milk & milk products				
- Daily	13	86.66	13	86.66
- Weekly	2	13.34	2	13.34
* Meat:				
- Daily	11	73.34	13	86.66
- weekly	4	26.66	2	13.34
* Egg:				
- Daily	4	26.66	6	40
- weekly	10	66.66	9	60
* Legumes:				
- Daily	4	26.66	2	13.34
- weekly	10	66.66	13	86.66
* Vegetables:				
** Okra				
- weekly	3	20	1	6.6
- seasonally	10	66.66	13	86.66
** Cabbage				
- weekly	-	-	1	6.6
- seasonally	11	73.34	13	86.66
** Spinach				
- weekly	2	13.34	-	-
- seasonally	10	66.66	14	93.0
* Fruits:				
** Plum				
- seasonally	13	86.66	15	100
** Peach				
- seasonally	14	93	15	100
* Pickles:				
- Daily	6	40	12	80
- weekly	-	-	-	-

Table (3): Mean weight, Height and body mass index of renal stone patients.

Parameters	Male (15) Mean + SD	Female (15) Mean + SD
Weight (Kg)	73.73 + 11.89	62.26 + 16.53
Height (Cm)	172.80 + 6.74	160.06 + 6.69
BMI (Kg/m^2)	24.38 + 3.32	23.76 + 5.02

Table (4): Nutritional status among renal stone according to body mass index.

Sex	Body Mass Index				
	Under weight	Normal	Obesity Grade I	Obesity Grade II	Obesi Grade III
Male	1(6.6%)	7(46.6%)	6(40%)	1(6.6%)	-(-)
Fem.	3 (20%)	4(26.6%)	6(40%)	2(13.3%)	-(-)

the prevention of recurrent nephrolithiasis [27]. Other research[28] reported that the patients who develop nephrolithiasis may have an increased calciuric response to dietary protein and perhaps to dietary sodium.

Table (5) shows that mean carbohydrate intakes was 289 gm and 263.05 gm for male and female patients respectively and these intakes represented 60.39% and 78.52 % of RDA for male and female respectively Table (6). The present results agree with the result of other study [5] which showed that caloric intake and dietary intake of carbohydrate and fat were reduced in stone patients. Table (6) show that sodium intake was higher among 100 % of males and 60 % of females and these excessive intakes of both sodium and protein may lead to increase urinary crystallization as indicated by other study[29]. These results explain the observation that (20 %) of males and females suffer from hypertension, Table(1).

With regard to vitamins intake, results of the present study showed that the mean intake of both niacin and ascorbic acid among renal stone patients were exceeded the RDA. Mean niacin (mg) intakes represented 112.07% and 125.54 % of RDA for males and females, respectively. While mean ascorbic acids intakes represented 169.23 % and 129.98 % of RDA for males and females, respectively. And our results found that 60 % of both male and females their daily intake of niacin exceeded the RDAs. While 73.3 % and 60 % of both males and females, respectively their intakes from ascorbic acid considered to be higher than RDAs.

These results agree with the results of other investigators who reported that stone formers seemed to have a higher dietary intake of vitamin C [1].

Mean value of laboratory analysis (serum / urine) and distribution of patients according to the obtained laboratory values are recorded in table (7 and 8). Results showed that mean pH was 6.12 for male and 6.3 for female and this results agree with our results in table (1) which indicated that most patients were suffer from acidic stone.

Mean values of urinary calcium were 312.5 and 287.5 mg for male and female, respectively. The obtained values were 25 %, 15 % higher than the normal value for male and female, respectively. On the other hand the mean value of serum calcium was found to be 12.86 (mg/dl) which 22.4 % higher than the normal value for male, but the mean value for female was 11.45 (mg/dl) which found to be 9 % higher than the normal value.

Zagazig J. Pharm. Sci., June 2000
Vol. 9 , No. 1, pp. 43 - 50

Table (5): Mean daily energy and nutrients intake, as percentage of adults RDA 1989 for individuals under the study.

