

## Pattern of Prior Related Behavior, Self-Efficacy and Health Promoting Behavior among Kidney Stone Adult Patients

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**Abstract:Background:** Kidney stone disease is a common problem worldwide manifested with recurrent intermittent pain episodes, surgical interventions and medication consumption which affects the quality of life of the patients. Therefore, it is important to understand kidney stone patients' behaviors and the factors which influence this behavior through Pender's health promotion model. **Aim:** This study was conducted to assess pattern of prior related behavior, benefits, barriers, self-efficacy of behavior modification and health promoting behavior to reduce kidney stone recurrence among adult patients. **Design:** Descriptive comparative design was utilized. **Setting:** This study was conducted at urology outpatient clinics at university hospital and educational Shebin El-Kom hospital at Menoufia Governorate, Egypt. **Sample:** A purposive sample of 140 adult patients with kidney stones divided into two groups (university hospital group and educational Shebin El-Kom hospital group). **Tools:** 1. Structured interview questionnaire which included sociodemographic data, past and present history. 2. Perception of kidney stone patients' behavior, Likert scale based on Pender's model. **Results:** The majority of both groups reported always not drinking enough water daily, drinking more tea or coffee daily, adding more salt to the meal, eating lots of high oxalates food and eating more red meat with no significant difference between both groups. About half of both groups reported agree response regarding the perceived benefits of behavior modification to reduce kidney stone recurrence with no significant difference between both groups. Moreover, the majority of both groups reported agree response regarding the perceived barriers of behavior modification with no significant difference between both groups. Additionally, the majority of both groups reported either no confidence or moderate confidence response regarding self-efficacy of behavior modification with no significant difference between both groups. Also, the majority of both groups reported never response regarding compliance with health promoting behavior with no significant difference between both groups. **Conclusion:** There was no significant difference between university hospital group and educational Shebin El-Kom hospital group regarding prior related behavior, perceived benefits, perceived barriers, perceived self-efficacy of behavior modification and health promotion behavior to reduce kidney stone recurrence. **Recommendations:** The need for developing the nursing discharge plan instructions about behavior modification to prevent risk of kidney stone recurrence among adult patients.

**Key words:** Prior related behavior, Self-efficacy, Health promoting behavior, Kidney stone

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### I. Introduction

Kidney stones are hard pebbles that form inside your kidneys when tiny mineral crystals in your urine stick together. Kidney stones can range in size and shape. They can be as small as a grain of sand or as large as a golf ball, although stones that big are rare[1]. Kidney stone disease, also known as urolithiasis, is when a solid piece of material (kidney stone) occurs in the urinary tract. Kidney stones typically form in the kidney and leave the body in the urine stream. A small stone may pass without causing symptoms. If a stone grows to more than 5 millimeters (0.2 in) it can cause blockage of the ureter resulting in severe pain in the lower back or abdomen. A stone may also result in blood in the urine, vomiting, or painful urination. About half of people will have another stone within ten years[2].

Urolithiasis refers to stones forming anywhere in the urinary system, including the kidneys and bladder. Nephrolithiasis refers to the existence of such stones in the kidneys. Calyceal calculi are aggregations in either the minor or major calyx, parts of the kidney that transport urine into the ureter (the tube connecting the kidneys to the urinary bladder). The condition is called ureterolithiasis when a calculus is situated in the ureter. Stones may also form or pass into the bladder, a condition referred to as bladder stones [3]. Kidney stone disease

is considered a third most common disorder of the urinary system. It has been known for thousands years but in recent years the incidence of kidney stone has been increased [4]. Dramatic changes in dietary habits are one of the major causes of an increased incidence of nephrolithiasis in recent years. Kidney stone forms when the urine becomes supersaturated with specific crystals such as calcium, oxalate, uric acid, or cysteine [5].

Pender's health promotion model (HPM) is one of the widely used models to plan for and change unhealthy behaviors and promote health. Different studies have highlighted the efficiency of this model to control unhealthy behaviors [6]. The HPM is based on social cognitive theory according to which cognitive-perceptual factors (perceived benefits, barriers, and self-efficacy) influence engagement in health-promoting behaviors. Modifying factors (demographic characteristics, interpersonal influences, and behavioral factors) are considered to interact with each other to influence cognitive perceptual processes [7]. The Pender's HPM consists of variables that comprise the main part of the interventions. These components provide a rich source of interventional content and strategies[8].

Pender stated "perceived competence or self-efficacy to execute a given behavior increases the likelihood of commitment to action and actual performance of the behavior". Perceived self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave. Self-efficacy is based on the person's judgment about themselves in managing self-care activities to achieve the desirable result [9]. In addition, behavioral outcomes are affected by a number of factors, including personal characteristic and behavioral cognition. Each individual has a different background, perceived self-efficacy, perceived barriers and perceived benefits, such that the behavioral outcomes cannot be easily predicted. Empirical evidence shows that perceived self-efficacy and perceived benefits of action are predictive of healthy diets [10]. This model is reported to be effective in improving the compliance to treatment for chronic diseases. The concepts of this model are used to develop and maintain healthy lifestyles. In the health promotion model, the concept of perceived benefits signifies the individual's beliefs in the benefits of the recommended protective behaviors, and the concept of perceived barriers signifies an individual's perception towards the factors that are effective in failure to perform a certain action [11].

Perceived benefits and barriers are strong determinants of healthy lifestyle behaviors. Lacking knowledge regarding kidney stone disease have large impact on perceived barriers by patient in behavior modification. Along with educating them regarding kidney stone disease, it is important to identify all barriers at individualize level because motivating patients with kidney stones to maintain behavior for recommended diet, first requires an understanding of the factors influencing this behavior and approach should be tailored for individual patient [12]. Nurses can use the perceived benefits and perceived barriers terms of the health promotion model within the care programs in order to facilitate and support the changes that need to be made in the lifestyle of kidney stone patients [13]. Practicing health-promoting behaviors is one of the best approaches to maintain health. Health-promoting behaviors include activities that enable people to monitor their health and are useful to improve individual and community health [14].

