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Effect of nursing guidelines on adherence to healthy lifestyle practices among patients with a small lower ureteric stone

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Abstract
Background: Urinary stone affects about 12% of the world's population and has become a worldwide health problem. Lifestyle practices can contribute to the risk of urinary stone formation; addressing these practices adequately can provide a simple and more cost-effective measure for the prevention of urinary stones and the reduction of its recurrence among urinary stone patients. The current study aimed to evaluate the effect of nursing guidelines on adherence to healthy lifestyle practices among patients with a small lower ureteric stone.
Research design: Quasi-experimental design was used to achieve the aim of this study.
Sample: A purposive sample of 60 patients was divided into two groups (30 patients in the study group and 30 patients in the control group).
Tool (I): includes part one: demographic characteristics of the patients, part two: included present medical history and previous medical history.
Tool (II): Adherence of healthy lifestyle practices scale: it was divided into three subscales regarding consumption of restricted foods, consumption of fluids, and healthy usual self-activities.
Results: The mean age for the study and control groups are 38.63 and 41.33 years, respectively. More than one-third (36.7%) and 33.3% respectively of the study and control groups have previous histories of urinary tract stones. There are statistically significant differences in mean scores of adherence levels to healthy lifestyle practices between both groups post the nursing guidelines. Only the majority of the study group (93.3%) achieved a satisfactory level following the nursing guidelines.
Conclusion: Nursing guidelines have a positive effect on adherence to healthy lifestyle practices to prevent its recurrence.
Recommendations: Creation of an educational unit for urinary tract stone patients in the nephrology and urology hospital. Conducting similar studies on a larger probability sample is recommended to achieve generalization of the findings.

Keywords: Adherence, guidelines, lifestyle, ureteric stone

Introduction
The presence of stones in the urinary tract is medically known as urolithiasis. In most cases, the kidneys are the source of ureteral stones, and once they become lodged in the ureter, they can continue to grow there. Most stones in the urinary tract are composed primarily of calcium. The acute ureteral blockage leads to dilatation, stretching, and spasms, the painful mechanisms behind renal colic [1].
Prevalence of urolithiasis is estimated at 3% of all individuals and affects up to 12% of the general population during their lifetime [2]. The majority of urolithiasis patients develop calcium stones, which are often made up of calcium oxalate or calcium phosphate. Uric acid stones, struvite (magnesium ammonium phosphate), and cystine stones are the other common forms [3].
Patients with acute renal colic usually present with rapid onset of severe pain in the flank that radiates inferiorly and anteriorly; at least 50% of patients will also have nausea and vomiting. Urinary stone patients may have discomfort, infection, or hematuria [4].
Urinary stone therapy aims to detect problems and reduce recurrence. All patients should start with lifestyle adjustment to promote health and prevent recurrence.

Hence, lifestyle practices can contribute to the risk of urinary stone formation; addressing these practices adequately can provide a simple and more cost-effective measure for the prevention of urinary stones and the reduction of its recurrence among urinary stone patients. Therefore, lifestyle modification related to dietary habits, fluid intake, weight reduction, physical activity, smoking cessation, follow up and compliance with therapeutic regimens are particularly important strategies for the self-management of urinary stones [2].

Community health nurses must be a cornerstone in the care and education of adult patients with urinary stone disease for a successful treatment outcome, improving quality of life and preventing the disease complications and its recurrence for those patients through assessment, planning, implementation, and evaluation of educational guidelines for helping patients to learn or relearn healthy lifestyle practices [2].

Significance of the study

Urinary stones are one of the earliest human diseases and continue to be a significant problem today. Twenty percent of urinary stones are ureteral stones, the majority of which are located in the farthest part of the ureter (the distal ureter) [5]. According to reports, the Middle East has a 20-25% higher occurrence rate than the majority of the world because of the region's extreme heat and the associated risk of dehydration. There were 15,820 mortalities in Egypt attributed to kidney disease (3.41 percent of all deaths), as reported by the World Health Organization. Egypt has the world's twelfth-highest death rate due to kidney disease [6].

