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Original Article

Assessment of Risk Factors for Formulation of Kidney Stone among Adult Males

1Enas El-Sayed Hammed, 2Mona Emad Eldien Hussein & Samar Elhoseiny Abdelraouf

1BSc, Faculty of Nursing, Zagazig University, ,2Lecturer of Community Health Nursing, 3Professor of Community Health Nursing, Faculty of Nursing, Mansoura University, Egypt

1.ABSTRACT

Kidney stone disease (KSD) is a worldwide disease leading to more than one million emergency department visits each year. The current study aimed to assess risk factors for formulation of kidney stone among adult males, through a case-control study which was conducted at outpatient clinics of nephrology, urology and general medicine in Nephrology and Urology, Mit-Ghamer Hospital, affiliated to Ministry of Health and Population on a convenience sample of 158 case, and 158 control. The researcher developed a structured interview to assess on socio-demographic characteristics, health status, and life style of case and control groups. Results illustrated that, case group had significant higher number of relatives with KSD (63.3%, n=100) than those in control group (17.1%, n= 27) with $\chi 2 = 70.15$, P= 0.000, urinary tract infection, recurrent pelvic, and renal inflammations, and insertion of urinary catheter, were higher in case group then in control group (X^2=55.71, 81.99, 78.50, and 47.16, respectively and p =0.00), as well 74.1% (117) of case group was obese, compared to only 44.3%(70) of control group. We can conclude that: health status factors as well, life style factors can contribute to be risk factors of kidney stones formulation in adult males including; dietary habits and inadequate water drinking. Finally the researcher has recommended reusing awareness of public about risk factors of kidney stones, and carrying out further researches on larger sample to investigate risk factors of kidney stones among Egyptian's males.

***Key Wards**:* Adult Male, Kidney Stone, Risk Factors

2.Introduction:

Kidney stone disease (KSD) is a worldwide disease leading to more than one million emergency department visits each year. Although kidney stones can be treated with a high stone-free rate, recurrence is another issue. Better understanding of the risk factors for kidney stone formation is needed urgently (Lee et al., 2021). Recent epidemiological data demonstrates that the prevalence and incidence rates of KSD have increased considerably in nearly all countries (Wang et al., 2021).

KSD is the consequence of multiple causative agents and risk factors. Geographic, climatic, and seasonal factors play a major role as causative agents on urinary tract calculi. Many studies have revealed that kidney stone is a complex procedure closely related to personal habits, quality and quantity of drinking water, diet diversity and familial inheritance (Shrivastavaet et al., 2016).

As well, risk factors have not a direct cause of the disease, many studies prove that there is no exact cause of urinary calculi; urolithiasis is the consequence of multiple causative agents and risk factors. Geographic, climatic, and seasonal factors play a major role as causative agents on urinary tract calculi (Khalili et al., 2021). KSD can cause serious complications, pain, hematuria, infection, decreased kidney function, and even kidney failure (Sun et al., 2021).

Community health nurse has an important role in prevention and management of renal stone. As the recurrence rate of stones formation are very high and there is strong association of diet and lifestyle with stones formation so, nurses should educate patients about diet modification and stop bad health habits. Nurse explain to patients the common risk factors that cause the stones formation as family history, recurrent urinary tract infection, decrease fluid intake, hyperparathyroidism, ulcerative colitis and soon (American Urological Association, 2014).

Accordingly, community health nurse advises patients to make stone analysis, when a stones are available, increase fluid intake, decrease the sodium in diet, decrease animal protein, as well, nurses should counsel patients with calcium oxalate stones, and relatively high urinary oxalate to limit intake of oxalate-rich foods, and maintain normal calcium consumption, and the importance of follow up to decrease the recurrence rate of stones formation (American Urological Association, 2014).

Aim if the Study

The current study was conducted to assess risk factors for formulation of kidney stone among adult males in Nephrology and Urology Mit Ghamer Hospital.