Energy and nutrients	Male		Female	
	Daily intake Mean ± SD	% of RDA	Daily intake mean ± SD	% of RDA
Energy (kcal)	1952.94 ± 358.9	67.34	1702.12 ± 438.96	77.369
Total Protein (gm)	80.612 ± 36.86	142.24	70.17 ± 27.17	140.35
Animal protein(gm)	46.64 ± 21.27	74.04	39.40 ± 12.47	78.80
Total Fat (gm)	37.21 ± 15.70	61.01	31.30 ± 11.60	51.31
Unsaturated fat(gm)	9.97 ± 7.95	16.35	10.56 ± 9.88	17.31
Carbohydrate (gm)	289.48 ± 53.91	60.39	263.05 ± 72.31	78.52
Elements				
Calcium (mg)	525.71 ± 284.9	65.71	354.50 ± 132.57	44.31
Phosphorus (mg)	1159.88 ± 362.06	144.98	1059.81 ± 308.72	132.47
Sodium (mg)	756.87 ± 177.07	151.37	535.92 ± 140.51	107.18
Potassium (mg)	1729.12 ± 538.02	86.45	1422.52 ± 334.04	71.12
Iron (mg)	15 ± 5.47	158.8	12.16 ± 4.68	81.10
Vitamins				
Retinol (ug)	759.21 ± 304.71	75.92	624.88 ± 258.66	78.10
Thiamin (mg)	1.25 ± 0.43	83.3	0.932 ± 0.04	84.77
Riboflavin (mg)	1.49 + 0.35	88.07	0.104 + 0.044	84.93
Niacin (mg)	21.29 ± 10.94	112.07	18.83 ± 4.30	125.54
Ascorbic acid (mg)	101.54 ± 51.6	169.23	77.99 ± 34.05	129.98

Table (6): Distribution of patients according to their daily dietary intake of nutrients as percentage of RDA (1989).

Energy and nutrients	Male			Female		
	* < 67%	**67 - 100%	***> 100%	*< 67%	**67 - 100%	***> 100%
Energy (kcal)	8 (3.53)	6 (40)	1 (6.6)	3 (20)	10 (66.6)	2 (13.3)
Protein (gm)	1 (6.6)	3 (20)	11 (73.3)	1 (6.6)	1 (6.6)	13 (86.6)
Fat (gm)	3 (20)	5 (33.3)	7 (46.6)	6 (40)	4 (26.6)	5 (33.3)
Carbohydrate (gm)	10 (66.6)	5 (33.3)	- (-)	4 (6.26)	8 (53.3)	3 (20)
Elements:						
Calcium (mg)	10 (66.6)	2 (13.3)	3 (20)	13 (86.6)	2 (3.13)	- (-)
Phosphorus (mg)	- (-)	1 (6.6)	14 (93)	1 (6.6)	3 (20)	11 (73.3)
Sodium (mg)	- (-)	- (-)	15 (100)	1 (.6.6)	5 (33.3)	9 (60)
Potassium (mg)	- (-)	4 (6.26)	11 (73.3)	2 (13.3)	4 (26.6)	9 (60)
Iron (mg)	- (-)	2 (13.3)	13 (86.6)	6 (40)	5 (33.3)	4 (26.6)
Vitamins:						
Retinol (ug)	8 (53.3)	4 (6.26)	3 (20)	7 (46.6)	5 (33.3)	3 (20)
Thiamin (mg)	5 (33.3)	6 (40)	4 (26.6)	5 (33.3)	5 (33.3)	5 (33.3)
Riboflavin (mg)	2 (13.3)	10 (66.6)	3 (20)	2 (13.3)	10 (66.6)	3 (20)
Niacin (mg)	4 (26.6)	2 (13.3)	9 (60)	4 (26.6)	2 (13.3)	9 (60)
Ascorbic acid (mg)	- (-)	4 (26.6)	11 (73.3)	2 (13.3)	4 (26.6)	9 (60)

* Less than normal RDA. ** Normal value . *** More than RDA

Table (7) Mean value of blood and urine analysis of selected chemical composition for renal stone patients.

Parameter	Urine					Blood				
	Normal value	Patient				Normal value	Patient			
		Male		Female			male		Female	
		Mean	%	Mean	%		mean	%	Mean	%
Acid value	4.6 - 8	6.12	76.5	6.3	78.75	--	--	--	--	--
Calcium (Ca)	30 - 250 (mg)	312.5	125	287.5	115	8.5–10.5 mg/dl	12.86	122.4	11.45	109.0
Phosphorus (P)	700 - 1500 (mg)	1846.15	123	1984.61	132.3	2.5–4.8 mg/dl	4.45	92.8	5.5	114.6
Sodium (Na)	110 - 360 (mEq)	336.72	935	321.2	89.2	135 – 145 (mEq)	127.59	88.2	147.64	101.8
Potassium (K)	20 - 100 (mEq)	106.6	106.6	93.02	93.02	3.5–5.2 (mEq)	5.72	110	5.74	110.4
Creatinine	800 - 1800 (mg)	2035.38	113	1606.15	89.2	0.6 – 1.6 mg/dl	1.61	100.6	1.51	94.6
Uric acid	500 - 700 (mg)	512.16	73.1	526.26	75.1	2.5–5.0 mg/dl	4.21	84.2	3.07	61.4