### **1.1. Significance of the study**

Globally, kidney stone is one of the oldest disorders of human and one of the major health burdens. Large number of peoples is affected with this disorder all over the world. Urolithiasis affects about 12% of the world population at some stage in their lifetime. It affects all ages, sexes, and races but occurs more frequently in men than in women within the age of 20–49 years [15]. The relapsing rate of secondary stone formations is estimated to be 10–23% per year, 50% in 5–10 years, and 75% in 20 years of the patient. In Middle East, high incidence rate is reported 20-25% due to hot climate with increased chances of dehydration [16]. In Egypt, according to the WHO data, kidney disease deaths reached 15,820 (3.41%) of total deaths. The age adjusted death rate is 26.63 per 100,000 of population. Egypt is ranked the 12<sup>th</sup> country in the world had a high death rate of kidney diseases[17].

The consequence of the increase in the prevalence of stone disease, the cost associated with diagnosis, treatment and follow-up of individuals with stones has risen accordingly and affects the working-age population due to lost workdays [18]. Also, nephrolithiasis has been associated with an increased risk of chronic kidney diseases, end-stage renal failure, cardiovascular diseases, diabetes, and hypertension. Consequently, prophylactic management is important to manage urolithiasis[19]. Therefore the aim of the present study was to assess pattern of prior related behavior, benefits, barriers, self-efficacy of behavior modification and health promoting behavior to reduce kidney stone recurrence among adult patients.

### **1.2. Aim of the Study**

The aim of the present study was to assess pattern of prior related behavior, benefits, barriers, self-efficacy of behavior modification and health promoting behavior to reduce kidney stone recurrence among adult patients.

### 1.3. Research questions

1. What are prior related behavior, perceived benefits, perceived barriers, perceived self-efficacy of behavior modification and health promoting behavior to reduce kidney stone recurrence among university hospital group and educational Shebin El-Kom hospital group?
2. Are there any differences regarding prior related behavior, perceived benefits, perceived barriers, perceived self-efficacy and health promoting behavior to reduce kidney stone recurrence among both groups?
- 3.

## II. Subjects and Methods

### 2.1. Research design

Descriptive comparative design was utilized to achieve the aim of the study.

### 2.2. Research setting

The study was conducted at urology outpatient clinics at university hospital and educational Shebin El-Kom hospital at Menoufia Governorate.

### 2.3. Sample

- A purposive sample of 140 adult patients who were between 19- < 60 years old and recently discharged from the hospital after removal of kidney stone within 4 weeks. Exclusion criteria: patients with chronic diseases (gout, high blood pressure, diabetes mellitus, inflammatory bowel disease as (crohn's disease and ulcerative colitis), urinary tract infections, hyperparathyroidism and other medical conditions such as kidney disease, chronic diarrhea, and certain cancers (such as leukemia and lymphoma), because all of which put people at higher risk for stones.
- The sample was divided into two equal groups (group 1: university hospital and group 2: educational Shebin El-Kom hospital, 70 subjects each).

### 2.4. Sample size

- The sample size was calculated according to effect size that is expected to be 0.3 [20].
- To achieve 80% power to detect this difference with a significance level of 5% it is estimated that 63 subjects per group would be required.
- With a withdrawal/non-evaluable subject rate of 10% a total of 70 per group subjects were recruited leading to a total required sample size of 140 subjects.

### 2.5. Tools of the study

Data was collected through using the following tools:

**2.5.1. Structured interview questionnaire:** It was developed by the researcher after reviewing the related studies. It included:

**A. Sociodemographic data:** It consisted of seven items including name, age, gender, educational level, marital status, occupation, family income and number of family members.

**B. Medical assessment sheet:** It included past and present medical history. Past medical history (previous hospital admission with urinary tract stones) consists of five questions e.g. time of diagnosis with urinary tract stones and previous method of treatment etc. The current medical history consists of seven questions e.g. time of stone removal, location of the stone, size of the stone, type of the stone and number of removed stones etc.

**2.5.2. Perception of kidney stone patients' behavior, Likert scale:** It was developed by the researcher based on Pender's health promotion model [10]. It composed of five elements which included prior related behavior, perceived benefits of action, perceived barriers to action, perceived self-efficacy and health promoting behavior (behavioral outcomes).

**Prior related behavior,** it means previous dietary behavior before removal of stone consisted of 17 items negatively worded. The response of items used three points Likert scale (always, sometimes and never). **Perceived benefits of compliance with behavior modification** included 15 items using a three points Likert scale (disagree, may be and agree). **Perceived barriers of non-compliance with behavior modification** consisted of 18 items. The response of items used a three points Likert scale (disagree, may be and agree). **Perceived self-efficacy of behavior modification** consisted of 17 items. The response of items used a three points Likert scale (no confidence, moderate confidence, and great confidence). **Behavioral outcomes (health promoting behavior) of compliance with behavior modification** consisted of 19 items. The response of items used a three points Likert scale (never, sometimes and always).

### **Validity and reliability of the tool:**

Validity of the tool was tested for its content by a jury of five experts in the field of family and community health nursing and urology medicine to ascertain relevance and completeness. It was done before the pilot study. Reliability of the tool was estimated among 10 participants using test retest method with two weeks apart between them. Then Cronbach's alpha,  $\alpha$  (or coefficient alpha), to measure reliability, or internal consistency was calculated between the two scores. The total Cronbach alpha for all study tool was 0.85. The value of Cronbach's alpha for each component of Pender's model was as follow: prior related behavior was 0.82, perceived benefits was 0.81, perceived barriers was 0.83, perceived self-efficacy was 0.80 and behavioral outcomes was 0.84. This indicates that the tool was consistent and reliable.

### **2.6. Pilot study**

A pilot study was conducted on 14 patients of the study sample to assess the feasibility of the study as well as clarity and objectivity of the tools. Based on the findings of the pilot study, the needed modifications were achieved and participants of pilot study not included in the actual study.

### **2.7. Ethical considerations**

- Approval of ethical and scientific research committee was obtained at Faculty of Nursing, Menoufia University.
- Oral and written consent was obtained from the participants at urology outpatient clinics at university hospital and educational Shebin El-Kom hospital at Menoufia Governorate.
- Confidentiality of the information was assured.