3.Method

Study design

A case control design was used to conduct this study.

Setting

This study was conducted at outpatient clinics of nephrology, urology and general medicine in Nephrology and Urology Meet Ghamr Hospital, affiliated to Ministry of Health and Population.

The hospital capacity was 184 hemodialysis patients and 16 beds for urology surgery. The hospital provides other services, such as laparoscopy.

Sample size and sampling technique

Calculating sample size for studying the risk factors of kidney stones, through DSS research.com sample size calculator software, at 5% ∞ error (95.0% significance) and 20.0% β error (80.0% power of the study), assuming the incidence of kidney stones was ranging from 2.5% to 9.0% (Romero et al., 2010). The calculated sample size was 158 patients in each group (totally 316 patients).

Convenient sampling technique was used to select 158 patients from outpatient clinics of nephrology and urology (cases) and 158 patients from outpatient clinics of general medicine (control) in Nephrology and Urology Meet Ghamr Hospital to be included in the study.

Tools of data collection

Based on Kimber, (2006-2007) and McHorney et al. (1994), the researcher developed a structured interview to assess the following: First part: socio demographic and economic characteristics such as: age, marital status, residence, education level, occupation, and monthly income. Second part: health status which divided into: family history, past and present history, physical assessment which included abdominal and pelvic ultrasound and laboratory investigations which included complete urine analysis, and kidney function analysis. Third part: life style covered the following three items: dietary habits, fluid intake, and physical activity and rest.

Phases of the study

- **Administrative process.** Faculty of Nursing, Mansoura University issued an official letter to the Director of Nephrology and Urology Meet Ghamer Hospital, affiliated to Ministry of Health and Population to permit for the researcher to carry out the study.
- **Literature review.** The researcher reviewed national and international literatures on the various aspects of risk factors of kidney stone formulation among adult males using scientific published articles, internet search, and textbooks. This review was a guide for developing the study tools.
- **Face and contents validity of the study tools.** Five experts in the field of community health nursing and one expert in the field of statistics tested validity of the study tools, the researcher made their recommended modifications.
- **A pilot study.** A pilot study was conducted on 10% of the study sample (15 patients) from nephrology, urology and general medicine outpatient clinics and excluded from the main studied sample to evaluate the clarity, applicability, validity, and reliability of the study tools and estimated the approximate time required for data collection. Accordingly, the researcher did the necessary modification.
- **Data collection**

- Duration of data collection was approximately two months, from Augustus to October 2018.
- The researcher visited Nephrology and Urology outpatient clinics six days a week from Saturday to Thursday from 9:00 AM to 2:00 PM.
- A structured interview was used to assess patients' socio-demographic and economic characteristics, health status, and life style. Each patient was interviewed for about 25-35 minutes.

- **Ethical considerations.** The researcher obtained an approval from the Research Ethics Committee, Faculty of Nursing, Mansoura University. An informed consent was obtained from the participants. The researcher introduced herself and a simple explanation about aim of the study was given to them. The researcher assured to participants that their participation in the study was voluntary and that collected data treated confidentially, and only used for the purpose of the study. Participants were informed that they had the

right to withdraw at any time from the study without giving any reason.

Statistical analysis. Data were analyzed by SPSS (Stand for Statistical Product and Service Solutions) version16. The statistic tests that used in the current study were; Mean, Standard Deviation, Qui Square, and p value, which significance at <0.05.

4.Results

Table (1) shows patients' aged 40 to less than 50 years represented 50.0% of case group, and 54.4% of control group. In relation to marital status, 85.4% of case group and 77.8% of control group were married. Rural residence reported among 62.7% of case group, and 40.5% of control group. Both 37.3% of case group and 40.5% of control group had secondary education. Concerning to occupation 34.8%, and 27.2% of case, and control groups were traders respectively. Finally 86.7% of case group, and 65.8% of control group had not enough monthly income.