The increased cost of diagnosing, treating, and following up on people with stones is directly related to the disease's rising incidence. Additionally, urolithiasis has been linked to an increased danger of chronic kidney disease, renal failure, cardiovascular disease, diabetes, and hypertension. Therefore, urolithiasis management should focus on preventative measures [7]. So, urinary stone nursing guidelines are a useful tool for educating patients on their condition, reducing the likelihood of a second attack, and empowering them to have greater control over their health. Therefore, increasing knowledge and adherence to healthy lifestyle practices for such patients regarding the disease can help them to prevent the recurrence of the disease [8].

Aim of the Study

This study aimed to evaluate the effect of nursing guidelines on adherence to healthy lifestyle practices among patients with a small lower ureteric stone.

Research hypothesis

Patients' adherence to healthy lifestyle practices will be higher in the post-nursing guidelines than in the pre-nursing guidelines among the study group.

Subject and Methods

Research design: Quasi-experimental design (two groups pre-test, post-test) was used to achieve the aim of this study.

Setting: The study was conducted at the urology outpatient clinic in the nephrology and urology hospital, Minia University which covers Minia governorate.

Sample

A purposive sample was approached. According to the Minia university hospital census, the yearly average of patients with small lower ureteric stones and undergoing only medical treatment attending urology outpatient clinic was 400. Epi info 7 calculated sample size using the following:

Population=400
5.1% Acceptance Error
95% confidence
95% response distribution

Sixty patients were divided into two groups (30 patients in the study group and 30 patients in the control group).

Inclusion criteria

1. Diagnosis with unilateral lower ureteric stone smaller than 10mm.
2. Age above 18 years.
3. Patients who are undergoing only medical treatment.

Exclusive criteria

1. Patients with mental or severe cerebrovascular disorders, including those who are deaf.
2. Bilateral and multiple lower ureteric or other urinary stones.

Tools of data collection

The investigator created the structured interview questionnaire by reviewing the relevant literature and consulting with specialists in the fields of community health nursing and medical-surgical nursing from the faculty of nursing; at Minia University to ensure its content validity and feasibility.

Tool I: Structured interviewing questionnaire: it included two parts

Part One: Demographic characteristics of the patients; including age, gender, education, marital status, residence, occupation, workplace, and source of water supply.

Part Two

A. **Present medical history:** It involved the type of associated chronic diseases, the side of the ureteric stone, the current complaint, and the numerical rating pain scale (‘0-10’ point pain intensity scale) [9].
B. **Previous medical history:** It involved family history, previous history with urinary tract stones, number of recurrences, side of the previous stone, number of removed stones, and methods of previous treatment.

Tool II: Adherence of healthy lifestyle practices scale, Investigators adapted it based on their unique review of the existing literature [10]. It was divided into three subscales as the following:

1. Adherence regarding consumption of restricted foods.
2. Adherence regarding consumption of fluids.
3. Adherence regarding healthy usual self-activities.

Scoring system

Using a three-point Likert scale where: usually done (two marks), sometimes done (one mark), and never (zero marks). All patients' scores were added up to get a cumulative percentage, and then those percentages were evaluated as follows: [10]

- Satisfactory adherence level ≥ 70%
- Unsatisfactory adherence level < 70%

Validity and Reliability

Extensive literature reviews at the national and international levels helped establish the content validity of the data collection instruments. Five specialists in community health nursing and medical-surgical nursing from Minia University's nursing faculty reviewed the tools to ensure their reliability. There was a thorough evaluation of the instruments' scope of coverage, sequence of items, clarity, relevance, applicability, phrasing, length, format, and general appearance. Experts were consulted, and some tweaks were made based on their feedback and suggestions. Cronbach's alpha was used to determine the reliability of the interview questionnaire. Testing for consistency using Cronbach's alpha yielded a value of 0.873.

