Self-Care Management of Kidney Stone Patients

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Abstract

Background: Kidney stone is a common and important problem affected urinary system due to changing the lifestyle and diet. Self-care management has a great effect in improving and health status of the patients. **Aim of the study:** Was to assess self-care management of kidney stones patients. **Design**: A descriptive research design. **Settings**: This study was conducted at Urology Outpatient Clinics of Benha University Hospital. **Sampling:** A convenient sample of kidney stone patients who attending in previously mentioned setting for six months (200 patients). **Data collection tools:** Two tools were used to conduct this study; **I.** A structured interviewing questionnaire. **II.** Kidney stone patients' practices about self-care management. **Results:** More than two fifths of the studied patients had poor total knowledge about kidney stone. While more than one third of them had average total knowledge about kidney stone. Less than three quarters of the studied patients had average total score of self-care pattern. While almost one fifth of them had good total score of self-care pattern. **Conclusions:** There was highly statistically significant relation between studied patients' demographic characteristics and their total knowledge score moreover; there was highly statistically significant relation between studied patients' demographic characteristics and their total score of self-care pattern. Less than three quarters of studied patients had average total score of self-care pattern and less than half of studied patients had poor total knowledge about kidney stone. **Recommendations:** Developing and implementing educational program for kidney stone patients to improve self-care management.

Keywords: Kidney stone, Knowledge, Self-care managements.

Introduction

A kidney stone is a hard object that is made from chemicals in the urine. There are four types of kidney stones: calcium oxalate, uric acid, struvite, and cysteine. A kidney stone may be treated with shockwave lithotripsy, uteroscopy, percutaneous nephrolithomy or nephrolithotripsy. The stone may stay in the kidney or travel down the urinary tract into the ureter. Sometimes, tiny stones move out of the body in the urine without causing too much pain. But stones that don't move may cause a back-up of urine in the kidney, ureter, the bladder, or the urethra and causes the pain (**Lisa et al., 2019**).

Kidney stone can be caused by slow urine flow allows accumulation of crystals which damaging the lining of the urinary tract and decreasing the number of inhibitor substances that would prevent crystal accumulation, may remain asymptomatic until passed into a ureter or urine flow is obstructed, at which time the potential for renal damage is acute and the level of pain is

at highest, and can be caused by dehydration; heredity; excessive intake of vitamins C and D, grapefruit juice, and purines (gout); congenital renal abnormalities; and some medications, such as acetazolamide (Diamox) or indinavir (Crixivan) (**Yang et al., 2021).**

Management calcium stones: Reduced dietary protein and sodium intake; liberal fluid intake; medications to acidify urine, such as ammonium chloride and thiazide diuretics if parathormone production is increased. And for uric stones: low purine and limited protein diet; allopurinol (Zyloprim). Moreover for cystine stones: low protein diet; alkalinization of urine; increased fluids also for oxalate stones: dilute urine; limited oxalate intake (spinach, strawberries, rhubarb, chocolate, tea, peanuts, and wheat bran) (**Lisa et al., 2019)**.

Kidney stone self-management behaviors including medication adherence, self-blood pressure monitoring, and lifestyle modifications involving diet, exercise, and tobacco are critical components of recommended kidney stone treatment and have been associated with significant improvements in kidney stone (**Flynn et al., 2017).**

Community health nurse plays a key role in kidney stone focus on alleviating pain by administering opioid analgesics (IV or intramuscular) with IV NSAID as prescribed, encourage and assist patient to assume a position of comfort, assist patient to ambulate to obtain some pain relief and monitor pain closely and report promptly increases in severity. Also the nurse should focus on monitoring and managing complications by encourage increased fluid intake and ambulation, begin IV fluids if patient cannot take adequate oral fluids, monitoring total urine output and patterns of voiding, encouraging ambulation as a means of moving the stone through the urinary tract, instructing patient to report decreased urine volume, bloody or cloudy urine, fever, pain and instruct patient to report any increase in pain and monitoring vital signs for early indications of infection; infections should be treated with the appropriate antibiotic agent before efforts are made to dissolve the stone (**Kritika & Alka 2018)**.