Table (2) illustrates statistical significant differences between case and control groups in relation to family members had kidney stones, and kin relationship. In addition to there was positive correlation between family's health history, and kidney stones since (odd ratios) OR 8.365, 5.53, 1.26, 10.11, and 3.88 respectively

There were statistically significant differences between case and control groups in relation to previous health problems, and incretion of urinary catheter as p values ranged between 0.000, and 0.003. In addition to there was positive correlation between incretion of urinary catheter, and kidney stones since OR 6.49, and 9.10 respectively (Table 3).

Table (4) describes the formulation of kidney stones in cases group since 2-3 weeks represented 42.4% of them.

Table (5) demonstrates that, obesity represented 74.1% of cases group, while 53.8% of control group. There was statistically significant difference between both groups p 0.000.

In relation to site of stones 50.5% of case group had them in right kidney, with size of <5 mm in 38.8% of case group, while 55%, and 42% of case group had only one kidney stone, which type was urat respectively (Table 6).

Table (7) reveals that, there were statistically significant differences between case and control groups in relation to reported dietary and smoking habits such as having; three meals a day regularly, and home meal at breakfast, and dinner, and takeaway meals, preferring sweets, especially chocolate, having high-protein diets, removing the skin from the chicken and fat from red meat, avoid high-fat foods, and having; legumes a lot, high salt foods, too spicy food, citrus fruits a lot, pickles frequently, tomatoes a lot, green vegetables such as spinach frequently, and dairy products such as cheese Turkish cheese, finally smoke cigarettes.

Table (8) demonstrates statistically significant differences between case and control groups in relation to reported amount of drinking water, soda water, milk, tea, coffee citrus juice (orange).

There were statistically significant differences between case and control groups in relation to rest period a day, and its duration, sleeping more than seven hours a night, and bed-lieutenant (Table 9).

Table 1 *Socio-demographic characteristics for studied groups (Cases = Controls = 158)*

Items	Cases		Controls	
	No	%	No	%
Age (years)				
40-	79	50.0	86	54.4
50-60	79	50.0	72	45.6
Mean ± SD	49.83 ± 6.47		48.44 ± 5.97	
Marital status				
Married	135	85.4	123	77.8
Single	12	7.6	17	10.8
Divorced	8	5.1	12	7.6
Widow	3	1.9	6	3.8
Residence				
Rural	99	62.7	64	40.5
Urban	59	37.3	94	59.5
Education				
Not read and write	54	34.2	18	11.4
Read and write	23	14.6	9	5.7
Primary	5	3.2	6	3.8
Preparatory	13	8.2	28	17.7

Secondary	59	37.3	64	40.5
University	4	2.5	30	19.0
Occupation				
Trader	55	34.8	43	27.2
Employee	48	30.4	34	21.5
Craftsman*	28	17.7	38	24.1
Manual work	18	11.4	26	16.5
Not working	9	5.7	17	10.8
Monthly Income				
Not enough	137	86.7	104	65.8
Enough	21	13.3	39	24.7
Enough and save	0	0.0	15	9.5

*Carpenter, blacksmith, car mechanic, or construction worker

Table 2*Family health history for case and control groups- (Cases = Controls = 158)*

Items	Cases		Controls		P value	OR C I 95%
	No	%	No	%		
Family members had kidney stones	100	63.3	27	17.1	0.00	8.36 (4.94 -14.15)
Kin relationship						
Brothers	36	22.8	8	5.1		5.53 (1.36 -13.44)
Father	16	16	13	8.2		1.26 (0.79 -1.58)
Mother	8	5.1	6	3.8		0.74 (22 – 2.42)
Others*	40	25.3	0	0.0		

*Sister, grandmother, grandfather, uncle, ant, son, or daughter

Table 3*Past health history among case and control groups (Cases = Controls = 158)*