Ethical consideration

The research ethics committee of Minia University's School of Nursing provided written first clearance. Patients who participated in the study were given information about the research's goals and procedures before providing their verbal agreement to participate. For reasons of patient privacy, assessment forms were coded rather than listing patients' names. Patients were reassured that they could stop participating in the current trial at any moment and didn't need to provide a reason.

Study procedure

The study was accomplished through four phases: preparatory, assessment, implementation, and evaluation.

Preparatory phase

This phase pertains to the construction of the study tools and the production of the nursing guidelines by the investigator based on an extensive review of current related literature. It was written in the Arabic language. Teaching aids that were used include visual materials such as photos and a personal laptop were used. The booklet was prepared and written in simple Arabic language supported by illustrative pictures.

Assessment phase (pre-test)

After getting patients' consent to participate, the researcher gave them a rundown of the study and clarified some of the questions on the tool. The researcher conducted in-depth interviews with each participant, using a predetermined set of questions to gather information about the participants' demographics, current health status, and medical history. Then the investigator-assessed adherence to healthy lifestyle practices regarding restricted food, consumption of fluids, and usual healthy self-activities.

Implementation phase

Each patient was interviewed face to face and individually at the urology outpatient clinic by the investigator. The investigator has started a collection of data from the study group primarily by using the tools which consisted of two tools. The selected study group received nursing guidelines about urinary tract stones, and data collection for the control group began using the same instruments after the research group's data was complete.

The nursing guidelines were applied individually for each patient which included (How do the kidneys and urinary system work? - What is meant by urinary tract stones? - What are the components of urinary tract stones? - What are the causes of urinary tract stones?- signs and symptoms - How is the diagnosis made for urinary tract stones? – treatment methods - How do you protect yourself from getting urinary tract stones?). The investigator used the face-to-face method to achieve the proposed goal and allow patients to ask questions, have discussions, and reach a high level of understanding. The investigator used illustrations, lectures, teaching videos, and a colored booklet.

Evaluation phase

The evaluation of adherence to healthy lifestyle practices regarding restricted food, consumption of fluids, and usual self-activities through (Tool II) was executed after six weeks of implementation of the nursing guidelines among the study and control groups.

Statistical design

A statistical package for social science (version 28) was used for data tabulation, analysis, and computerization. Descriptive and inferential statistics will be utilized to present study data. The descriptive statistics were reported as numbers and percentages. The mean and standard deviation were the two ways that quantitative data was presented. Quantitative continuous data were compared using (T-test, Mann-Whitney U test, and Wilcoxon test) in case of comparison between two groups. Chi-square and Fisher's exact test was used to test the association between two qualitative variables or to detect the difference between two groups. The level of significance was accepted at a p-value < 0.05.

Results

Table 1: Distribution of the study and control groups according to their demographic characteristics at the urology outpatient clinic, 2022, (n=60).

Demographic Characteristics	Groups				X^2	*P* – value
	Study (n=30)		Control (n=30)			
	No	%	No	%		
Age						
20-<30	7	23.3	6	20.0	0.386	0.943
30-<40	9	30.1	8	26.7		
40-<50	7	23.3	7	23.3		
>=50	7	23.3	9	30.0		
Mean±SD	38.63±10.091 years		41.33±10.911 years			
Gender						
Male	19	63.3	21	70.0	0.300	0.584

Female	11	36.7	9	30.0		
Educational level						
Illiterate	10	33.3	6	20.0	3.111	0.375
Secondary Education	2	6.7	6	20.0		
Diploma	8	26.7	9	30.0		
University Education	10	33.3	9	30.0		
Occupation						
An employee	9	30.0	14	46.7	2.179	0.536
Housewife	8	26.7	5	16.7		
Farmer	6	20.0	4	13.3		
Worker	7	23.3	7	23.3		
Workplace	(n = 22)		(n = 25)			
Outdoors	12	40.0	13	43.3	0.30	0.861
Indoors	10	33.3	12	40.0		
Work in hot climate	(n = 22)		(n = 25)			
Yes	11	36.6	13	43.3	0.019	0.891
No	11	36.6	12	40.0		