Significance of the study:

In Egypt, kidney stones occur as 1 every 1000 people, 12.5% of cases undergoing surgery at urology unit is due to renal stone it represents about 4.5 million patients having a various type of renal stones. Although some patients are asymptomatic with their KSD, many will have pain, Urinary Tract Infection (UTI) or hematuria and may require multiple hospital admissions or multiple surgical procedures (**Thongprayoon et al., 2020).**

Kidney stone formation may also affect their kidney function with an impact on their self-care management. Patients with KSD can have increased levels of bodily pain, depression, loss of days at work and increased anxiety and financial distress, leading to overall lower self-care practice. The impact of KSD on patients' is becoming increasingly important to consider, as the focus of treatment has shifted not just only from considering morbidity and mortality but also considering the impact on their health status (**Yang et al., 2021)**.

Aim of the study:

The aim of the study was to assess self-care management of kidney stones patients.

Research questions:

1) What is kidney stone patients knowledge about self-care management?
2) What is kidney stone patient's self-care management?
3) Is there a relation between patients socio-demographic characteristics and their knowledge and practices about self- care regarding kidney stones?

Subjects and method:

Research design:

A descriptive research design was utilized to conduct this study.

Setting:

The study was carried out at Urology Outpatient Clinics in Benha University Hospital.

Sampling:

A Convenient sample of all kidney stone patients who attending in previously mentioned setting for six months included in study. Total sample patient (200)

Tools for Data Collection: Two tools were used for data collection.

Tool I: A structured interviewing questionnaire schedule: it was consisted of three parts:

Part I: Demographic characteristics as age, sex, residence, marital status, level of education, occupation, residence, and family income. Family history of kidney stone as (there is history of kidney stone of family and the relationship of kinship

Part II: Patients general knowledge regarding kidney stone

Include "kidney stone mean, signs and symptoms of kidney stones, types of kidney stones, risk factors for kidney stones, tests that are done to diagnose kidney stones, complications of kidney stones, methods of preventing kidney stone and methods for treating kidney stones".

Part III: Self-care management, include "self-care management mean, self-care patients with kidney stones, physical care, the food for patients with kidney stones, the general methods of preventing kidney stones".

Scoring system of patients' knowledge

Each item was assigned a score of (2) give when answer was completely correct answer, a score (1) was given when the answer was incompletely correct and a score (0) was given when the answer was wrong/don't know. All knowledge variables were weighted according to items each question was scored as the following: Good if patients scored ≥ 75%, average if patients scored50<75 and poor if patients scored < 50%

Tool II: Kidney stone patient's practices about self-care management which include: Physical care, Psychological car, food for a patients with kidney stones, general methods of preventing kidney stones.

Scoring system for patients' self-care management: Each response was done as patients' reported self-care management was scored(2), sometimes done as patients' reported self-care management was scored(1) and not done as patients' reported self-care management was scored (0). These scores was calculated and self-care management score points was considered satisfactory if the score of self-care management >60% while considered un satisfactory if it is

<60%Reliability and content validity of the tools:

Tools validity and reliability:

The tool validity was done by three panel expertise in Community Health Nursing specialty who reviewed the tools for clarity, relevance; comprehensive, applicability and reliability. The reliability was done by Cranach's Alpha which revealed that the internal consistency of knowledge was 0.81 and the internal consistency of the practices was 0.95.

Ethical consideration:

The investigator clarified aim of the studied to patients included in the study. Patients ' oral consent was obtained from them before their participation in the study. patients were assured that all gathered data was used for research purposes only and the study was harmless. Additionally, patients allow to withdrawal from the study at any time without giving the reason. Confidentially of the gathered data and results were secured.

Pilot study:

A pilot study was carried out to test the applicability, clarity, efficiency of tools and time needed for each tool. It was done on 10% (20 patients) of the total subjects (200 patients) who included in the present study. Minor modifications were done in form of adding or omission of some questions and the last form was developed. Pilot study carried out at beginning of April (2020) to the end of April (2020).