Items	Cases		Controls		P value	OR C I 95%
	No	%	No	%		
Previous health problems						
Urinary tract infection	104	65.8	38	24.1	0.000	0.21(0.1-074)
Recurrent pelvic inflammation	91	57.6	15	9.5	0.000	
Recurrent renal inflammation	83	52.5	11	7.0	0.000	
Hypertension	79	50.0	80	50.6	0.910	
Others*	34	21.5	20	12.7	0.036	
Insertion of urinary catheter						
Once	41	25.9	10	6.3		
More than one	23	14.6	4	2.5	0.000	6.49(2.95-14.59)
Often	3	1.9	0	0.0		9.10(2.86-32.18)
Never	91	57.6	144	91.1		

*Ureteric obstruction, renal cyst, diabetes mellitus (DM), osteoporosis, osteoarthritis, gout hyperthyroidism, bilhraziasis

**Peptic ulcer, esophageal varices

***Cedophage, insulin mixtard, dimicron

Table 4 *History of formulation of kidney stones among cases group (n=158)*

Time of formulation of kidney stones	No	%
< One week	47	29.8
2-3 weeks	67	42.4
One month to < 1 year	37	23.4
1-2 years	7	4.4

Table 5*Body mass index for case and control groups (Cases = Controls = 158)*

Items		Cases		Controls		Chi-Square
		No	%	No	%	
Obese	BMI ≥ 30	117	74.1	70	44.3	χ^2=33.646,
Over weight	25.0 - < 30.0	35	22.2	85	53.8	P 0.000
Normal weight	18.5 - <25.0	6	3.8	3	1.9	

Table 6*Results of ultrasound for case group (n=158)*

Items	No	%
Site of stones		
Right kidney	121	50.5
Left kidney	93	38.7
Both	26	10.8
***Size of stones**		
<5 mm	93	38.8
5m – 1cm	89	37.1
>1cm	58	24.1
Number of stones		
One	87	55
Two	60	38
Three	11	7
Type of stones		
Urat	103	42.9
Calcium oxalate	68	28.4
Calcium phosphate	62	25.8
Others**	7	2.9

*Struvite, cysteine

**More than one choice

Table 7*Dietary and smoking habits among case and control groups (Cases = Controls = 158)*

Items	Cases		Controls		T. test	
	Mean	± SD	Mean	± SD	T	p-value
Having three meals a day regularly	3.22	±0.71	2.86	±0.78	4.257	0.000
Having home meal at breakfast	3.17	±0.53	3.32	±0.65	2.171	0.031
Having home meal at lunch	3.11	±0.55	3.21	±0.85	1.248	0.213
Having home meal at dinner	3.12	±0.57	3.44	±0.74	4.219	0.000
Having takeaway meals	2.41	±0.81	2.13	±0.75	3.145	0.002
Preferring sweets, especially chocolate	2.05	±0.78	1.79	±0.82	2.878	0.004
Having food while watching TV	2.04	±0.78	2.03	±0.85	0.137	0.891
Calculate daily calories intake	1.56	±0.85	1.58	±0.91	0.190	0.849
Having high-protein diets	2.94	±0.42	2.65	±0.82	3.846	0.000
Removing skin of chicken and fat from meat	2.87	±0.47	2.64	±0.88	2.945	0.003
Avoid high-fat foods	2.89	±0.40	2.57	±0.80	4.410	0.000
Having legumes a lot	2.90	±0.41	2.74	±0.70	2.427	0.016
Having high salt foods	2.91	±0.45	2.34	±0.82	7.574	0.000
Having too spicy food	2.89	±0.51	3.32	±0.65	9.248	0.000
Having citrus fruits a lot	2.84	±0.55	2.34	±0.80	6.425	0.000
Having pickles frequently	2.96	±0.55	2.12	±0.79	10.99	0.000
Having ready-made potatoes a lot	2.50	±0.87	2.37	±0.81	1.263	0.207
Having tomatoes a lot	2.84	±0.55	2.27	±0.64	8.390	0.000
Having green vegetables such as spinach frequently	2.91	±0.49	2.23	±0.73	9.736	0.000
Having dairy products such as cheese	2.90	±0.56	1.98	±0.70	12.79	0.000
Smoking	3.16	±1.25	1.85	±1.23	9.366	0.000