### **2.8. Data collection procedure**

- A reviewing of past and current literature covering the various aspects of the topic was done using books, articles, magazines and studies related to kidney stones and reducing kidney stones recurrence.
- An official letters were issued from the Faculty of Nursing, Menoufia University and sent to the directors of educational Shebin El-Kom hospital and university hospital and the director of urology department to get their permission for data collection. The letters explained the purpose of the study and sought their cooperation.
- The initial visit: First time meeting with the participants was considered the baseline for the study. At the beginning, it was necessary for the researcher to introduce herself and explain the purpose of the study. Each participant was personally interviewed.
- Participants were interviewed at urology outpatient clinics at university hospital and educational Shebin El-Kom hospital using structured interview questionnaire to collect sociodemographic data, medical assessment sheet that included past and present medical history and perception of kidney stone patients' behavior questionnaire. The interview took about 20-25 minutes according to participant understanding.

### **2.9. Statistical analysis**

- Data was coded and transformed into specially designed form to be suitable for computer entry process. Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 22. Graphics were done using Excel program.
- Quantitative data were presented by mean ( $\bar{X}$ ) and standard deviation (SD). It was analyzed using student t-test for comparison between two means.
- Qualitative data were presented in the form of frequency distribution tables, number and percentage. It was analyzed by chi-square ( $\chi^2$ ) test. However, if an expected value of any cell in the table was less than 5, Fisher Exact test was used (if the table was 4 cells), or Likelihood Ratio (LR) test (if the table was more than 4 cells). Level of significance was set as P value  $<0.05$  for all significant tests.

## **III. Results**

**Table (1):** Shows that the mean age of both university hospital group and educational Shebin El-Kom hospital group was  $37.9 \pm 2.5$  years and younger age groups (31-40 years) were predominant among the group 1 (34.3%) and group 2 (40%) than older age groups (51-<60 years). Approximately more than half of participants (58.6%) were males and 41.4% were females. Regarding education level, about one third of participants were illiterate and 40% of them were moderate education. As regards marital status, 82.9% of them were married and 8.6% were widowed. Concerning occupation, 32.9% of participants were housewives, one fifth was employee or workers, and farmer had the lowest percentage of 12.9%. Regarding family income, approximately one half of participants (48.6%) reported that their income was not enough. Approximately more than half of participants (57.1%) were living with a family of 5-7 members.

**Table (2):** Demonstrates previous patient history among the studied sample. Regards onset of urinary tract stones, onset of symptoms was blood in urine and flank pain among more than half (57.1%) of group 1 compared

to 22.9% among group 2, the difference was statistically significant (P=0.000). Regarding time of diagnosis with urinary tract stones, the majority of group 1 (54.2%) diagnosed with urinary tract stones 2-5 years compared to 37.1% among group 2 who diagnosed with urinary tract stones at more than 5 years and there was significant difference between both groups (P=0.002). Concerning numbers of times of previous admission, the highest percentage (82.8%) among group 1 was once time compared to 66.7% among group 2 and there was significant difference between both groups (P=0.02).

**Table (3):** Demonstrates that, the majority of both groups (88.6%, 71.4%) respectively was removed stones from 1-2 weeks, the difference was statistically significant (P=0.01). Concerning numbers of removed stones, more than half (57.1%) of group 1 was removed one stone compared to 45.7% among group 2 with significant difference between both groups (P=0.02).

**Table (4):** Shows that, the majority of both groups reported always not drinking enough water daily, drinking more tea or coffee daily, adding more salt to the meal, eating lots of high oxalates food and eating more red meat etc. and no significant difference between both groups (P>0.05).

**Table (5):** Reveals that, about half of both groups reported agree response regarding the perceived benefits of behavior modification to reduce kidney stone recurrence with no significant difference between both groups (P>0.05).

**Table (6):** Shows that, the majority of both groups reported agree response regarding the perceived barriers of behavior modification to reduce kidney stone recurrence and no significant difference between both groups (P>0.05).

**Table (7):** Demonstrates that, the majority of both groups reported either no confidence or moderate confidence response regarding self-efficacy of behavior modification to reduce kidney stone recurrence with no significant difference between both groups (P>0.05).

**Table (8):** Reveals that, the majority of both groups reported never response regarding compliance with health promoting behavior to reduce kidney stone recurrence and no significant difference between both groups (P>0.05).

**Table1:** Distribution of socio-demographic characteristics of the studied sample (N= 140)

Socio-demographic characteristics		Groups				Total	
		University hospital (Group 1)		Educational Shebin El-Kom hospital (Group 2)		No.	%
		No.	%	No.	%		
Age groups	20-30 Y	22	31.4	18	25.7	40	28.6
	31- 40 Y	24	34.3	28	40	52	37.1
	41-50 Y	16	22.9	16	22.9	32	22.9
	51- <60 Y	8	11.4	8	11.4	16	11.4
Mean± SD		37.4±3.2Y		38.2±2.6Y		37.9±2.5Y	
Sex	Male	40	57.1	42	60	82	58.6
	Female	30	42.9	28	40	58	41.4
Education	Illiterate	20	28.6	20	28.6	40	28.6
	Basic	6	8.6	10	14.3	16	11.4
	Moderate	28	40	28	40	56	40
	University	16	22.8	12	17.1	28	20
Occupation	Housewife	26	37.2	20	28.6	46	32.9
	Employee	20	28.6	10	14.3	30	21.4
	Worker	8	11.4	22	31.4	30	21.4
	Farmer	8	11.4	10	14.3	18	12.9
	Others	8	11.4	8	11.4	16	11.4
Marital status	Single	2	2.9	8	11.4	10	7.1
	Married	66	94.3	50	71.4	116	82.9
	Divorced	0	0	2	2.9	2	1.4
	Widowed	2	2.8	10	14.3	12	8.6
Not enough		36	51.4	32	45.7	68	48.6
Income	Enough	34	48.6	36	51.4	70	50
	Enough & save	0	0	2	2.9	2	1.4
Family size: 2-4members		28	40	32	45.7	60	42.9
	5-7 members	42	60	38	54.3	80	57.1
Total		70	100%	70	100%	140	100