Field work:

Data collection was carried out in the period from the beginning of April (2020) to the end of September (2020) covering six months .The investigator was available in the study settings three days weekly (Saturday, Monday and Wednesday) to collect data and implement this study alternatively in each study setting . The average numbers of interviewed patients were 5-6 patients per day. At the beginning of interview; the investigator welcomed each patients. The title, objectives, tools and the study technique were illustrated for each patients to obtain their approval and cooperation which is needed for conducting this study. Each patients was individually interviewed using Arabic structured interviewing questionnaire and mothers reported practices likert scale. The time needed for filling the knowledge questionnaire ranged from 15-20 minutes and about 15-20 minutes for filling the patients reported practice likert scale.

Statistical analysis:

The data collected were revised, coded, tabulated and statistically analyzed using Statistical Package for the Social Science (SPSS) version 20 for windows and running on IBM compatible computer. Results were presented by tables and graphs. Descriptive statistics were applied (e.g. frequency, percentages, mean and standard deviation) and chi-square coefficient (X2) was used. Reliability of the study tools was done using Cronbach's Alpha. A significant level value was considered when $p < 0.05$ and a highly significant level value was considered when $p < 0.001$.

P > 0.05 Not significant
P < 0.05* Significant
P < 0.001 ** Highly significant

Results:

Table (1): Shows that, 48.5% of studied patients were 30<40 years. Also 52.5% of them were male and 72% of the studied patients were married. 44.5% of the studied patients were illiterates and 61.5% of the studied patients were not working. While 64 % of them lived in rural. In addition to, 52.5% of the studied patients had enough family income and 92% of the studied patients hadn't family history of kidney stone

and 6% of the relation were father. 62.5% of the studied patients had information from medical team.

Table (**2**): Shows that, 18%- 17% of the studied patients had completely correct answer regarding the general methods of preventing kidney stones and physical care respectively, while 92%-83% of them had incomplete correct answer regarding self-care for patients with kidney stones and the food for a patients with kidney stones respectively. In addition to; 67% and 45% of them had incorrect knowledge regarding self-care management mean and psychological care.

Figure (**1**): Clears that, 44.5% of the studied patients had poor total knowledge about kidney stone. While, 38.5% of them had average total knowledge about kidney stone. In addition to, 17 % of them had good total knowledge about kidney stone.

Figure (**2**): Clears that, 73% of the studied patients had average score of self-care pattern. While, 19% of them had good total score of self-management. In addition to, 8% of them had poor total score of self-pattern.

Table (**3**): Shows that, there were highly statistically significant relation between studied patients demographic characteristics and their total knowledge score .P>0.001

Table (**4**): Shows that, there were highly statistically significant relation between studied patients demographic characteristics and their total self-care management score.

Table (**5**): Shows that, there were highly statistically significant correlation between studied patients total knowledge score and total self-care management score, p< 0.000** .

Table (1): Frequency distribution of studied patients regarding demographic characteristics (n= 200).

Demographic characteristics	No	%
Age		
> 30 years old	35	17.5
30-40 years	97	48.5
40-50 years	31	15.5
+ 50 years	37	18.5
Mean± SD	34.67±11.86	
Sex		
Male	105	52.5
Female	95	47.5
Marital status		
Single	19	9.5
Married	144	72.0
Widowed	37	18.5
Educational level		
Illiterates	89	44.5
Secondary education	61	30.5
University education or more	50	25.0
Occupation		
Working	77	38.5
Not working	123	61.5
Residence		
Urban	72	36.0
Rural	128	64.0
Income		
Enough	105	52.5
Not enough	95	47.5
There is history of kidney stones of family		
Yes	16	8.0
No	184	92.0
If yes, what is the relationship of kinship? Is it(n=8)		
Mother	4	2.0
Father	12	6.0
Source of information		
Medical team	125	62.5
Internet	31	15.5
Family or friends	20	10.0
Magazines and newspaper	67	33.5

Table (2): Frequency distribution of studied patients regarding their knowledge about kidney stone self-care management (n=200).