Table 8*Amount of drinking fluid a day among studied groups (Cases = Controls = 158)*

Items	Cases		Controls		P value
	No	%	No	%	
Cups of water					
More than 8	58	36.7	98	62.0	0.000
7:8	57	36.1	25	15.8	
5: 6	29	18.4	29	18.4	
3:4	14	8.9	6	3.8	
Cups of soda water					

With each meal	50	31.6	8	5.1	0.000
Sometimes	23	14.6	32	20.3	
Cups of milk					
Sometimes	61	38.6	56	41.8	0.000
Cup only morning	40	25.3	28	17.7	
Cups of tea					
Continuously	90	57.0	9	5.7	0.000
Cup with meals	24	15.2	37	23.4	
Cups of coffee					
Sometimes	44	27.8	43	27.2	0.000
only morning	36	22.8	6	3.8	
Cups of citrus juice (orange)					
Sometimes	35	22.2	74	46.8	0.000
Rarely	9	5.7	37	23.4	

Table 9*Physical activities, rest and sleep; patterns among studied groups (Cases = Controls = 158)*

Items	Cases		Controls		P value
	No	%	No	%	
Type of physical activity					
Walking	146	92.4	149	94.3	0.498
Running	5	3.2	2	1.3	0.252
Other*	7	4.4	7	4.4	0.214
Rest period a day					
After Asr	121	76.6	90	57.0	0.000
Afternoon	26	16.5	39	24.7	
Other**	11	6.9	29	18.3	
Rest duration a day					
One hour	74	46.8	60	38.0	0.000
Two hours	60	38.0	51	32.3	
Half an hour	22	13.9	20	12.7	
Three hours	2	1.3	6	3.8	
≥3 hours	0	0.0	21	13.3	
Sleeping ≥7 hours a night	2.87± 0.44		2.49± 0.71		t. test 5.67, P 0.000
Bed-lieutenant	2.51± 0.85		1.55± 0.80		t. test10.36, P 0.000

*Yoga, wrestling, body building, gym exercises

**Did not sleep during a day, at morning

5.Discussion

KSD is a worldwide disease leading to more than one million emergency department visits each year. Although kidney stones can be treated with a high stone-free rate, recurrence is another issue. Better understanding of the risk factors for kidney stone formation is needed urgently (Lee et al., 2021). Recent epidemiological data demonstrates that the prevalence and incidence rates of KSD have increased considerably in nearly all countries (Wang et al., 2021).

Unfortunately, recurrence of KSD is common, with an estimated five year recurrence rate of up to 30–50%. Several studies demonstrated that the recurrence rate of urinary calculi in cured patients increased annually after the initial stone event. These suggest that calculi formation, as a lifelong disease, should not only be treated but also prevented. Kidney stones can cause serious complications, pain, hematuria, infection, decreased kidney function, and even kidney failure (Sun et al., 2021). The current study was conducted to assess risk factors for formulation of kidney stone among adult males in Nephrology and Urology Mit Ghamer Hospital.

Family health history for case and control groups. In relation to family members have kidney stones, there are statistically significant differences between case and control groups, as almost two thirds of case group's family members have kidney stones, while almost one fifth of control group's family members have kidney stones. These results agree with Sayer (2017), study in UK, established the familial nature and significant heritability of stone disease is known, and recent genetic studies have successfully identified genes that may be involved in renal stone formation. In addition, Baatiah et al. (2020) conducted a study in, KSA, showed that, the odds for kidney stone occurrence doubled among participants who had a father with KS (OR = 2, 95% CI: 1.4–2.9).