**Significance (P value < 0.05)**

**Table 2:** Distribution of previous patient history among the studied sample (N= 140)

Previous patient history	Groups				P value
	Group 1 (70)		Group 2 (70)		
	No.	%	No.	%	
Onset of urinary tract stones					
Suddenly	2	2.9	10	14.3	X <sup>2</sup> =19.2, P=0.000 HS
Medical examination	28	40	44	62.9	
Onset of symptoms such as blood in urine and flank pain	40	57.1	16	22.9	
Time of diagnosis with urinary tract stones					
First time	10	14.3	16	22.9	X <sup>2</sup> =14.8, P=0.002 HS
One year	12	17.2	6	8.6	
2 -5 years	38	54.2	22	31.4	
> 5 years	10	14.3	26	37.1	
Previous admission to hospital with urinary tract stones					
Yes	58	82.9	54	77.1	X <sup>2</sup> =0.71, P=0.52 NS
No	12	17.1	16	22.9	
Number of times of previous admission					
Once	48	82.8	36	66.7	LR=9.1, P=0.02 Sig.
Twice	6	10.4	16	29.6	
≥3 times	4	6.8	2	3.7	
The time of previous admission					
≤ One year	4	6.9	8	14.8	X <sup>2</sup> =1.9, P=0.37 NS
> One year	8	13.8	8	14.8	
≥Two years	46	79.3	38	70.4	
Previous method of treatment					
Medications	2	2.9	10	14.3	X <sup>2</sup> =9.0, P=0.06 NS
Extracorporeal shock wave lithotripsy (ESWL)	16	22.9	18	25.7	
Endoscopy	22	31.4	14	20	
Surgery	18	25.7	12	17.1	

Significance (P value < 0.05)

**Table 3:** Distribution of present patient history among the studied sample (N= 140)

Present patient history	Groups				P value
	Group 1 (70)		Group 2 (70)		
	No.	%	No.	%	
Time of stone removal					
1-2 weeks	62	88.6	50	71.4	X <sup>2</sup> =6.4, P=0.01 Sig.
3-4 weeks	8	11.4	20	28.6	
Location of the removed stone					
Right Kidney	14	20	12	17.1	LR=7.0, P=0.13 NS
Left kidney	26	37.1	16	22.9	
Right ureter	16	22.9	16	22.9	
Left ureter	10	14.3	22	31.4	
Bladder	4	5.7	4	5.7	
Size of the removed stone					
5 mm or less	14	20	14	20	X <sup>2</sup> =3.6, P=0.16 NS
6 mm or more	32	45.7	22	31.4	
I do not know	24	34.3	34	48.6	
Type of the removed stone					
Uric acid	32	45.7	32	45.7	X <sup>2</sup> =0.0, P=1.0 NS
Calcium	38	54.3	38	54.3	
No. of removed stones					
One stone	40	57.1	32	45.7	X <sup>2</sup> =8.4, P=0.02 Sig.
Two stones	26	37.1	22	31.4	
Three stones	4	5.8	16	22.9	
The main complain to remove stone					
Flank Pain	26	37.1	26	37.1	X <sup>2</sup> =0.024 P=0.82 NS
Frequency of urination	5	7.1	6	8.6	
Pain during Urination	14	20	16	22.9	
blood in urine	15	21.4	12	17.1	
No urination	10	14.3	10	14.3	
Using any type of dietary supplements					
Yes	18	25.7	10	14.3	X <sup>2</sup> =2.9, P=0.09 NS
No	52	74.3	60	85.7	
Type of dietary supplement					
Vit. D	5	27.8	3	30	X <sup>2</sup> =0.12, P=0.91 NS
Vit. B	6	33.3	3	30	
Vit C	7	38.9	4	40	

**LR= Likelihood Ratio**  
**Significance (P value < 0.05)**

**Table 4:** Distribution of prior related behavior among the studied sample (N= 140)

Prior related behavior	Group 1(70)			Group 2 (70)			P value
	Never No. (%)	Sometimes No. (%)	Always No. (%)	Never No. (%)	Sometimes No. (%)	Always No. (%)	
1. Drinking not enough water daily	2 (2.9)	2 (2.9)	66 (94.2)	2 (2.9)	4 (5.7)	64 (91.4)	LR=2.8, P=0.09 NS
2. Drinking more tea or coffee daily	4 (5.7)	2 (2.9)	64 (91.4)	2 (2.9)	2 (2.9)	66 (94.2)	LR=2.8, P=0.09 NS
3. Drinking a glass of soft drinks daily	6 (8.6)	10 (14.3)	54 (77.1)	8 (11.4)	12 (17.1)	50 (71.5)	X <sup>2</sup> =0.41, P=0.0.52 NS
4. Drinking citrus juice daily	16 (22.8)	48 (68.6)	6 (8.6)	8 (11.4)	56 (80)	6 (8.6)	X <sup>2</sup> =3.3, P=0.19 NS
5. Adding more salt to the meal	4 (5.7)	0	66 (94.3)	2 (2.9)	0	68 (97.1)	LR=6.6, P=0.06 NS
6. Using ready-made sauce and chicken stock in cooking	0	38 (54.3)	32 (45.7)	0	30 (42.9)	40 (57.1)	Fisher =0.23 NS
7. Eating salty snacks such as salted biscuits, chips and crackers daily	26 (37.1)	30 (42.9)	14 (20)	34 (48.6)	22 (31.4)	14 (20)	X <sup>2</sup> =2.3, P=0.31 NS
8. Eating more nuts or chocolate daily	12 (17.1)	32 (45.7)	26 (37.2)	7 (10)	35 (50)	28 (40)	X <sup>2</sup> =2.0, P=0.34 NS
9. Eating lots of high oxalates food	8 (11.4)	34 (48.6)	28 (40)	4 (5.7)	46 (57.1)	26 (37.2)	X <sup>2</sup> =1.8, P=0.38 NS

