

## Fluid Consumption and Nutritional Habits among Egyptian Kidney Stone Patients

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### Abstract:

**Background** The effective ways of treatment are based on recognition of risk factors. fluids consumptions and nutritional habits are considered one of several factors that affect on kidney stone formation and its recurrence. The study **aims** to assess the nutritional habits and fluids consumption among kidney stone patients.

**Methods** Descriptive research design was conducted for 150 adult who had kidney stone. The participants were recruited from one of the big teaching hospitals in Cairo. Food Nutritional Questionnaire (FFQ) was used alongside a socio-demographic /medical data sheet to collect the data.

**Results:** The study finding revealed that nutritional habits was as follows: (58.0%) of the studied patients were eating three meals per day, (91.3%) of studied patients were usually taking coffined drinks between meals, (74.7%)of the studied patients were preferring foods with very salty taste, (50.0%) were utilizing vegetables oils. Assessment of foods categories explicit that (59.3%) of the studied patients were consuming more than 100g/day from animal protein sources, while (36.7%) of the studied patients were eating plant protein source, (85.3%) consuming less vegetables and fruits, (79.3%) were taking fruits less than 200g/day, and all of the studied patients were consuming salts more than 6gm/d from 1-3 times /day. Regarding to fluids consumption (74.7%) of the studied patients were drinking water less than 1500ml/day, As regard coffined drinks, (70.0%) of the studied patients were taking caffeine drinks more than 400ml.About (86.7%), of the studied patients were consuming soft drinks intake less than 100ml/day.

**Conclusion:** it be concluded that increase in consumption of animal protein, unhealthy fat, and salty foods. A decrease in ingestion of vegetables and fruits, and calcium rich product might be the most important risk factors for the development and formation of kidney stone .In addition to, a decreasing in water intake, increase caffeine intake could be another risk factors .Therefore, assessment of nutritional habits and fluid consumption are the cornerstone to prevent kidney stone formation.

**Recommendation:** develop and implement nutritional health teaching program for Egyptian kidney stone patients to prevent its recurrence.

**Key words:** Fluid, nutritional habits, kidney stone

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### I. Introduction

Kidney stone is the presence of renal calculi caused by a disruption in the balance between solubility and precipitation of salts in the urinary tract and in the kidneys. Kidney stones develop when urine becomes “supersaturated” with insoluble compounds containing calcium, oxalate (CaOx), and phosphate (CaPh), resulting from dehydration or a genetic predisposition to over-excrete these ions in the urine [1].

Nutritional habits have a great influence on the concentration of excreted salts, either promote or inhibit the stone formation [2].Nutritional oxalate may be important in stone development; spinach, beets and rhubarb in particular, contain large amounts of oxalate and they may increase urinary oxalate excretion and predispose to the development of calcium oxalate stones. High dose vitamin C therapy can also lead to increased oxalate generation as vitamin C (ascorbic acid) is metabolized. Oxalate re-absorption in the colon is reduced by the formation of in-soluble calcium oxalate [3, 4]. A diet rich in animal protein, because of its high purine content, which produces uric acid in its catabolism, may increase the risk of uric acid stone formation [5,6,7]. At a urinary pH of less than 5.5, uric acid is poorly soluble, but solubility increases at a pH greater than 6.5.[8,9], cystine stones urinary tract infection and obstruction are common, as is stone recurrence every 1-4 years.

Kidney stones also commonly have been found in those that drink less than the recommended fluids especially water intake per day. Drinking two liters of water per day is a simple way to reduce urinary risk factors for kidney stone in healthy subjects. A low water intake with a subsequent low volume of urine

production produces high concentrations of solutes in the urine, causing super saturation and crystallization of stone-forming compounds [10].

Not all fluids may be equally beneficial for reducing the risk of kidney stones. Coffined drinks such as Coffee and tea can add to person's total fluid intake and have been shown that they act as a diuretic that it leads to production of more dilute urine and decreasing the risk of kidney stone formation [11]. On other hand a study done by [12] noted that a higher intake of caffeine drinks, causing the body to lose fluids too quickly and the urine to become too concentrated, causing super saturation and crystallization of stone-forming compounds.