Table (8) Distribution of patients according to laboratory analysis for blood and urine in comparison to normal values

Parameters		Urine		Blood	
		Male %	Female %	Male %	Female %
Calcium	Lower than normal value	- (-)	- (-)	2 (13.3)	- (-)
	Higher than normal value	2 (13.3)	3 (20)	4 (26.6)	7 (46.6)
Phosphorus	Lower than normal value	- (-)	1 (6.6)	1 (6.6)	- (-)
	Higher than normal value	7 (46.6)	6 (40)	4 (26.6)	11 (73.3)
Sodium	Lower than normal value	- (-)	6 (40)	1 (6.6)	- (-)
	Higher than normal value	2 (13.3)	6 (40)	3 (20)	9 (60)
Potassium	Lower than normal value	- (-)	1 (6.6)	- (-)	- (-)
	Higher than normal value	5 (33.3)	9 (60)	5 (33.3)	9 (60)
Creatinine	Lower than normal value	- (-)	- (-)	- (-)	- (-)
	Higher than normal value	11 (73.3)	9 (60)	4 (26.6)	9 (60)
Uric acid	Lower than normal value	2 (13.3)	2 (13.3)	2 (13.3)	- (-)
	Higher than normal value	4 (26.6)	4 (26.6)	4 (26.6)	- (-)

Table (9) Correlation between nutrients and urinary analysis for renal stone patients

Nutrients	Daily intake (mg)		Urine analysis	
	Male	Female	Male	Female
Calcium	525.71	574.50	- 0.49 *	- 0.58 *
Sodium	756.87	535.92	+ 0.45 *	+ 0.37 (NS)
Potassium	1729.12	1422.62	0.0770 (NS)	0.0778 (NS)

* = significant NS = not significant
Level of significant at 0.05

Increase urinary calcium excretion may be due to the large consumption of animal protein as indicated by several investigators who reported that diet rich in protein increases urinary calcium excretion [4,30]. In addition, severe calcium restriction is dangerous and may promote osteoporosis in the renal stone patient [4]. Other results reported that a diet enriched with protein causes changes in urinary composition and an increase in urinary calcium [1]. Vegetarian with an alkaline urine excretes less urinary calcium than meat-eaters, who have an acid urine [24]. Values of urinary phosphorus excretion represented 123.0 % and 132.3 % of normal values for male and female, respectively. Among patient 46.6 % and 40 % of male and female respectively had higher values than normal. On the other hand serum phosphorus execration was above normal value for female 114.6 % but lower than normal value for male 92.8 %. Among male and female patients 26.6 % and 73.3 % respectively had higher values than normal.

Moreover, increasing sodium intake as observed in the present study was indicated by other investigators and found to increase significantly urinary calcium excretion in some individuals (sodium sensitive) [26].

The data of the present study revealed that mean value of urinary sodium were 336.72 and 321.2 mEq for male and female respectively. These values represented 93.5 % and 29.2 % of normal values for male and female respectively. On the other hand mean values for serum sodium were 127.95 (mEq)and 147.64 (mEq) for male and female patients, respectively. Table (8) showed that 13.3 % and 40 % of male and female, respectively had higher values for urinary sodium. While 20 % and 60 % of male and female showed to have higher values for serum sodium. Results of table (5) showed that most patients (male/female) their dietary sodium intakes were exceeded the recommended value. Continues higher dietary intake of sodium may lead to higher blood pressure. Patients should be encouraged to increase their consumption of water. Increasing sodium intake

within the range of usual dietary intake is associated with increased urinary Ca loss. It is not known to what extent sodium-induced calciuria is compensated for by increased absorption of dietary ca^{2+} or to what extent this ca^{2+} is derived from resorption of bone [25].

Increasing Na intake from 80 to 180 m mol /d. significantly increases urinary Ca^{2+} excretion in some individuals (Na sensitive)[26].