10. Eating more animal guts like liver, heart, etc.	8 (11.4)	10 (14.3)	52 (74.3)	10 (14.3)	12 (17.1)	48 (68.6)	X <sup>2</sup> =0.55,4, P=0.55 NS
11. Eating more red meat	10 (10.2)	44 (62.9)	16 (22.9)	16 (22.9)	42 (60)	12 (17.1)	X <sup>2</sup> =2.0, P=0.36 NS
12. Eating more seafood	8 (11.4)	12 (17.1)	50 (71.5)	8 (11.4)	10 (14.3)	52 (74.3)	X <sup>2</sup> =0.43, P=0.5NS
13. More intake of legumes	5 (7.1)	8 (11.4)	57 (81.5)	4 (5.7)	6 (8.6)	60 (85.7)	X <sup>2</sup> =0.11, P=0.9NS
14. Eating eggs 1-2 eggs per day	4 (5.7)	26 (37.1)	40 (57.2)	2 (2.9)	24 (34.2)	44 (62.9)	X <sup>2</sup> =0.23, P=0.8 NS
15. Eating 1 cup of yogurt or milk daily	6 (8.6)	42 (60)	22 (31.4)	5 (7.1)	45 (64.3)	20 (28.6)	X <sup>2</sup> =0.31, P=0.7NS
16. More intake of ready-made canned foods	12 (17.1)	52 (74.3)	6 (8.6)	6 (8.6)	62 (88.5)	2 (2.9)	LR=5, P=0.08 NS
17. Taking a dietary supplement with meals such as vitamin C, D or B	52 (74.3)	6 (8.6)	12 (17.1)	60 (85.7)	2 (2.9)	8 (11.4)	X <sup>2</sup> =0.62, P=0.7 NS

Significance (P value < 0.05)

Table 5: Distribution of perceived benefits of behavior modification among the studied sample (N= 140)

Perceived benefits of behavior modification	Group 1(70)			Group 2 (70)			P value
	Disagree No. (%)	May be No. (%)	Agree No. (%)	Disagree No. (%)	May be No. (%)	Agree No. (%)	
1. Reducing the financial burden	4 (5.7)	26 (37.1)	40 (57.2)	5 (7.1)	27 (38.6)	38 (54.3)	X <sup>2</sup> =2.8, P=0.09 NS
2. Reducing exposure to stone recurrence	13 (18.6)	22 (31.4)	35 (50)	17 (24.3)	20 (28.6)	33 (47.1)	X <sup>2</sup> =0.12, P=0.81NS
3. Reducing the progression of the disease to a later stage of kidney disease	10 (14.3)	24 (34.3)	36 (51.4)	14 (20)	22 (31.4)	34 (48.6)	X <sup>2</sup> =0.11, P=0.95 NS
4. Reducing exposure to hypertension, coronary artery, heart disease or obesity	15 (21.4)	17 (24.3)	38 (54.3)	14 (57.1)	16 (22.8)	40 (57.1)	X <sup>2</sup> =1.2, P=0.13NS
5. No sensation of pain	11 (15.7)	25 (35.7)	34 (48.6)	10 (14.3)	24 (34.3)	36 (51.4)	X <sup>2</sup> =0.21, P=0.64 NS
6. Urinating normally	12 (17.1)	33 (24.3)	25 (35.6)	14 (20)	32 (45.7)	24 (34.3)	X <sup>2</sup> =0.54, P=0.68 NS
7. Improving the lifestyle	14 (20)	16 (22.9)	40 (57.1)	15 (21.4)	13 (18.6)	42 (60)	X <sup>2</sup> =0.61, P=0.0.26 NS
8. Increasing the sense of health	8 (11.4)	25 (35.6)	37 (52.9)	6 (8.6)	26 (37.1)	38 (54.3)	X <sup>2</sup> =0.65, P=0.63 NS
9. Preventing complications such as kidney obstruction, inflammation, repeated stones or kidney failure	14 (20)	22 (31.4)	34 (48.6)	15 (21.4)	20 (28.6)	35 (50)	X <sup>2</sup> =0.63, P=0.63 NS
10. Weight management	12 (17.2)	22 (31.4)	36 (51.4)	13 (18.6)	20 (28.6)	37 (52.9)	X <sup>2</sup> =0.25, P=0.69NS
11. Ability to engage in daily living activities	2 (2.9)	26 (37.1)	42 (60)	6 (8.6)	24 (34.3)	40 (57.1)	X <sup>2</sup> =1.2, P=0.64 NS
12. Regularity of work and non-absenteeism	8 (11.4)	22 (31.4)	40 (57.2)	10 (14.3)	18 (25.7)	42 (60)	X <sup>2</sup> =0.36, P=0.0.65 NS
13. Reducing the psychological burden on the family	12 (17.1)	20 (28.6)	38 (54.3)	14 (20)	20 (28.6)	36 (51.4)	X <sup>2</sup> =1.8, P=0.08 NS
14. Reducing the chance of sudden death	24 (34.3)	12 (17.2)	34 (48.5)	28 (40)	10 (14.3)	32 (45.7)	X <sup>2</sup> =1.4, P=0.11 NS
15. Peace of mind	18 (25.7)	12 (17.2)	40 (57.1)	16 (22.9)	16 (22.9)	38 (54.2)	X <sup>2</sup> =1.6, P=0.21 NS

Significance (P value < 0.05)