Soft drinks have been found to be associated with kidney stones. Some studies suggested that non cola drinks (such as spirite) are mostly containing citric acid in contrast dark colored colas (such as Coca cola, pepsi) are mostly containing phosphoric acid. Phosphoric acid in cola drinks can reduce the amount of citrate in urine, which is necessary to prevent stone formation [13]. Other studies found that Cola intake did not increase stone risk such as a study done by [14] stated that Cola drinks didn't contribute to stone formation.

Nurses have a crucial role in assessment, and management to prevent recurrence of stones. Nursing care plan should explicit fluids composition and nutritional management, keeping in mind the specific risks involved for each type of stones. Recognition of these risk factors and development of long-term management strategies for dealing with them are the most effective ways to prevent recurrence of kidney stones [15].

Therefore this study was conducted to assess the nutritional habits and fluids consumption among kidney stone patients.

### **1.1 Significance of the study:**

Kidney stone is an increasing urological disorder of human health, affecting about 12% of the world population. [16]In Meta-analysis study indicated that history of kidney stones is significantly associated with increase the risk of chronic kidney disease (CKD) if the effective preventive and therapeutic measures wasn't taken [17].

Recent studies have reported that the prevalence of urolithiasis has been increasing in the past decades in both developed and developing countries. This growing trend is believed to be associated with changes in lifestyle modifications such as lack of physical activity and nutritional habits [18, 19].

Assessment of nutritional habits and fluids are considered as the backbone for useful knowledge about the nutritional risk factors of occurrence and recurrence of kidney stone disease to obtain favorable patient outcomes. Despite its significance, little studies were done in Egypt in the field of diet and kidney stone risk. Hopefully, this study could provide new evidence based used to support for best practice guidelines to enhance the quality of nursing care and provide efficient patient education.

## **II. Material and Methods**

### **2-1 Aim of the study**

This study aims to assess the nutritional habits and fluids consumption among kidney stone patients. To fulfill this aim two research question were formulated; 1-what is the nutritional habits among kidney stone patients?; 2- what is the fluids intake among kidney stone patients?

### **2.2 Study Design**

A descriptive research design was conducted.

### **2.3 Setting**

This study was carried out only at the urology department affiliated to El- Kasr El-Ainy hospital. This hospital is a one of large teaching hospital in Egypt.

### **2.4 Sample**

A purposeful sample of 150 adult male and female patients diagnosed with kidney stone was participated in current study. Patient who had medical conditions that acts as precipitating factors for kidney stone formation such as hyperparathyroidism, and diabetes were not participating in the current study.

### **2.5 Data collection tools**

Three tools were utilized to gather data pertinent to the study as follows: 1. Structured Interview Questionnaire, it contains demographic data and medical data such as recurrence rate, and body mass index. 2. Dietray Habits Questionnaire; It provide us with information about how many meals taken/snakes per day, methods of cooking for different types of foods, and3.Food Frequency questionnaire was structured in light of Food Composition Table as reference book affiliated to national Institute in Cairo. It contains all main food categories such protein sources, grains and legumes, fats, vitamins, and fluids. Each category consists of a list of

common food and drinks in Egypt. Each food category was quantified according to its measure unit. Daily food and drinks was calculated by summation of total mean amount for utilization of different categories.

**2.6 Procedure for data collection**

Once official permission was granted to proceed with the study, the investigator performed interview with concerned patients after explaining the nature and purpose of the study at urology department, each participant who are willing to participate in the study was asked to sign the consent form. If he/she can't read and write; one of his or her relatives signs the consent. Then the investigator started to collect demographic and medical related data using (tool I), subsequently the investigator assessed the participant nutritional habits using (tool II) and Food Frequency Questionnaire using (tool III). During the visit, any clarification or question was answered by investigator. Time spent with each individual participant was 40-50 minute.

**III. Results**

**3.1 Part I: Demographic and Medical Related Data (Table 1- 2).**

**Table (1)** Frequency and percentage distribution of demographic data among the studied patients (n=150).

Variables	N	%
<b>Age</b>		
20- <40	29	19.3
40-50	73	48.7
51-60	48	32.0
<b>X±SD 46.83± 8.39</b>		
<b>Sex</b>		
Male	107	71.3
Female	43	28.7
<b>Education</b>		
Can't read and write	96	64.0
-Primary education	24	16.0
Secondary education	19	12.7
- University education	11	7.3
<b>Occupation</b>		
Working	114	76.0
Not working	36	24.0
<b>Type of work(n=114)</b>		
Office works	9	7.9
Manual works	28	24.6
Physical works	77	67.5
<b>Residence</b>		
Rural	83	55.3
Urban	67	44.7

Table (1) showed that 71.3% of the studied subject were males and (28.7%) were female their mean age was (46.83± 8.39), and 48.7% of them their age ranged between 40-50 years. As regard to educational level 64.0% of the studied patients can't read and write but (7.3%) graduated from university. About 76.0% were practicing physical jobs while, 7.9 % of them had office work. (55.3%) of the studied patients were living in rural areas, while (44.7%) were living in the urban areas.