Table (1) shows that the mean age for the study and control groups are 38.63 and 41.33 years, respectively. Regarding gender, 63.3% and 70.0% of the study and control groups are male. Regarding occupation, 30.0% and 46.7% of the study and control groups are employees. Concerning the workplace, 40.0% and 43.3% of the study and control group are working outdoors. More than one-third (36.6% and 43.3%) of both groups respectively are working in a hot climate. Lastly, no statistically significant variations in demographic features were found between the study and control groups.

Table 2: Distribution of the study and control groups according to their present medical history at the urology outpatient clinic, 2022, (n=60)

Present medical history	**Groups**				**X** **X^2/ Fisher exact test**	***P* – value**
	Study (n=30)		**Control (n=30)**			
	No	**%**	**No**	**%**		
Type of associated chronic diseases #						
Hypertension	6	20.0	12	40.0	2.857	0.091
Diabetes mellitus	3	10.0	8	26.7	-	0.181
Recurrent urinary tract infections	4	13.3	6	20.0	-	0.731
Gout	3	10.0	5	16.7	-	0.706
Side of ureteric stone						
Right side	19	63.3	18	60.0	0.071	0.791
Left side	11	36.7	12	40.0		
#The current complaint related to ureteric stone						
Renal colic	30	100.0	30	100.0		
Hematuria	9	30.0	10	33.3	0.077	0.781
Nausea	11	46.7	13	54.2	0.287	0.598
Dysuria	26	86.7	28	93.3	0.741	0.389
Anorexia	10	33.3	11	36.7	0.073	0.787
Fever	5	16.7	7	23.3	0.417	0.519
Vomiting	13	43.3	7	23.3	2.700	0.100
Oliguria	21	70.0	25	83.3	1.491	0.222
Increase the frequency of voids per day	26	86.7	24	80.0	0.480	0.488
Urine discoloration	16	53.3	18	60.0	0.271	0.602
Rating Pain Scale						
Moderate	9	30.0	6	20.0	0.800	0.371
Severe	21	70.0	24	80.0		

There is more than one answer
Fisher exact test is used when 25% or more of the cells are less than 5

Table (2) shows that hypertension is the most common chronic disease among the study group (20%), followed by recurrent urinary tract infections (13.3%) and diabetes mellitus (10%). As compared to the control group, hypertension is the most common chronic disease (40%), followed by diabetes mellitus (26.7%) and recurrent urinary tract infections (20%).

Concerning the side of the ureteric stone, the right side has the highest percentage for the study and control groups (63.3% and 60%, respectively). Relating to current complaints related to the ureteric stone pre-nursing guidelines, all study and control groups (100%) reported renal colic. Dysuria, increased frequency of voids per day, oliguria, and urine discoloration are the most prevalent complaints among the study group (86.7%, 86.7%, 70%, and 53.3%, respectively). As compared to the control group, dysuria, oliguria, increased frequency of voids per day, and urine discoloration are the most prevalent complaints (93.3%, 83.3%, 80%, and 60%, respectively).

As regards the rating pain scale used before the nursing guidelines, 70% and 80%, respectively, of the study and control groups suffer from severe pain. Finally, there are no significant differences between the study and control groups regarding their present medical histories.