Self -care knowledge	Completely correct		Incomplete correct		Incorrect	
	No	%	No	%	No	%
Self-care management mean	16	8.0	50	25.0	134	67.0
Self-care for patients with kidney stones	8	4.0	184	92.0	8	4.0
Physical care	34	17.0	164	82.0	2	1.0
Psychological care	32	16.0	78	39	90	45.0
The food for a patients with kidney stones	30	15.0	166	83.0	4	2.0
The general methods of preventing kidney stones	36	18.0	164	82.0	0	0.0

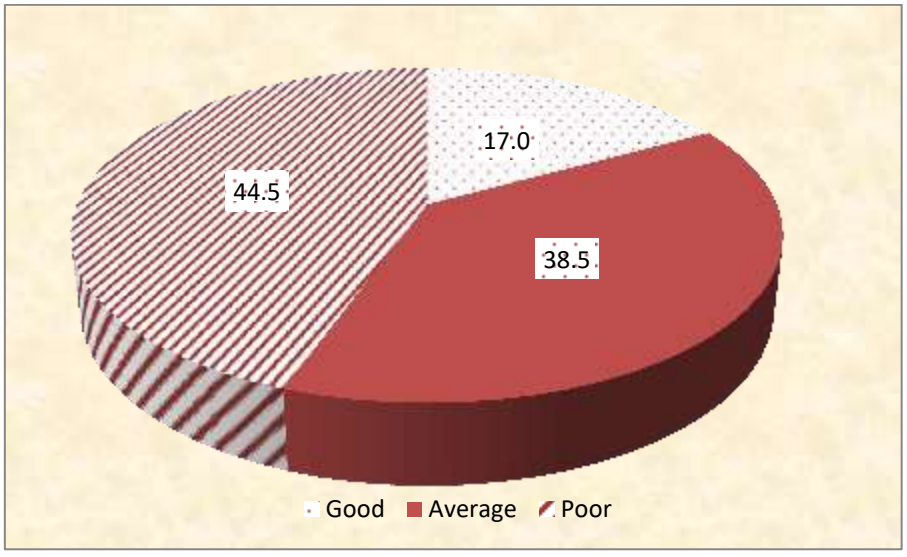

Figure (1): Percentage distribution of studied patients regarding level total knowledge score (n=200).

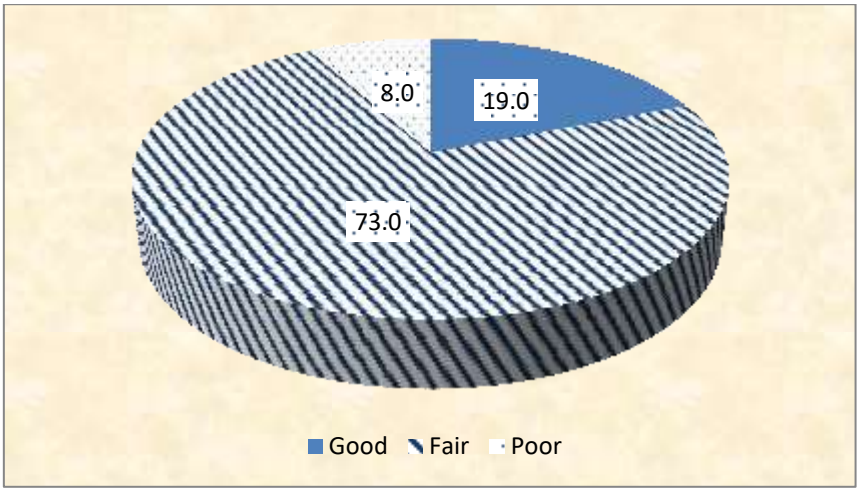

Figure (2): Percentage distribution of studied patients regarding score of self-care pattern (n=200).

Table (3): Statistically relation between total knowledge score of studied patients and their demographic characteristics (n=200).