**Table (2):** Frequency and percentage distribution of medical data among the studied patients (n=150).

Variables	N	%
<b>BMI</b>		
-Normal weight(18.5-24.9)	36	24.0
-Over weight(25-29.9)	85	56.7
-Obesity (≥ 30)	29	19.3
<b>X±SD 27.49 ± 3.12</b>		
<b>Recurrence rate of kidney stone</b>		
-No recurrence	80	53.3
-Once	42	28.0
-Twice	28	18.7
<b>Type of kidney stone (n=50)</b>		
-Calcium oxalate	37	74.0
-Uric acid	13	26.0

Table (2) revealed that, (56.7%) of the studied patients were overweight and (19.3%) were obese, their mean BMI was (27.49 ± 3.12). Concerning recurrence rate of kidney stone, (53.3%) of the studied patients had kidney stone for once, but (18.7%) had recurrence of kidney stone for twice. The table

also showed that, only (33.3%) of the studied patients analyzed their stones, (74.0%) had calcium oxalate stone and (26.0%) had uric acid stone.

**Table (3):** Frequency and percentage distribution of nutritional habits (N = 150)

Variables	N	%
<b>Meals number during the day</b>		
- One meal	3	2.0
- Two meals	60	40.0
- Three meals	87	58.0
<b>Main meal</b>		
-Lunch	141	94.0
-Dinner	9	6.0
<b>Snakes that usually taken between meals</b>		
-Soft drinks(Cola, non cola)	13	8.7
-Coffined drinks(tea, coffee)	137	91.3
<b>Preferring foods with very salty taste</b>		
-Yes	112	74.7
-No	38	25.3
<b>Choosing foods with free or low sodium</b>		
-No	150	100.0
<b>Frozen or canned foods routinely to eat</b>		
-No	65	43.3
-Sometimes	73	48.7
- Rarely	12	8.0
<b>Kind of fat often used for cooking</b>		
-Butter	34	22.7
-Vegetables oils (corn, soy, sunflower)	75	50.0
-Margarines	41	27.3
<b>Visible fats of meat</b>		
-Eating most of them	22	14.7
-Eating some of them	68	45.3
-weren't eating fats of meat	60	40.0

Table (3) showed that, (58.0%) of the studied patients were eating three meals per day, while only (2.0%) were eating one meal per day; a main meal among (94.0%) of studied patients was lunch. Relating to snakes, (91.3%) of studied patients was usually taking confined drinks between meals, but only (8.7%) were usually consuming soft drinks between meals. Additionally, (74.7%) of the studied patients were preferring foods with very salty taste, however (25.3%) weren't preferring foods with very salty taste, and all of the studied patients weren't choosing foods with free or low sodium, (48.7%) of the studied patients were sometimes eating frozen or canned foods, but (8.0%) were rarely eating frozen or canned foods. As regard kind of fat used for cooking, (50.0%) were utilizing vegetables oils and (22.7%) were using butter. The table also appeared that, (45.3%) of the studied patients were eating some fats of meat; however (14.7%) were eating most fats of meat.

**Table (4):** Frequency and percentage distribution of food categories intake among the studied patients (n=150).

Variables	N	%	average food frequency/day
<b>Animal protein sources (Purine-rich foods)</b>			
-Low (<50 g/day)	16	10.7	0 time/day*
-Moderate (50-100g/day)	45	30.0	
-High (>100 g/day)	89	59.3	
<b>Plant protein sources(legumes)</b>			
-Low (<50 g/day)	48	32.0	1-2 times/day
-Moderate (50-100 g/day)	47	31.3	
-High (>100 g/day)	55	36.7	
<b>Food rich calcium</b>			
-Low (< 200g/day)	148	98.7	0-1time/day
-Moderate (200-400g/day)	2	1.3	
-High (>400 g/day)	0	0.0	
<b>Vegetables</b>			
-Low (< 200g/day)	128	85.3	0-1time/day
-Moderate (200-400g/day)	22	14.7	
-High (>400 g/day)	0	0.0	