Table 3: Distribution of the study and control groups according to their previous medical history at the urology outpatient clinic, 2022, (n=60)

Previous medical history	Groups				X^2/ Fisher exact test	*P* – value
	Study (n=30)		Control (n=30)			
	No	%	No	%		
Family history of urinary tract stones						
Yes	9	30.0	10	33.3	0.077	0.781
No	21	70.0	20	66.7		
The degree of kinship	(n = 9)		(n = 10)			
Sister	1	3.3	1	3.3	-	0.973
Mother	1	3.3	1	3.3		
Father	6	20.0	6	20.0		
Grand father	1	3.3	2	6.6		
Previous history of urinary tract stones						
Yes	11	36.7	10	33.3	.073	.787
No	19	63.3	20	66.7		
If yes, site	(n = 11)		(n = 10)			
Kidney stone	1	3.3	2	6.7	-	.562
Ureteral	8	26.7	5	16.7		
Kidney & ureteral	2	6.7	3	10.0		
Times of its recurrence	(n = 11)		(n = 10)			
Only one time	7	23.3	5	16.7	-	.843
Two times	2	6.7	3	10.0		
More than 2 times	2	6.7	2	6.7		
Side of a previous stone	(n = 11)		(n = 10)			
Right side	2	6.7	6	20.0	-	.190
Left side	6	20.0	3	10.0		
Both sides	3	10.0	1	3.3		
No. of removed stones	(n = 11)		(n = 10)			
Only one time	7	23.3	7	23.3	-	0.961
Two times	1	3.3	1	3.3		
More than 2 times	3	10.0	2	6.7		

Fisher exact test is used when 25% or more of the cells are less than 5

Table (3) reveals that 30% and 33.3% respectively of the study and control groups have a family history of urinary tract stones. More than one-third (36.7%) and 33.3% respectively of the study and control groups have previous histories of urinary tract stones. Regarding the site of a previous urinary tract stone, the ureteral site has the highest percentage for the study and control groups (26.66% and 16.66%, respectively). In terms of the number of removed stones, 23.33% of the study and control groups have only one removed stone. Finally, there are no significant differences between the study and control groups regarding their previous medical histories.

Table 4: Comparison of total mean scores of adherence of the study and control groups pre and post-nursing guidelines at urology outpatient clinic, 2022, (n=60)

Adherence score	Groups		Test of significance
	Study (n=30)	Control (n=30)	
	Mean ± SD	Mean ± SD	
Consumption of restricted foods			
Pre- Intervention	19.63±5.43	18.90±6.37	t (.480) 0.633
Post - Intervention	39.30±4.32	19.03±6.403	z (6.534) 0.0001*
Test of significance	z (4.786) 0.0001*	t (1.439) 0.161	
Consumption of fluids			
Pre- Intervention	7.20±2.743	7.47±3.003	z (0.544) .587
Post - Intervention	12.60±1.567	7.43±3.07	z (5.950) .0001*
Test of significance	z (4.795) 0.0001*	t (.372) 0.712	
Healthy usual self-activities			
Pre- Intervention	8.17±2.036	8.13±1.925	z (0.293) 0.769
Post - Intervention	10.53±1.655	8.20±1.846	z (4.700) 0.0001*
Test of significance	z (4.658) 0.0001*	t (1.414) 0.157	
Total adherence score			
Pre- Intervention	35.00±7.254	34.50±8.842	t (.239) .812
Post - Intervention	62.43±7.214	34.67±8.751	z (6.349) 0.0001*
t / P- value	z (4.788) 0.0001*	z (1.890) 0.059	

* p = ≤ 0.05 (statistical significance)

Table (4) presents that, there are no statistically significant differences between both groups pre-nursing guidelines regarding consumption of restricted foods, consumption of fluids, healthy usual self-activities, and total adherence,

while there are statistically significant differences between them post-nursing guidelines (P- value:0.0001).
The control group's mean scores of adherences pre- and post-nursing guidelines indicate no statistically significant differences, while the study group's mean scores of adherences pre- and post-nursing guidelines reveal statistically significant differences (P- value:0.0001).