Demographic characteristics	Total knowledge						X^2	P-value
	Poor (n=89)		Average (n=77)		Good (n=34)			
	No	%	No	%	No	%		
Age (years)								
> 30 years old	18	20.2	17	22.1	0	0.0	96.78	.000**
30-40 years	26	29.2	37	48.1	34	100.0		
40-50 years	8	9.0	23	29.9	0	0.0		
+ 50 years	37	41.6	0	0.0	0	0.0		
Sex								
Male	44	49.4	61	79.2	0	0.0	59.96	.000**
Female	45	50.6	16	20.8	34	100.0		
Marital status								
Single	18	20.2	1	1.3	0	0.0	91.05	.000**
Married	34	38.2	76	98.7	34	100.0		
Widowed	37	41.6	0	0.0	0	0.0		
Educational level								
Illiterates	89	100.0	0	0.0	0	0.0	307.74	.000**
Secondary education	0	0.0	61	79.2	0	0.0		
University education or more	0	0.0	16	20.8	34	100.0		
Occupation								
Working	0	0.0	77	100.0	0	0.0	200	.000**
Not working	89	100.0	0	0.0	34	100.0		

Table (4): Statistically relation between total self-care management score of studied patients and their demographic characteristics (n=200).

Demographic characteristics	Total practices						X^2	P-value
	Poor (n=16)		Fair (n=146)		Good (n=38)			
	No	%	No	%	No	%		
Age (years)								
> 30 years old	16	100.0	18	12.3	1	2.6	122.53	.000**
30-40 years	0	0.0	60	41.1	37	97.4		
40-50 years	0	0.0	31	21.2	0	0.0		
+ 50 years	0	0.0	37	25.3	0	0.0		
Sex								
Male	0	0.0	67	45.9	38	100.0	54.62	.000**
Female	16	100.0	79	54.1	0	0.0		
Marital status								
Single	0	0.0	18	12.3	1	2.6	25.35	.000**
Married	16	100.0	91	62.3	37	97.4		
Widowed	0	0.0	37	25.3	0	0.0		
Educational level								
Illiterates	0	0.0	89	61.0	0	0.0	154.05	.000**
Secondary education	0	0.0	23	15.8	38	100.0		
University education or more	16	100.0	34	23.3	0	0.0		
Occupation								
Working	16	100.0	23	15.8	38	100.0	118.16	.000**
Not working	0	0.0	123	84.2	0	0.0		

Table (5): Correlation between total knowledge and total self-care management score (n= 200).

Practices	Total knowledge	P-value
Total practices	r	
	0.66	0.000**

Discussion:

According to demographic characteristics of the studied patients, the result of the current study illustrated that, nearly half of studied patients aged from 30 to 40 years old and more than half of them were male. The result of study agreed with **Lisa et al**., (**2019**) who studied "Predictors of Symptomatic Kidney Stone Recurrence After the First and Subsequent Episodes" conduct the study in Olmsted County. Minnesota. and they found that more than half of patients aged between 30& 40 years old and nearly two thirds of them were male, from the investigator point of view this may be related to that the disease most commonly occur in middle age population due to sedentary life and increase intake of fast food. Conversely the finding study different with **Penniston et al.,(2016)** who studied "Factors associated with patient recall of individualized dietary recommendations for kidney stone prevention" conducted in America at multidisciplinary stone or urology clinic and revealed that, the mean age of studied sample was 56 ±13 years old.

Regarding educational level of studied patients, the result of the current study illustrated that, nearly half of studied patients were illiterates. The result of the study is supported by **Abdelwahab et al., (2021)** who studied "Effect of implementing Evidence-Based Guidelines on Lifestyle Modification for Adult Patients with Renal Stone Undergoing ESWL Procedure" conducted at Urology department at the Alexandria main University Hospital, and they revealed that more than one third of their study sample was illiterate. This may be related to high number of them lives in rural areas which characterized by lack of infrastructures, cultures, and lack of awareness about importance of education. The finding study disagreed with **Yang et al., 2021** who studied "Incidence and Risk Factors for Bilateral Nephrolithiasis: A Large Case-retrospective Study" conducted at in the Second Hospital of Tianjin Medical University, they revealed that more than three quarters of their study sample had secondary school education.

The result of the current study also revealed that nearly two thirds of patients weren't working and nearly half of them don't have enough income. The finding of the study is consistent with **Ahmed et al., 2019** who studied "Low Income and Nonwhite Race are Strongly Associated with Worse Quality of Life in Patients with Nephrolithiasis" conducted in Patients with stones at a total of 11 stone centers across the United States and revealed that more than half of studied patients weren't working and have insufficient income. from the investigator point of view this may be related to the high rate of illiteracy and living in rural area, also it may be related to the pain that caused by the disease result in impaired their ability to work.