<b>Fruits</b> -Low (<200g/day) -Moderate (200-400g/day) -High (>400 g/day)	119 31 0	79.3 20.7 0.0	0 time/day*
<b>Cereals, Grain Products</b> -Low (<120 g/day) -Moderate (120-180 g/day) -High (>180 g/day)	0 17 133	0.0 11.3 88.7	2-3 times /day
<b>Salts intake</b> -Low (<5g/day) -Moderate (5-6g/day) -High (> 6 g/day)	0.0 0.0 150	0.0 0.0 100	1-3 times/day

\*0 time per day means (not consumed daily)

Table (4) revealed that, (59.3%) of the studied patients were consuming more than 100g/day from animal protein sources, but only (10.7%) were consuming less than 50g/day, (36.7%) of the studied patients were eating plant protein sources more than 100 g/day, while (31.3%) were eating 50-100g/d of plant protein from 1-2 times/day. Regarding food rich calcium, (98.7%) of the studied patients were consuming less than 200g/d. Concerning vegetables and fruits consumption, (85.3%) of the studied patients were eating vegetables less than 200 g/d from 0-1 time/day, (79.3%) were taking fruits less than 200g/day, but only (20.7%) were taking from 200-400g/day of fruits. In addition to refined cereals intake, (88.7%) of the studied patients were consuming more than 180g/d from 2-3 times per day. The table also, stated that all of the studied patients were consuming salts more than 6gm/d from 1-3 times /day, see figure (1).

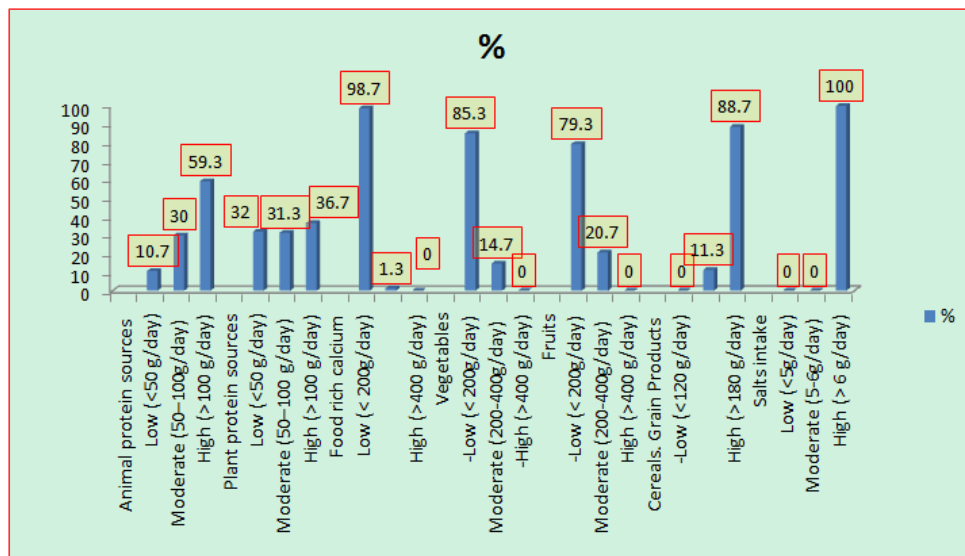


Figure (1). Frequency and percentage distribution of food categories intake among the studied patients

Table (5): Frequency and percentage distribution of fluid categories intake among the studied patients (n=150).

Variables	N	%	average food frequency/day
<b>Water intake</b> -low(<1500ml/day) - Moderate (1500-2000ml/day) - High (>2000ml/day)	112 38 0	74.7 25.3 0.0	1-4times /day
<b>Coffined drinks (tea and coffee)</b> - Low (<200ml/day) -Moderate (200-400ml/day) -High (>400ml/day)	16 29 105	10.7 19.3 70.0	1-8times /day
<b>Soft drinks (cola &amp; non cola drinks)</b> -Low (<100ml/day) -Moderate (100-200ml/day) -High (>200ml/day)	130 17 3	86.7 11.3 2.0	0-1 time/day
<b>fruit Juices (canned and fresh)</b> -Low (<50ml/day) -Moderate (50-100ml/day) -High (>100ml/day)	136 14 0	90.7 9.3 0.0	0 time/day*

\*0 time per day means (not consumed daily).