Concerning with kin relationship with relatives, there are significant differences between case and control groups, as case group has higher incidence of a relative (brothers, father, mother, and others) with KS than the incidence of KS among control group's relatives. These came agree with Baatiah et al. (2020), in Saudi Arabia, which reported that 50% of diagnosed participants had a direct relative previously diagnosed with KS. Furthermore, Aldaher et al. (2021), in UAE, reported that, a family history of kidney stones

increased the risk of developing stones by 2.27 times.

As well Safdar et al. (2021), in KSA, observed that, 35.9% of the cases (n = 23) had a positive family history of kidney stones among first degree relatives (parents, siblings), and 21.9% (n = 14) could had a positive family history as well. In opposite side, Ryu et al. (2018), in Korea, found no significant differences in positive family history (p=0.377) between patient and control groups.

Past health history among cases and control groups. There is statistically significant difference between case and control groups in relation to previous health problems (Urinary tract infection, recurrent pelvic inflammation, and recurrent renal inflammation. Xie et al. (2020) explained the potential mechanism that bacteria contribute to calcium-based stone, the vast majority of kidney stones, remains obscure. In opposite, a study conducted by, Diangienda et al. (2021), in Congo found that, majority of patients with stones had no comorbidities of urinary tract infection.

The present study results revel significant difference between cases, and control groups in terms of chronic medical problems such as DM. It is well established that insulin resistance, as the central feature of DM, can cause decreased urine alkalinity by deranging ammoniagenesis and increasing sodium and bicarbonate reabsorption. DM also results in a lower level of urine citrate, which further caused hypercalciuria due to decrease citrate binding (Spatola et al., 2018). Lin et al. (2020) support the current result as they found a significant association of DM with the risk of nephrolithiasis. Also, Baatiah et al. (2020), in KSA, found an increased prevalence of KS among diabetic patients; the proportion of KS was 27.2% (33/121) in patients with diabetes. Diabetic individuals were 3.2 times more likely to have KS when compared to nondiabetic individuals (OR = 3.2, 95% CI: 2.1–4.9).

Current study indicates that, case group has a significant higher Body Mass Index (BMI) than control group, as almost three quarters of case group has BMI > 30, while slightly more than half of control group has BMI > 30. Several underlying mechanisms explaining the association between obesity and kidney stones have been proposed. Higher BMI is correlated with an increase in urine uric acid and sodium and a decrease in alkalinity and urine citrate, which might facilitate stone formation. In addition, inflammation and oxidative stress closely associated with obesity may also play a role in kidney stones (Poore et al., 2020). The current results come in agreement with Kelly et al. (2019), in UK, reported that individuals who are considered obese were more at risk of developing kidney stones, and in particular increased levels of visceral adiposity had been associated with uric acid nephrolithiasis.

As well, Baatiah et al. (2020), in, KSA, found that, individuals with a higher BMI also had a higher likelihood of renal stone formation, with urolithiasis diagnosed among 19.3% of morbidly obese participants, 14% of obese participants, 11.9% of overweight participants, 9.1% of normal weight. Study of Almannie et al. (2020), in KSA, found an association between stones formation and BMI, as the researchers reported that most patients were overweight. The incidence of calcium oxalate and uric acid stones was higher in patients with a BMI above thirty than in patients with a lower BMI. However, cystine stones were more common in normal-weight patients.

Furthermore, Yuan and Larsson, (2021), in Sweden, assessed causal association of obesity with kidney stones. They found that the risk of kidney stones increased by 21% per additional 5 kg/m2 increase in BMI. In disagreement with these results Ryu et al., (2018), in Korea, found no significant differences in BMI (24.7±3.6 vs. 23.0±2.5 kg/m2, p=0.065) between the patient group and the control group.

Results of dietary and smoking habits among case and control groups. The present results show statistical significant difference between case and control groups in relation to dietary habits, which come in agreement with Somashekara and Urooj (2015), who reported that, dietary factors have been implicated in the occurrence of KS disease most important being high protein, calcium, sugar, dietary fiber and oxalate intake. The mean protein intake of the subjects was found to be adequate; calcium intake was higher while the energy was low.