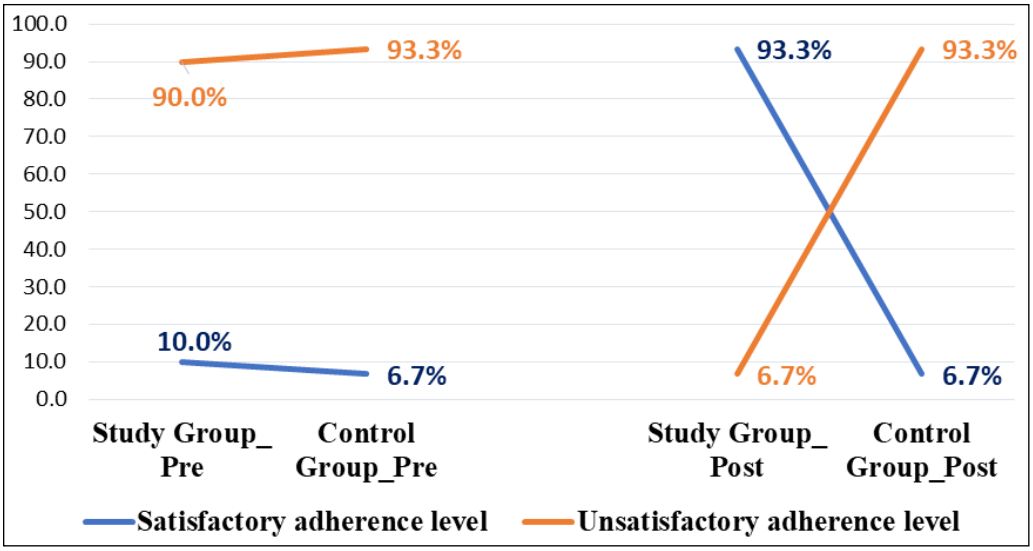

Fig 1: Comparison of total adherence level of healthy lifestyle practices of the study and control group pre and post-nursing guidelines at urology outpatient clinic, 2022, (n=60).

Figure (1) shows that the minority of the study and control groups, 10% and 6.7%, respectively, have satisfactory total adherence levels of healthy lifestyle practices pre-nursing guidelines, whereas 93.3% of the study group only have satisfactory levels after the nursing guidelines.

Discussion

The incidence of urolithiasis is affected by a number of variables, including location, socioeconomic status, and diet. Consistent increases in prevalence can be traced to a number of factors, including rising obesity rates, shifts in food habits, and altered fluid intake. There is still a significant recurrence rate. Twenty percent of urinary tract stones are ureteral stones, the majority of which are located in the distal ureter. Clinicians are sometimes faced with the challenge of deciding on the best course of therapy for ureteral stones, which play a significant role in daily urological practice [11].
Concerning demographic characteristics of the studied sample; the current study showed that the mean age for the study and control groups was 38.63±10.091 and 41.33±10.911 respectively. Regarding gender, two-thirds of the studied sample was male. These come in agreement with Shivanna, *et al*., (2018) reported that the mean age among the study and control groups was 36.74±13.07 years and 35.10±12.66 years respectively. There were (80%) male patients and (20%) were female patients [12]. Another study done in the same context supports this finding by Hassan & Rashid, (2021), reported that the mean age was 39.22 (±13.5963) years with an approximate male: female ratio of 3.34:1 [13].
In contrast to the current results Raja, *et al*., (2020), found that a mean age of 51 years but the same authors agreed with the current study is reporting that 67% of participants were male and 33% were male [14].
Concerning the marital status of the study and control groups, the majority of both groups were married (93.3% and 83.3%) respectively. Regarding residence, 76.7 & 70% respectively of the study and control groups resided in rural areas. These results were advocated by Salah El-din Amin, *et al*., (2022) reported that nearly three-quarters of the studied patients (72%) were married While nearly two-thirds (64%) of them lived in rural [15].
Concerning the side of the ureteric stone, the right side had the highest percentage for the study and control groups (63.3% and 60% respectively). This result is in accordance with Bokka & Jain, (2019) stated that more than half of the studied patients (56%) had right lower ureteric stone while 44% of the studied patients had left lower ureteric stone [16].
In addition, this result comes consistent with Basnet, *et al*., (2018) reported that the total number of distal stones on the right ureter was found to be 18 (60%) of the studied sample and 40% on the left ureter [17]. In contrast to the current results Singh & Shakya, (2018) indicated that more than half of patients (55%) had left distal ureteric stones and 45% of patients had right distal ureteric stone [18].
Regarding the family history of urinary tract stones, around one-third (30% and 33.3%) respectively of the study and control groups had a positive family history. This result is in agreement with El-Shishtawy & Mohammed, (2022) showed that about one-third (34%& 30%) of patients in the study and control groups respectively had a positive family history for kidney stone formation [19].
The current study indicated that there were highly significant differences between the study and control groups' responses regarding mean scores of adherences of healthy lifestyle practices post-nursing guidelines, while there were no statistically significant differences between both groups' pre-nursing guidelines. Also, there were statistically significant differences between the mean scores of adherences pre and post-nursing guidelines of the study group. This finding is compatible with Abdelwahab, *et al*., (2021) showed that the total and all dimensions of lifestyle patterns, including fluid intake, healthy dietary habits, physical activity, compliance with medications, weight monitoring, stress management and periodic follow up show