Table (5) showed that, (74.7%) of the studied patients were drinking water less than 1500ml/d, while only (25.3%) were consuming around 1500-2000ml/d of water from 1-4 times per day. As regard coffined drinks, (70.0%) of the studied patients were taking caffeine drinks more than 400ml/d, but only (10.7%) were taking less than 200ml/day from 1-8 times/day. Relating to soft drinks intake, (86.7%) of the studied patients were consuming less than 100ml/d, while only (2.0%) were consuming more than 200ml/day from 0-1 time/day. Additionally, (90.7%) of the studied patients were consuming fruit juices less than 50ml/day, while (9.3%) were taking fruit juices from 50-100ml/day, see figure (2).

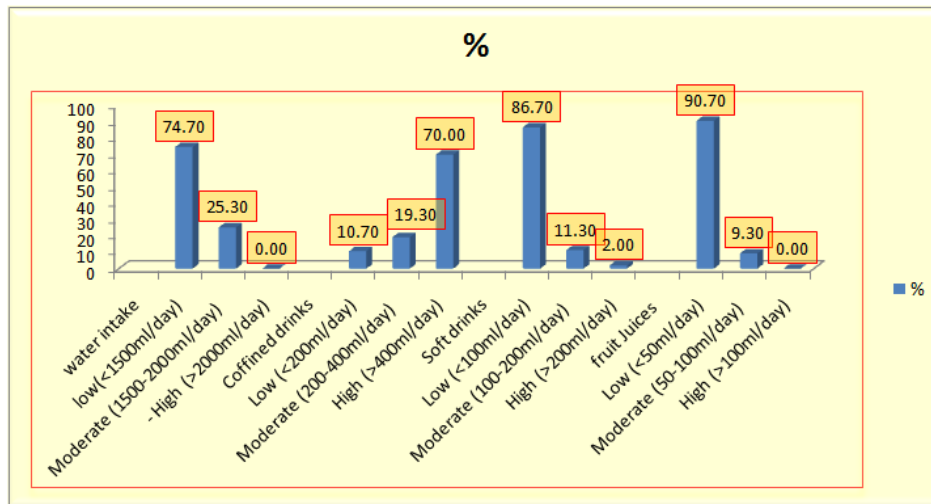


Figure (2). Frequency and percentage distribution of fluid categories intake among the studied patients

#### IV. Discussion

This study aims to assess the nutritional habits and fluids consumption among kidney stone patients. To fulfill this aim two research question were formulated; 1-what is the nutritional habits among kidney stone patients?, 2- what is the fluids intake among kidney stone patients?

The study's findings are discussed in three sections: (1) Sample characteristics and medical data (2) nutritional habits will be displayed through nutritional habits questionnaire and (b) food frequency questionnaire and 3) fluids consumptions.

##### Part 1-Sample characteristics and medical data.

Concerning to age finding, this study was supported by a study of [20] who assess the epidemiology of reno-ureteral stone disease in Koreans, they reported that the total number of upper urinary tract stone was the highest in middle-aged patients at ages between 40–49 years. The present study illustrated that more than two thirds of the studied patients were male. In consistent with a study conducted by [21] who assess update on nephrolithiasis, they noted that kidney stone is formed in men more than women with 2:1 ratio.

Concerning patients' education, the study showed that the majority of the studied patients couldn't read and write. This study supported by a study demonstrated by [22] who examine urolithiasis prevalence and related factors in a rural area of Manipur they found that more than half of their study subjects were illiterate. On other hand, a study done [23] who assess epidemiologic study of urolithiasis in Turkey, they observed that the prevalence of urolithiasis was more among literate patients who graduated from primary school.

The existing study also displayed that more than two thirds of the studied patients were working; from them the majority had physical work as, farmer, porter and builder. From the researcher's point of view, physical work may be good for health but if the work in hot weather without drinking enough water this might lead to loss of water through sweating and less urine production which might allow for stone-causing minerals to settle and bound in the kidney to form stone.