As well, Lewis, (2017) reported that, high dietary intake of animal protein, sodium, sugars including honey, refined sugars, fructose, and high fructose corn syrup, and excessive consumption of fruit juices may increase the risk of kidney stone formation due to increased uric acid excretion and elevated urinary oxalate levels (whereas tea, coffee, wine and beer may decrease the risk). Also, Narain and Hedayatullah, (2021) found that, non-veg food intake is associated with a higher risk of stone formation.

Also, Rodrigues et al. (2020), in Brazil, found that, SK group presented a significantly higher intake of protein, fiber, and NaCl and lower

intake of lipids and calcium, especially of animal origin. They revealed lower intake of fruits, low-fat dairy items, and sweets/added sugar servings but higher intake of vegetables and nuts/seeds/legumes when compared to non-SK.

In the same line, Barghouthy et al. (2021), in UK, reported that, the reduction of carbohydrate in the diet, and counterbalancing protein rich diets with sufficient intake of fruits and vegetables, seem to play a protective role against KSD formation. Maintaining sufficient calcium intake in vegan and vegetarian diets is important.

In opposite to these results, Soueidan et al. (2015) found no significant differences were observed between participants with and without KS in diet habits. Additionally, Ryu et al. (2018), in Korea, found no significant differences between the two groups in terms of intake of various foods, including meats, beans, sugars, vegetables, fruits, seaweeds, cereals, oils and fats, and milk.

The current results illustrate significant difference between case and control groups regarding smoking habits, since smoking cigarettes among case group has significantly higher average than the control group. This can be related to the increase in vasopressin levels, a strong antidiuretic, which can lead to poor urinary flow and a low urine output, which was further associated with greater risk of KSD. Smoking decreases the level of urinary calcium excretion, which was proven a risk factor of KSD. Smoking also causes the release of reactive oxygen species and resultant oxidative stress on the kidneys (Sulaiman, et al., 2020).

These results come in agreement with Khalili et al. (2021), in Iran, found that, higher prevalence of current smoking among KS group (41.4%) than those among non-KS (26.3%). Also, Jones et al. (2021) found a significant association between smoking and renal stone formation. In contrast, Marić et al. (2019), in Croatia, investigated the effect of smoking on KSD, their results showed no positive correlation between them

Amount of drinking fluid a day among cases and control groups. In relation to quantity of water has consumed, there are significant differences between case, and control groups regarding number of water cups has consumed, as almost two thirds of control group drinks > 8 cups of water, whereas only more than one third of case group drinks > 8 cups of water.

In agreement with these results Alelign and Petros, (2018), in Ethiopia, found that, decreased fluids intake contributes to the development of kidney stones. As well as Littlejohns et al. (2020), in UK, found that, fluid intake was one of the most important factors, being associated with lower incidence of nephrolithiasis: for each 200 mL of fluids consumed per day, a 13% reduction in the risk of stone formation was found. Moreover, Icer et al. (2019), in Brazil, found that, daily total water consumption in KS group was lower than that of healthy individuals.

Also, Khalid, (2020), in Pakistan, found that, 35% patients were drinking six to eight glasses of water, 42% patient were drinking less than six glasses of water and only 23% patients were drinking more than eight glasses of water before kidney stone. As well, Kargarsharifabad et al. (2021), in Iran, reported that, an increase in the consumption of water and fluids to above 2500 mL daily played a significant role in preventing stone formation by reducing the saturation of stone constituents.

In disagreement with these results Esnaasharan et al. (2020), in Iran, and Adeel et al. (2021), in Pakistan, found that, no association between the volume of total fluid intake, and risk of kidney stones. However, according to Jafari et al. (2019), wrong time of drinking water, such as during or immediately before, and after meals, may disturb food digestion, and increase ghaliz humor; therefore, liquid consumption should be limited to 20 minutes before and two hours after meals.