**Table 6:** Distribution of perceived barriers of behavior modification among the studied sample (N= 140)

Perceived barriers of behavior modification	Group 1 (70)			Group 2 (70)			P value
	Disagree No. (%)	May be No. (%)	Agree No. (%)	Disagree No. (%)	May be No. (%)	Agree No. (%)	
1. Ignorance of the principles of reading and writing	52 (74.3)	0	18 (25.7)	50 (71.4)	0	20 (28.6)	X <sup>2</sup> =0.14, P=0.7 NS
2. Not remembering the instructions or teaching	34 (48.6)	0	36 (51.4)	36 (51.4)	2 (2.9)	32 (45.7)	LR=3, P=0.21 NS
3. Not clear and easy instructions	24 (34.3)	0	46 (65.7)	32 (45.7)	2 (2.9)	36 (51.4)	LR=5.1, P=0.07 NS
4. Failure of health care providers to modify the dietary behavior	18 (25.7)	2 (2.9)	50 (71.4)	20 (28.5)	2 (2.9)	48 (68.6)	X <sup>2</sup> =0.21, P=0.64 NS
5. Insufficient time to follow a healthy diet	16 (22.8)	6 (8.5)	48 (68.7)	12 (17.1)	8 (11.4)	50 (71.4)	X <sup>2</sup> =0.27, P=0.53 NS
6. Financial burden to comply with healthy diet	6 (8.6)	8 (11.4)	56 (80)	6 (8.5)	10 (14.3)	54 (77.2)	X <sup>2</sup> =0.24, P=0.61 NS
7. Inability to taste food without salt or even a little salt	2 (2.9)	0	68 (97.1)	0	0	70 (100)	LR=2.8, P=0.09 NS
8. Inability to comply with non-intake of prohibited foods	2 (2.9)	0	68 (97.1)	0	0	70 (100)	LR=2.8, P=0.09 NS
9. Lack of motivation after enough time of removing the stone	10 (14.3)	5 (7.1)	55 (78.6)	8 (11.4)	4 (5.7)	58 (82.9)	X <sup>2</sup> =0.17, P=0.085 NS
10. Unwillingness to drink water	10 (14.3)	4 (5.7)	56 (80)	12 (17.1)	0	58 (82.9)	LR=1.02, P=0.14 NS
11. Forgetting drinking water throughout the day	4 (5.7)	8 (11.4)	58 (82.9)	4 (5.7)	6 (8.5)	60 (85.8)	X <sup>2</sup> =0.18, P=0.72 NS
12. Not entering bathroom regularly	2 (2.9)	10 (14.3)	58 (82.8)	4 (5.7)	10 (14.3)	56 (80)	X <sup>2</sup> =0.21, P=0.64 NS
13. Taking dietary supplements due to physical weakness	52 (74.3)	8 (11.4)	10 (14.3)	60 (85.8)	4 (5.7)	6 (8.5)	X <sup>2</sup> =0.16, P=0.46 NS
14. Nature of the work and heavy sweat	24 (34.3)	12 (17.2)	34 (48.5)	28 (40)	10 (14.3)	32 (45.7)	X <sup>2</sup> =1.4, P=0.11 NS
15. No time for follow up regularly	14 (20)	10 (14.3)	46 (65.7)	14 (20)	8 (11.4)	48 (68.6)	X <sup>2</sup> =0.17, P=0.61 NS
16. No presence of health insurance	18 (25.7)	2 (2.9)	50 (71.4)	20 (28.5)	2 (2.9)	48 (68.6)	X <sup>2</sup> =0.21, P=0.64 NS
17. The problem of transportation and distance to visit doctor	66 (94.2)	2 (2.9)	2 (2.9)	70 (100)	0	0	LR=5.6 P= 0.06 NS
18. High prices of examination and medications	10 (14.3)	4 (5.7)	56 (80)	10 (14.3)	2 (2.9)	58 (82.8)	X <sup>2</sup> =0.12, P= 0.54 NS

Significance (P value < 0.05)

**Table7:** Distribution of self-efficacy of behavior modification among the studied sample (N= 140)

Self-efficacy towards behavior modification	Group 1(70)			Group 2 (70)			P value
	No confidence No. (%)	Moderate confidence No. (%)	Great confidence No. (%)	No confidence No. (%)	Moderate confidence No. (%)	Great confidence No. (%)	
1. Following a healthy diet	64 (91.4)	4 (5.7)	2 (2.9)	66 (94.2)	2 (2.9)	2 (2.9)	X <sup>2</sup> =0.11, P=0.41 NS
2. Drinking liquids 3 liters per day	60 (85.7)	8 (11.4)	2 (2.9)	58 (82.8)	10 (14.3)	2 (2.9)	X <sup>2</sup> =0.19, P=0.62 NS
3. Reducing tea and coffee	50 (71.4)	16 (22.9)	4 (5.7)	48 (68.6)	17 (24.3)	5 (7.1)	X <sup>2</sup> =0.21, P=0.32 NS
4. Avoiding soft drinks and canned juices	5 (7.1)	50 (71.4)	15 (21.5)	4 (5.7)	52 (74.3)	14 (20)	X <sup>2</sup> =0.16, P=0.38 NS
5. Reducing salt in food	48 (68.6)	18 (25.7)	4 (5.7)	46 (65.7)	20 (28.6)	4 (5.7)	X <sup>2</sup> =0.12, P=0.23 NS
6. Reducing the intake of pickles, sardines and old cheese	60 (85.7)	6 (8.6)	4 (5.7)	58 (82.9)	8 (11.4)	4 (5.7)	X <sup>2</sup> =0.51, P=0.11 NS
7. Avoiding salty snacks	20 (28.6)	42 (60)	8 (11.4)	22 (31.5)	40 (75.1)	8 (11.4)	X <sup>2</sup> =0.73, P=0.14 NS
8. Reducing high oxalates foods	6 (8.6)	48 (68.5)	16 (22.9)	8 (11.4)	52 (74.3)	10 (14.3)	LR=1.8, P=0.39 NS
9. Reducing high	54 (77.1)	10 (14.3)	6 (8.6)	50 (71.4)	12 (17.2)	8 (11.4)	X <sup>2</sup> =0.61,

calcium-containing foods							P=0.25 NS
10. Reducing animal protein	10 (14.2)	58 (82.9)	2 (2.9)	12 (17.1)	54 (77.2)	4 (5.7)	X <sup>2</sup> =0.93, P=0.17 NS
11. Reducing legumes	58 (82.9)	12 (17.1)	0	62 (88.6)	8 (11.4)	0	X <sup>2</sup> =0.9, P=0.3 NS
12. Avoiding fat and replacing it with vegetable oils	10 (14.3)	54 (77.1)	6 (8.6)	12 (17.1)	52 (74.3)	6 (8.6)	LR=0.0, P=1.0 NS
13. Reducing sugar and sweets	12 (17.1)	52 (74.3)	6 (8.6)	8 (11.4)	54 (77.2)	8 (11.4)	X <sup>2</sup> =0.63, P=0.22 NS
14. Avoiding canned food, takeaway and fast food	48 (68.6)	14 (20)	8 (11.4)	52 (74.2)	12 (17.2)	6 (8.6)	X <sup>2</sup> =0.13, P=0.92 NS
15. Dispensing with dietary supplements (b-c-d)	54 (77.1)	14 (20)	2 (2.9)	52 (74.3)	14 (20)	4 (5.7)	LR=0.71, P=0.6 NS
16. Exercising to reduce weight	25 (35.7)	45 (64.3)	0	28 (40)	42 (60)	0	X <sup>2</sup> =0.27, P=0.6 NS
17. Ability to provide time and money for regular follow-up	25 (35.7)	45 (64.3)	0	28 (40)	42 (60)	0	X <sup>2</sup> =0.27, P=0.6 NS