This study coincided with [24] who studied the interrelationship of obesity, diet, physical activity, and kidney stones; he noted that intense activity is associated with stones risk. Also a study investigated by [25] who evaluate the association between occupational heat stress and kidney disease, they noted that occupation involving work in a hot environment without drinking enough amount fluids are associated with risk of kidney disease due to dehydration that result from excessive sweating.

The flowing study found that more than half of the studied patients were living in rural area. It may be argued that the university hospital where the place of data collection is an economical and has multiple specialists that serve people in Cairo and rural areas. This study supported by a study conducted [23] who assess epidemiologic study of urolithiasis in Turkey, they observed that the majority of studied patients lived in rural areas and also noted that socio-economical status was not significantly related to kidney stone.

Relating to the study findings about medical related data, the flowing study declared that, more than half of studied patients were overweight with mean BMI ( $27.49 \pm 3.12$ ), this might be due to high intake of high calories foods. This result matched with a study done by [26] they found that the majority of studied patients with lithiasis were overweight. The present study also displayed that nearly one third of studied patients had repetition of kidney stone once and nearly one fifth of studied patients had repetition of kidney stone twice. This might be due to lack of awareness about prevention measures of kidney stone disease. These rationale are in harmony with a review study demonstrated by Khan, et al, (2017) who study kidney stones; they noted that inappropriate protective management as well as special drugs interventions besides to instruction for a lifestyle modification and nutritional habits are most important factors for escalating repetition rate of kidney stone[27].

In the same line a study done by [28] they evaluate stone composition observed that more than half of studied patients had calcium oxalate stones. Moreover a meta-analysis study conducted by [29] entitled, "metabolic syndrome and nephrolithiasis", they found that calcium stones are the most frequent components of kidney stones, accounting for nearly eighty percentages of all the removed and/or excreted stone each year. In congruent this study finding reported that majority from who analyzed their stones had calcium oxalate stone.

### **Part 11 a-Nutritional habits**

The results of present study revealed that more than half of studied patients were eating three meals per day. From researcher's point of view, eating three meals each day might be optimal for controlling appetite and for gaining energy but type and amount of food intake on each meal might be affecting on weight gain and kidney stone incidence. In accordance to a study demonstrated by [30] who assess meal frequency and timing, they noted that meals size and frequency had impact on health and disease.

Concerning snakes, the existing study presented that more than two thirds of studied patients were usually taking caffeine drinks (coffee and tea) as a snakes between meals. This is expected to be due to caffeine drinks especially black tea is considered popular drinks in Egypt. According to a study conducted by [31] who evaluate the hydration in kidney stone disease, he concluded that caffeine drinks like tea and coffee have diuretic effects, causing frequent urination, result in dehydration if not drink plenty of water to maintain adequate hydration to prevent kidney stone formation.

The existing study also illustrated that more than two thirds of the studied patients were preferring foods with very salty taste; this might to unhealthier habit as reported by patients. This finding consistent with [32] that assesses reducing salt intake in the Americas, they noted that excessive nutritional salt intake and no consumption of salt substitutes are a major cause of kidney disease in many countries.

The present study revealed that all studied patients weren't choosing foods with sodium free or low, this might be due to majority of studied patients couldn't read and write or due to lack of awareness. In accordance to a study demonstrated by [33] who assess restricting nutritional sodium and potassium intake, he concluded that patients with kidney stone need to read foods label to identify free or low sodium varieties of foods to control their sodium intake. Moreover a study done by [34] who evaluate Canadian urological association guideline on the evaluation and medical management of the kidney stone patient, they noted that decrease daily sodium intake and foods high sodium have contributed to lower kidney stones incidence.

The present study also showed that nearly half of studied patients were sometimes eating Frozen or canned foods. This change in eating habits promotes kidney stone formation. According to National Institute of Diabetes and Digestive and Kidney Diseases at United States of America [35] reported that frozen or canned foods have large amounts of sodium that increase the risk of kidney stone.

The current study also revealed that half of studied patients were using vegetable soil for cooking. In accordance to a study done by [36] who studied medical and nutritional therapy for kidney stone prevention, they noted that vegetables oils and animal fats contain n-6 fatty acid. The n-6 Fatty acids have been implicated in stone formation because it increases calcium absorption in the gut, decreases re-absorption in the renal tubules causes' hypercalciuria and subsequent development of calcium stone.