Conversely, the result of the study disagreed with **Mousa, & Chackra,(2019)** who studied "Patient's perception of kidney stone prevention within the emergency department and its adherence factors: a single institution study" in the ED at Zahra Hospital at Beirut. They revealed that, about three quarters of studied patients were working and had sufficient income

Pertaining to patients' knowledge about kidney stone the result of the current study illustrated that one quarter of studied patients had adequate knowledge regarding definition of renal stones and more than one quarter of them had adequate knowledge about risk factors for kidney stone, the finding of the

study disagreed with **Jamnadass et al., (2018)** who studied "The Role of Social Media and Internet Search Engines in Information Provision and Dissemination to Patients with Kidney Stone Disease: A Systematic Review from European Association of Urologists Young Academic Urologists" conducted online and they revealed that more than half of studied patients had poor knowledge about definition and risk factors for kidney disease. This might be related to experiencing disease lead them to search and getting information from their treating doctor and nurse.

Regarding patients' knowledge about self-care management, the result of the current study revealed that, three quarters of studied patients had incorrect knowledge regarding self-care management and nearly half of them had impaired psychological status. The finding study is congruent with **Hess** (**2017**) who studied "Renal stone clinic survey: calcium stone formers' self-declared understanding of and adherence to physician's recommendations" conducted in Kidney Stone Center Zurich, they illustrated that more than half of studied patients had incorrect knowledge regarding self-care management .This might be related to lack of information source and afraid about the prognosis of disease result in stress and anxiety.

Pertaining to prevention of kidney stone formation, the result of the current study illustrated that only about fifth of them had a correct and complete knowledge regarding stone prevention of recurrence of kidney stone formation. The result of the study if congruent with **Penniston et al., (2016)**, who found that revealed that more than half of their study sample had incorrect knowledge and lack of understanding of preventive guidelines regarding stone formation, from the investigator point of view this may be interpreted that no one provide them with needed information and they didn't search for methods of preventing kidney stone formation.

The result of the current study illustrated that about half of studied patient had poor total knowledge regarding renal stone. The finding study agreed with **Hess, 2017** who studied "Renal stone clinic survey: calcium stone formers' self-declared understanding of and adherence to physician's recommendations" conducted in Kidney Stone Center Zurich and found that more than three quarters of his study sample had poor total level of knowledge regarding understanding of renal disease, this may be related to lack of exposure to adequate information and high illiteracy level,

Regarding studied patients' total score self-care pattern about self-care management, the result of the current study illustrated that nearly three quarters of studied patients had average practice, The result of the study agreed with **Qaseem et al., (2018)** who studied "Dietary and Pharmacologic Management to Prevent Recurrent Nephrolithiasis in Adults: A Clinical Practice Guideline from the American College of Physicians" conducted on published literature on this topic that was identified using Medline, the Cochrane Database of Systematic Reviews, Google Scholar, Clinical Trials.gov, and Web of Science, they revealed that more than half of studied patients had adequate practice regarding stone formation. this may be related to the effect of guidelines for life style modification such as increased fluid intake, increase mobilization, decrease fatty food and adherence to medication intake.

Pertaining to the relation between total knowledge and patients demographic characteristic, the result of the current study illustrated that there were a highly statistically significance difference between patients age and their total knowledge, young male patients had good total knowledge than older patients The results of the study is agreed with **Moudi et al., 2017** who studied "Nephrolithiasis in elderly population; effect of demographic characteristics" conducted in Amirkola, a small town in northern Iran near the Caspian Sea. They revealed that there was statistically significant difference between patients' age and their knowledge toward the disease. From the researcher point of view, this may be related to younger patients always search for information and acquire knowledge about their disease and their management to avoid further complications.