Acidifying agents, dietary sodium, protein and caffeine raise calcium excretion. Variations in salt intake explain much of the day-to-day fluctuation in urinary calcium. One teaspoonful of salt (100 mmol NaCl) raises urinary calcium by 40mg calcium/day, even on a low calcium intake [24].

The present results showed that value of urinary potassium was above the normal value and represented 106.6 % for male and 93.02 for female. Value of serum potassium represented 110.0% and 110.4% of normal value for male and female patients, respectively. On the other hand mean value of urinary creatinine excretion for male represented 113.0 % while the value for female patient represented 89.2 % of normal value. Blood creatinine was lower than normal value in female 94.6 % but was 100.6 % in male patients. Values for urinary uric acid execration represented 73.1 % and 75.1 % of normal values for male and female respectively. Blood uric acid was lower than normal value for male 84.2% and female 61.4%. Longitudinal study of Aging failed to show a relationship between high protein intake and impairment of creatinine clearance [24].

Correlation coefficient between nutrients and urinary analysis for renal stone patients is presented in table (9).This table showed that there was non significant correlation between daily intake of potassium and urine excretion for male and female patients. However there was significant positive correlation's between daily sodium intake and urine excretion for male, but negative correlation was found among female. On the other hand, the correlation among calcium intake and urine excretion in male and female was negatively significant.

The results of the present study indicate the important role of diet in the pathogenesis of various forms of nephrolithiasis and the effectiveness of dietary therapy in the management of renal stone patients.

This evidence supports a primary role for modification of diet, particularly dietary protein, calcium, sodium and phosphorus intake in the prevention of recurrent nephrolithiasis. Nutrition educational program should be directed to educate patients about the relationship between dietary intake and kidney stone formation.

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دراسة تأثير النمط الغذائي ونوعية الأطعمة المستهلكة على عينة مختارة من مرضى الحصوات الكلوية

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يهدف هذا البحث إلى دراسة تأثير النمط الغذائي والعادات الغذائية على تكوين الحصوات كذلك استخدام الطرق وذلك عن طريق استخدام الطرق الغذائية (استرجاع ٢٤ ساعة لمدة ثلاثة أيام) و(التاريخ الغذائي) البيوكيميائية عن طريق تقدير الكالسيوم والفسفور والبوتاسيوم والصوديوم والكرياتينين وحمض البوليك في كل من البول والدم. وقد أجرى هذا البحث على عينة عشوائية من مرضى الحصوات الكلوية(١٥ من الإناث و١٥ من الذكور) يتراوح أعمارهم بين ٢٠ – ٥٠ سنة.

وقد أسفرت النتائج عن زيادة المأخوذ من البروتين والفسفور والصوديوم بين الإناث والذكور عن التوصيات الغذائية بينما المأخوذ من الكالسيوم والبوتاسيوم كان أقل من احتياجهم. أما عن التحاليل المعملية فقد كانت نتائج تحاليل الدم أعلى من المعدل الطبيعي بالنسبة للبوتاسيوم والكالسيوم في الذكور والإناث ، والفسفور والصوديوم ، بالنسبة للإناث ، والكرياتينين بالنسبة للذكور. أما نتائج تحاليل حمض البوليك في كلاً من الإناث والذكور ونتائج تحاليل الصوديوم بين الذكور والكرياتينين في الإناث كان متوسط نتائج التحاليل أقل من المعدل الطبيعي ، أما عن متوسط نتائج تحاليل البول فكانت كالآتي الفسفور والكالسيوم بالنسبة لكل المرضى ، والبوتاسيوم والكرياتينين بالنسبة للذكور فقط تمثل معدل أعلى من المعدل الطبيعي ولكن نتائج تحاليل الصوديوم و حمض البوليك في كلاً من الإناث والذكور ، والبوتاسيوم والكرياتينين في الإناث تشمل معدل أقل من المعدل الطبيعي.

وقد أوضحت الدراسة ضرورة الاهتمام بالعلاج الغذائي للتحكم في تكوين الحصوات الكلوية ، وخاصة المتناول من البروتين والكالسيوم والصوديوم والفوسفور .

وقد أوصت الدراسة بعمل برامج تعليم غذائي للمرضى بالحصوات الكلوية وكذلك غير المرضى لتعليمهم كيفية عمل وجبات متوازنة وكذلك العلاقة بين نوعية الطعام وتكوين الحصوات الكلوية.