In relation to soda water consuming, results show significant differences between case and control groups as almost one third of case group drinks soda water with each meal, compared with only eight in control group do this. This may be explained as soda water contains an average of 150 calories per 350 mL and are frequently fructose-added. Fructose may increase the excretion of calcium, oxalate, and uric acid, being associated with a higher risk of kidney stone disease. These come in agreement with Ferraro et al. (2020), in Italy, showed higher risk for incident kidney stones for the consumption of one or more soda drinks per day compared with less than one per week. In contrast, Adeel et al. (2021), in Pkistan, unable to find significant associations between intakes of carbonated drinks and kidney stones.

The current results demonstrate more than half of case group continuously drinks tea, compared with only eight in control group do this. These results in the same line with, Chen et al. (2021), and Wu et al. (2017), in China, found that, tea consumption showed a significant positive relationship with kidney stone disease. In addition to, Haghighatdoost et al. (2021), in Iran, found that,

consuming at least four glasses of tea per day was associated with more than twofold rise in the risk of calcium oxalate kidney stone.

On the opposite side, Barghouthy et al. (2021), in Iran, found that, tea exerts many protective effects against stone formation, through the accompanying water intake, the action of caffeine and the effects of components with antioxidant properties. Ass well, Siener and Hesse, (2021), in Germany, found, no significantly increased risk for kidney stone formation could be derived from the ingestion of black tea in normal subjects.

Regarding results of citrus fruit juices, almost half of control group has drinking citrus fruit juices compared with less than one quarter in case group. In the same line Ferraro et al. (2020), in Italy, demonstrated that, drinking 1.2 L of orange juice or 2 L of lemon juice per day increases urinary citrate excretion and reduces kidney stones recurrence rate in both normal subjects and hypocitraturic stone formers. Also, Barghouthy et al. (2021), in France, reported that, orange juice plays a protective role against stone formation as long as it was not sweetened by artificial sugars. In addition to Chen et al. (2021), in China, found that, vegetables (lettuce, radish, potatoes, tomatoes, and bamboo shoots), fruit, and fish alleviated the risk of kidney stone disease.

The current results show statistically significant difference between case, and control groups in terms of their physical activities. These come in consistent with results of Zhuo et al. (2019), in China, reported a reduction risk of stone formation associated with physical activity. They reported a statistically significant protective role of exercise, and this was independent of intensity of activity, caloric intake, and body mass index.

In contrast, Marić et al. (2019), in Croatia, reported no effect of physical activity on KSD risk. Moreover, Aune et al. (2018), in Norway, found no significant association between physical activity and kidney stones but there was association with moderate levels of physical activity showing an inverse association.

The current study indicates statistical significant difference between case, and control groups according to their resting and sleeping habits as; more than three quarters of case group is more frequently to take a rest during “after Asr” time comparing to more than half of control group. In contrast to the present findings Soueidan et al. (2015) reported that, both KS and non-KS participants had similar habits of sitting time in minutes per day (min/day) (with and without transportation time included). To the best of the researcher's knowledge no research addressed the sleeping and resting habits as risk factors of kidney stone formation among adult men, which add more value and importance to the current study.

6.Conclusions

According to the results of the present study, the researcher has concluded that: health status factors that act as risk factors of kidney stone formulation in adult males including; family history of kidney stones, previous health problems such as urinary tract infection, recurrent pelvic inflammation, recurrent renal inflammation, incretion of urinary catheter, and obesity or overweight. Furthermore, life style factors that contribute to be risk factors of kidney stone formulation in adult males including; dietary habits as: high protein, rich carbohydrates and fats meals, and sufficient intake of fruits and vegetables, finally important point of inadequate water drinking.

7.Recommendations

- Reuse awareness of public about risk factors of kidney stones.

Carry out further researches on larger sample to investigate risk factors of kidney stones among Egyptian's males

8. References

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