Regarding to the relation between total knowledge and patients marital status, the result of the current study illustrated that there were a highly statistically significance difference between patients marital status and their total knowledge, married patients had good total knowledge than single and widow patients and also there were a highly statistically significance difference between patients educational level and their total knowledge, university and highly educated patients had a good total knowledge than illiterate and secondary educated patients. The finding of the study is congruent with **Abdelmowla et al.,(2017)** who studied "Impact of nursing interventions and patients' education on quality of life regarding renal stones treated by percutaneous nephrolithotomy conducted at Assiut Urology and Nephrology Hospital, they revealed that there were statistically significant relation between patients' (marital status and education) and their total knowledge regarding kidney stones. This may be related to that married patients always have a support motivation from their family to search for information about their disease to treat and prevent disease recurrence

Concerning the relation between total self-care management and patients' demographic characteristics, the result of the current study illustrated that, there were highly statistically significant difference between patients' age and total their practice. The finding of the study is congruent with **Abdelwahab et al., (2021)**, they revealed that there were statistically significant relation between patients' age and their self-care management. This may be interpreted that younger patients had a good total practice; they do their best to depend on themselves and not to rely on others in meeting their essential needs and also prefer to solve their health problems without affording their families their fatigues.

The result of the current study illustrated that, there were highly statistically significant relation between patients' total self-care practice and their educational level& working status. The study is congruent with **Abdelwahab et al., (2021)** they demonstrated, that highly educated and working patients adhere to self-care practice as increase fluid intake, adequate low fat diet, adherence to exercise, follow-up appointment and prescribed medication intake, this may be interpreted that highly educated and working patients had a good total practice because are more knowledgeable, having a stronger sense of self-care, autonomy and regularly take care of themselves than less educated people.

Regarding the correlation between patients' knowledge and their total self-care management, the result of the current study

showed that there was statistically significant correlation between patients' knowledge and their total practice. This may be interpreted that patient with satisfactory knowledge had adequate performance regarding their self-care management. The finding of the study is consistent with **Abdelmowla et al., 2017** who revealed that, there was a highly statistically significant correlation between patients knowledge and their total self-care management regarding kidney stones.

Conclusion

There was highly statistically significant relation between studied patients' demographic characteristics and their total knowledge score moreover; there was highly statistically significant relation between studied patients' demographic characteristics and their total self- care management score.

Recommendations:

Health educational program should be developed and implemented for kidney stone patients to increase their awareness about health practices toward kidney stone.

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إدارة الرعاية الذاتية لمرضى حصوات الكلى

سمر صلاح الدين امين- نوال محمود سليمان – سماح سعيد صبري

حصوات الكلى عبارة عن رواسب صلبة مصنوعة من المعادن والأملاح التي تتكون داخل الكلى. النظام الغذائي ، ووزن الجسم الزائد ، وبعض الحالات الطبية ، وبعض المكملات والأدوية من بين الأسباب العديدة لحصوات الكلى. يمكن أن تؤثر حصوات الكلى على أي جزء من المسالك البولية من الكلى إلى المثانة. في كثير من الأحيان ، تتكون الحصوات عندما يتركز البول ، مما يسمح للمعادن بالتبلور والالتصاق ببعضها البعض الرعاية الذاتية هي قدرة الفرد المصاب بمرض مزمن على المشاركة في عملية يومية ذات دوافع ذاتية وتعاونية (تُجرى مع دعم الأسرة والاجتماعية ومقدمي الرعاية الصحية) لإدارة الأعراض. لذلك هدفت هذه الدراسة الي تقييم الرعاية الذاتية لمرضى حصوات الكلى. وقد أجريت الدراسة في عيادات المسالك البولية الخارجية بمستشفى جامعة بنها علي ٢٠٠ مريض مصاب بحصوات الكلى. حيث أظهرت النتائج بان أكثر من خمسي المرضى الذين خضعوا للدراسة لديهم مستوى ضعيف من المعلومات بحصوات الكلى. أقل من ثلاثة أرباع المرضى الذين خضعوا للدراسة كان لديهم مستوى متوسط لنمط الرعاية الذاتية. كما اوصت الدراسة بتطوير وتنفيذ برنامج تعليمي لمرضى حصوات الكلى لتحسين الرعاية الذاتية لديهم.