Significance (P value < 0.05)

Table 8: Distribution of health promoting behavior among the studied sample (N=140)

Health promoting behavior	Group 1 (70)			Group 2 (70)			P value
	Never No. (%)	Sometimes No. (%)	Always No. (%)	Never No. (%)	Sometimes No. (%)	Always No. (%)	
1. Choosing proper food when being hungry	64 (91.4)	2 (2.9)	4 (5.7)	60 (85.7)	4 (5.7)	6 (8.6)	X <sup>2</sup> =1.18, P=0.27 NS
2. Drinking liquids 3 liters per day	56 (80)	4 (5.7)	10 (14.3)	58 (82.9)	8 (11.4)	4 (5.7)	X <sup>2</sup> =1.60, P=0.35 NS
3. Drinking a cup of barley water daily	64 (91.4)	6 (8.6)	0	62 (88.6)	8 (11.4)	0	X <sup>2</sup> =0.21, P=0.9 NS
4. Reducing tea and coffee	50 (71.4)	18 (25.7)	2 (2.9)	54 (77.1)	10 (14.3)	6 (8.6)	X <sup>2</sup> =0.12, P=0.88 NS
5. Avoiding soft drinks and canned juices	48 (68.6)	18 (25.7)	4 (5.7)	46 (65.7)	14 (20)	10 (14.3)	X <sup>2</sup> =1.5, P=0.14 NS
6. Reducing salt in food	52 (74.3)	4 (5.7)	14 (20)	54 (77.1)	8 (11.4)	8 (11.5)	X <sup>2</sup> =1.3, P=0.10 NS
7. Reducing the intake of pickles, fish, sardines and old cheese	48 (68.6)	14 (20)	8 (11.4)	46 (65.7)	10 (14.3)	4 (5.7)	X <sup>2</sup> =1.4, P=0.42 NS
8. Avoiding chicken stock and ready-made sauces for cooking	46 (65.7)	16 (22.8)	8 (11.5)	44 (62.8)	14 (20)	12 (17.2)	X <sup>2</sup> =1.92, P=0.24 NS
9. Avoiding salty snacks such as salted biscuits, chips and crackers	44 (62.9)	18 (25.7)	8 (11.4)	48 (68.5)	12 (17.2)	10 (14.3)	X <sup>2</sup> =1.7, P=0.40 NS
10. Reducing high oxalates foods	54 (77.1)	6 (8.6)	10 (14.3)	52 (74.3)	10 (14.3)	8 (11.4)	X <sup>2</sup> =0.62, P=0.75 NS
11. Reducing high calcium-containing foods	60 (85.7)	2 (2.9)	8 (11.4)	56 (80)	4 (5.7)	10 (14.3)	X <sup>2</sup> =1.9, P=0.2 NS
12. Reducing animal protein	66 (94.2)	2 (2.9)	2 (2.9)	58 (82.9)	8 (11.4)	4 (5.7)	X <sup>2</sup> =1.2, P=0.29 NS
13. Reducing legumes	64 (91.4)	6 (8.6)	0	60 (85.7)	4 (5.7)	6 (8.6)	X <sup>2</sup> =1.4, P=0.52 NS
14. Avoiding fats and replacing them with vegetable oils	44 (62.8)	20 (28.6)	6 (8.6)	48 (68.5)	14 (20)	8 (11.5)	X <sup>2</sup> =2.2, P=0.13 NS
15. Reducing sugar and sweets	50 (71.4)	10 (14.3)	10 (14.3)	52 (74.3)	10 (14.2)	8 (11.5)	X <sup>2</sup> =0.3, P=0.6 NS
16. Avoiding canned food, takeaway and fast food	42 (60)	12 (17.2)	16 (22.8)	44 (62.8)	14 (20)	12 (17.2)	X <sup>2</sup> =0.27, P=0.59 NS
17. Dispensing with dietary supplements (b-c-d)	46 (65.7)	14 (20)	10 (14.3)	48 (68.5)	12 (17.2)	10 (14.3)	X <sup>2</sup> =0.23, P=0.27 NS
18. Exercising to reduce weight	62 (88.6)	6 (8.5)	2 (2.9)	64 (91.4)	6 (8.6)	0	X <sup>2</sup> =0.85, P=0.11 NS
19. Ability to provide time and money for regular follow-up	48 (68.6)	22 (31.4)	0	50 (71.4)	18 (25.7)	2 (2.9)	X <sup>2</sup> =1.7, P=0.12 NS

Significance (P value < 0.05)

#### **IV. Discussion**

Kidney stones are truly one of the most painful medical conditions to afflict human beings, with an approximate incidence of one in ten lifetime risk in the general population [15]. It is important to understand kidney stone patients' behaviors; the factors which influence this behavior through Pender's health promotion model (HPM) and understand determinants of health-promoting behaviors and modifiable behavior-specific cognitions which include health benefits, barriers, and self-efficacy to recommend health-promoting behaviors guidance and social support to all people[21].

Therefore, the present study was aimed to assess pattern of prior related behavior, benefits, barriers, self-efficacy of behavior modification and health promoting behavior to reduce kidney stone recurrence among adult patients.