a significant improvement in the study group compared with the control group [2].

In the same line Salah El-din Amin, *et al*., (2022) revealed that nearly three-quarters of the studied patients had average practice. The patients' total scores on measures of knowledge and self-care management were substantially correlated with one another [15].

The current study illustrated that most patients in the study group and the control group had an unsatisfactory adherence level to the total healthy lifestyle practices pre-nursing guidelines. After implementing the nursing guidelines, most patients in the study group had satisfactory adherence levels, while most patients in the control group had unsatisfactory adherence levels with statistically significant differences between them. This result is supported by Mahmoud, *et al*., (2019) who stated that Pre-intervention, only a small number of individuals in both the study and control groups (19% and 21.4%, respectively) had a satisfactory total self-care practices score, but post-intervention, the majority of people in the study group (73.8% of people) had a satisfactory score [10].

In addition, this result was further supported by Qaseem, *et al*., (2018) stated that more than half of the patients in the study had sufficient experience with stone development, the results showed [20].

According to the investigator`s point of view, this improvement in adherence to healthy lifestyle practices regarding (restricted foods, fluids, and healthy usual self-activities) reflect the positive effect of nursing guidelines. So, the hypothesis was supported which stated that patients' healthy lifestyle practices will be higher in the post-nursing guidelines than in the pre-nursing guidelines among the study group.

Conclusion

Most patients in the study group and the control group had unsatisfactory adherence levels to healthy lifestyle practices pre-nursing guidelines. After implementing nursing guidelines, most study groups had satisfactory adherence levels while most patients in the control group had unsatisfactory adherence levels with statistically significant differences between them. Therefore, the nursing guidelines have a positive effect on adherence to healthy lifestyle practices to prevent its recurrence.

Recommendations

Based on the results of the present study the following can be recommended

1. Recommendations for patients

- Participate in health education courses regarding urinary tract stones and other aspects of lifestyle changes to treat and prevent stone formation.
- Encourage patients to continue following evidence-based practices to prevent stone recurrence.

2. Recommendations for nursing

- Participate in the creation of an educational unit for urinary tract stone patients in the nephrology and urology hospital.
- Engage in the development of evidence-based guidelines regarding urinary tract stones and other aspects of lifestyle changes to treat and prevent stone formation.
- Home visits or phone consultations are essential for evaluating the progress of patients' conditions and motivating them to adopt healthy lifestyle behaviors to prevent stone recurrence.

3. Recommendations for the community

- Providing Arabic booklets with easy language and numerous simple photos. They should be accessible in urologic outpatient clinics and also given to each patient for free.

4. Recommendations for nursing research

- Performing more studies to evaluate the effect of long-term follow-up of healthy lifestyle behavior modification guidelines on urinary tract stone recurrence.
- Conducting similar studies on a larger probability samples is recommended to achieve generalization of the findings.

Conflict of Interest

Not available

Financial Support

Not available

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