The existing study revealed that the majority of the studied patients were eating some fats of meat. From researcher's point of view, eating fats of meats might be increased the calorie intake and contributed for weight gain that was considered risk factor for kidney stone. These results confirmed by a study done by [37] who evaluate lifestyle recommendations to reduce the risk of kidney stones, they reported that a high fat diet correlate with increased urinary oxalate excretion, lower urinary pH and increased uric acid production resulting in increased rate of kidney stone disease.



### **Part III: Food Frequency Questionnaire Assessment**

The present study revealed that, more than half of studied patients were consuming animal protein sources (included: meats, poultry, fish) more than one hundred gram per day. This study supported by a study done [38] who assess diet and risk of kidney stones in the Oxford cohort of the European, they assumed that the majority of studied patients who consumed more than one hundred gram per day of meats were high risk for kidney stone formation compared with those who consuming less than fifty gram per day of meats. Moreover, a study done by [39] about nutritional recommendations and treatment of patients with recurrent idiopathic calcium stone disease, he noted that decreased animal protein sources intake (meat, poultry and fish) to forty gram per day had a reduction of excretion of calcium, oxalate, uric acid and increased excretion of citrate resulted in decrease the risk of stone disease.

The existing study also declared that, more than one third of the studied patients were eating more than one hundred gram per day of plant protein sources (involved: lentils, white navy beans, fullmedamus, Bisara, falafel) from one to two times per day. Most of the plant protein sources that consumed came from falafel and fullmedamus. On other hand a study done by [40] who evaluate DASH-style diet associates with reduced risk for kidney stones, they found that plant protein that derived from legumes is associated with a marked decrease the risk of kidney stones incidence. Also a study conducted by [41] who examine potential renal acid load and the risk of renal stone formation, they observed that high intake of plant protein foods were associated with decrease the renal acid load and risk for kidney stone formation among the studied patients.

Concerning food rich calcium (contained: milk, yogurt, whipped cream, fermented milk and cheese), the current study declared that nearly all studied patients were consuming less than two hundred gram per day of food rich calcium from (0-1 time /day). This could be due to the studied patients who were farmers were preferring to sell the milk or it products to earn money than using them and others studied patients were preferring to spend their money on high calories foods and animal protein foods such as meat and chicken as reported by patients.

In accordance to a study done by [42] who studied optimum nutrition for kidney stone disease, they noted that taking three to four servings of foods rich calcium per day help to prevent idiopathic calcium oxalate stone onset and recurrence. Moreover, a study investigated by [43] who assess the impact of nutritional factors on incident kidney stone formation, they observed that increased nutritional calcium intake was associated with a five to twenty eight percentage decreased the risk of kidney stones formation.

Relating vegetables intake, included green leafy vegetables, green beans, potatoes, sweet potatoes, squash, okra, spinach, the flowing study showed that, more than two thirds of the studied patients were eating vegetables less than two hundred per day from (0-1time/day). This study consistent with a study done by [38] who assess diet and risk of kidney stones in the Oxford cohort of the European, they assumed that majority of studied patients were low intake of vegetables less than 200g per day. In contrast a case-control study conducted by [44] who assess nutritional factors and risk of kidney stone in Southern China, they reported that consuming leafy vegetables more than three times per day was positively associated with stones among the studied patients.

Relating to fruits consumption (involved: apple, banana, citrus fruits, grapes, Apricots, peaches, mulberry, strawberries, melons, pears, cantaloupe, dates, and mango), the current study found that more two thirds of the studied patients were taking fruits less than two hundred gram per day. This study coincided with a study demonstrated by [45] who assess nutritional intake of fiber, fruit and vegetables decreases the risk of incident kidney stones in women, they found that the greatest proportion of women with stones were low intake of fruits less than two times per day. From the researcher's point of view, low intake of vegetables and fruits might be resulting from the replacement of traditional plant based diets that are rich in fruit and vegetables with diets rich in calories and protein. This could be referring to change of nutritional habits that might lead to increased incidence and recurrence rate of kidney stone among the studied patients.

The current study also revealed that, nearly all studied patients were eating refined cereals (included: bread, rice, pasta, kosharie) more than one hundred and eighty gram per day from two to three times per day. According to a study demonstrated by [44] who evaluate nutritional factors and risk of kidney in Southern China, they observed that excessive consumption of grains more than one time per day was associated with obesity and kidney stones formation among the studied patients. Also a study done by [46] about treatment and prevention of kidney stones, they noted that high consumption of grains increases the risk of calcium oxalate stone.