Regards onset of urinary tract stones, the present study revealed that onset of symptoms was blood in urine and flank pain among more than half of university hospital (group 1), compared to less than quarter of the educational Shebin El-Kom hospital (group 2), the difference was statistically significant. This result was consistent with Dongre, Rajalakshmi, Deshmukh, Thirunavukarasu, and Kumar, (2017) [22] they assessed "the social and dietary risk factors responsible for the occurrence of kidney stone in a local community in rural Puducherry in India". They reported that, the majority of first group diagnosed with renal stone and reported with onset of symptoms of hematuria, developed severe renal colic and obstructed kidney compared to one quarter of second group with statistically significant difference. Also, this finding was supported by Kolhe and Bhamre, (2017) [23] they examined "clinical profile of patients with renal calculi in a tertiary care center in India". They reported that, abdominal pain in combination with hematuria and classical renal colic were seen in majority of first group compared to other group and the difference was significant.

The current study revealed that the majority of group 1 diagnosed with urinary tract stones 2-5 years compared to about one third of group 2 who diagnosed with urinary tract stones at more than 5 years and there was significant difference between both groups. This result was consistent with Shang et al., (2017) [24] they evaluated "history of kidney stones and risk of chronic kidney disease in China". They reported that, about two thirds of the first group were diagnosed with urolithiasis from 3-5 years ago compared to twenty eight percent among the second group with history of kidney stones from more than five years and there was significant heterogeneity among both groups.

Concerning numbers of times of previous admission to the hospital with urinary tract stones, the highest percentage among group 1 was once time compared to two thirds among group 2 and there was significant difference between both groups. This finding was in agreement with Dongre et al., (2017) [22] they found that, the majority of participants of the first group admitted with previous one episode compared to one half of the second group with statistically significant difference.

Regarding present patient history among the studied sample, the present study showed that the majority of both groups were removed stones from 1-2 weeks, the difference was statistically significant. This result was in accordance with Scales, Saigal, Ponce, Mangione and Litwin, (2015) [25] they examined "emergency department revisits for patients with kidney stones in California". They found that, more than half of participants, their second visit within 15- 30 days of the initial discharge from emergent care after stone removal with statistically significant difference.

The current study revealed that more than half of group 1 was removed one stone compared to less than half among group 2 with significant difference between both groups. This finding was consistent with Kolhe and Bhamre, (2017) [23] they reported that, the majority of the first group was removed one stone of size 1cm to 2 cm more seen commonly in bladder and renal pelvis equally compared to one third of another group and the difference was significant.

The present study showed that the majority of both groups reported always not drinking enough water daily, drinking more tea or coffee daily, adding more salt to the meal, eating lots of high oxalates food and eating more red meat etc. and no significant difference between both groups. This result was in accordance with Ryu, Lee, Park, Son and Cho, (2018) [26] they assessed "the various dietary risk factors for urinary stone formation in Korean people". They reported that, there were no significant differences between the two groups in terms of intake of various foods, including meats, beans, sugars, vegetables, fruits, seaweeds, cereals, oils, fats, milk, carbohydrate, protein, vitamin C, vitamin D, fiber, folate, calcium, sodium, magnesium, chloride, lipid and total energy per day. Additionally, this finding was consistent with Dongre et al., (2017) [22] they found that, there was no significant difference between both groups as they were similar with respect to dietary habits of red meat consumption and water and fluid consumption, especially during the hot climates.

The current study revealed that about half of both groups reported agree response regarding the perceived benefits of behavior modification to reduce kidney stone recurrence with no significant difference between both groups. This result was supported by Patel & Mehta, (2014) [12] they examined "epidemiological characteristics of renal stone patients aged 21-60 and barriers in their dietary modification in

SaurashtraRegion,India”. They reported that, there was no significant difference among the participants of the study in regard to the potential benefits of a particular intervention before contemplating a behavior change.

Additionally, the present study revealed that the majority of both groups reported agree response regarding the perceived barriers of behavior modification to reduce kidney stone recurrence and no significant difference between both groups. This result was in agreement with Patel & Mehta, (2014) [12] they found that, there was no significant difference among the participants of the study in their perceived barriers to behavior change which included don't remember instructions, not clearly informed, health care providers fail to recommend appropriate dietary modification, time constraints, money constraints, dislike of taste by patient themselves or restriction by the family members because they don't like the taste and motivation decrease after stone episode.

Regarding self-efficacy of behavior modification among the studied sample, the present finding revealed that the majority of both groups reported either no confidence or moderate confidence response regarding self-efficacy of behavior modification to reduce kidney stone recurrence with no significant difference between both groups. This finding was consistent with kok, (2016) [27] who studied “the preventive treatment of recurrent stone-formation and how can we improve compliance in the treatment of patients with recurrent stone disease in Europe”. The researcher found that, there were no significant differences between the two groups as regard to perceived severity, self-efficacy, and preventive behaviors to reduce kidney stone recurrence.

Concerning health promoting behavior among the studied sample, the majority of both groups reported never response regarding compliance with health promoting behavior to reduce kidney stone recurrence and no significant difference between both groups. This result was supported by Baharudin, Shahar and Zainuddin, (2017) [28] they evaluated “the association of dietary intake and lifestyles factors with kidney stone disease at University Kebangsaan Malaysia Medical Centre”. They found that, there were no significant differences among the two groups in terms of habitual foods intake towards the risk of kidney stone disease as the majority of both groups showed highest consumption of unhealthy food.

## VI. Conclusions

There was no significant difference between university hospital group and educational Shebin El-Kom hospital group regarding prior related behavior, perceived benefits, perceived barriers, perceived self-efficacy of behavior modification and health promotion behavior to reduce kidney stone recurrence.

## VII. Recommendations

**Based on the results of this study, the following recommendations were suggested:**

1. The need for developing the nursing discharge plan instructions about behavior modification to prevent risk of kidney stone recurrence among adult patients.
2. Enhance awareness of the community regarding prevention and control of kidney stones.
3. Community health nurses should take a more active role for providing education programs about kidney stones and prevention of its recurrence.
4. Nursing training curricula should include knowledge about kidney stone patients' behaviors, factors affecting those behaviors and non-pharmacological intervention should be developed to prevent kidney stone recurrence post-operation.

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