Regarding salts based foods intake, included table salt, pickles, salted fish, and traditional aged cheese (mesh) which contain high salt. The current study found that all of the studied patients were consuming salts above six gram daily from one to three times. Most of the salt consumed came from table salt and pickles. This finding coincided with, a study done by [47] who evaluate salts and nephrolithiasis, they assumed that excess salts intake above six gram daily are associated with a higher risk for hypercalciuria, result in idiopathic nephrolithiasis onset or recurrence.

Moreover, a study [43] about impact of nutritional factors on incident kidney stone, they reported that nutritional sodium intake was associated with an eleven to sixty one percentage increase in the risk of kidney stones adjusted with the majority of studied patients with higher sodium intake. Also a study of [17] for assessment the prevalence and risk factors of kidney stone, they noted that the daily consumption of salt according to the World Health Organization should not exceed five grams or one teaspoon helps to reduce recurrent calcium nephrolithiasis.

### **3) Fluid consumption**

Regarding fluids intake, the present study revealed that, more than two third of studied patients were drinking water less than one and half liter per day (from one to four times/day). This findings supported by meta-analysis of [48] about Self-Fluid management in prevention of kidney stones, they found that intake above two liters of water per day reduced the risk of first kidney stone occurrence by at least eight percentage compared to one and half liter daily intake, and the highest category (three liters daily) showed a twenty six percentage reduction of kidney stone risk compared to the reference category (one and half liter).

Relating Caffeine intake, which is present in both in coffee and tea, the current study revealed that more than two third of studied patients were taking coffined drinks more than four hundred ml per day from one to eight times per day which might be associated with risk of kidney stone. This study supported by a study demonstrated by [18] about prevalence and risk factors of kidney stone, they noted that the majority of studied patients were consuming more than two cups per day of coffee and tea. On other hand a study done [11] who assess Soda and other beverages and the risk of kidney stones, they found that studied patients who consumed one or more glass of coffee or tea per day was associated with decrease the risk of stone formation.

Concerning soft drinks (cola & non cola drinks), the current study also revealed that more than two third of studied patients were low intake of soft drinks less than one hundred ml per day. While a study investigated by [49] who evaluate medical management to prevent recurrent nephrolithiasis in adults, they observed that soft-drink consumption greater than one hundred and sixty ml per day was associated with increased risk for kidney stone among studied patients.

The flowing study illustrated that majority of studied patients were consuming juices (fresh or canned) less than fifty ml per day. According to a study done by [50] they found that the greater consumption of juices more than two hundred ml per day was associated with a seventy percentage decreased risk of kidney stone among studied patients. Moreover a study done by [51] who assess nutritional therapy for patients with hypocitraturic nephrolithiasis, they noted that fruit juices that containing high citrate (canned or homemade) help to increase urine volume and urinary citrate level, result in decrease in stone onset and recurrence.

## **V. Conclusion**

It can be concluded that increase in consumption of animal protein, unhealthy fat , and salty foods. A decrease in ingestion of vegetables and fruits ,and calcium rich product might be the most important risk factors for the development and formation of kidney stone .In addition to , a decreasing in water intake, increase caffeine intake could be another risk factors therefore ,assessments of nutritional habits and fluids consumption are the first step and most important helpful method in reducing incidence and recurrence of kidney stone disease.

## **VI. Recommendation**

In the light of the findings of the present study, the following are recommended:

1. Conduction of the study on a large sample elected from diverse geographical district in Egypt is suggested to gain more general result
2. Ascertain an efficient educational program for nutritional therapy to instruct patients with kidney stones.
3. Nurses should instruct patients with kidney stones about prevention measures of stone disease.
4. Reduce intake of high salts foods such as pickles, old cheese and salted fish to prevent kidney stone formation.

5. Maintaining low intake of high purine foods (meats, poultry and fish) to prevent kidney stone incidence.
6. Choosing fresh vegetables and fruits for healthier snacks.
7. Drinking high quantity of water more than two liters daily might be helpful to prevent lowering the incidence of kidney stones formation.
8. reduce drinking of all caffeine form like coffee, and tea.

## VII. Limitation

Kidney stone analysis was not available for all patients that lead to lack of information.

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