

Effect of Educational Guidelines Prior Nephrolithotripsy on Patients' Performance and Satisfaction

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Abstract

Background: Nephrolithotripsy is a non-invasive kidney stone treatment procedure which breaks the stones into small fragments. Education about nephrolithotripsy helps patients gain best performance (knowledge, practice and behavior) to meet ongoing health care needs. **Aim of study:** Was to evaluate the effect of educational guidelines prior nephrolithotripsy on patients' performance and satisfaction. **Research design:** A quasi-experimental, pre-test and post-test intervention research design was implemented to conduct the current study. **Setting:** The study was conducted at the Urology department at Benha University Hospital, Qalyubia Governorate, Egypt. **Sample:** A purposive sample consisting of 80 urinary stone patients included case study 40 patients and control study 40 patients. **Tools of data collection:** Four tools were used to collect data: (I) A structured interview questionnaire for patients included four parts: Patients' personal data, patients' medical history, patients' health habits and patients' diagnostic studies. (II) Patients' knowledge about nephrolithotripsy assessment sheet. (III) Patients' practice and behavior checklist; included three parts: Diet ,fluids, sports activities and behavior. (IV) Patients' satisfaction assessment scale. **Results:** There was statistical significant improvement in patients' total knowledge level about nephrolithotripsy to 87.5%, increased mean score of patients' practice of kfluids, foods and sports activities and increase total patients' follow up behavior to82.5% in study group than control groups after implementing educational guidelines. **Conclusion:** Application of the educational guidelines has a positive effect on patient's knowledge, practice and behavior regarding nephrolithotripsy of the performance mean scores of study group post guidelines were statistically significantly higher than pre guidelines implementation. **Recommendations:** Continuous evaluation of patient's knowledge about nephrolithotripsy, identify their needs, and barriers that hinder healthy habits to prevent urinary stones recurrences.

Keywords: Educational guidelines, Nephrolithotripsy, Patients' performance and satisfaction.

Introduction:

Kidney stone disease, (also called renal calculi, nephrolithiasis or urolithiasis) are hard deposits made of minerals and salts that form inside the kidneys. 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 (Morgan & Pearle.2016).

The symptoms of kidney stone are related to their location whether it is in the kidney, ureter, or urinary bladder. Initially, stone formation does not cause any symptom. Later, signs and symptoms of the stone disease consist of renal colic (intense cramping pain), flank pain (pain in the back side), hematuria (bloody urine), obstructive uropathy (urinary tract disease), urinary tract infections, blockage of urine flow, and hydronephrosis (dilation of the kidney). (Ticinesi et al., 2016).

The nurse should introduce Postoperative care that includes: close monitoring of vital signs, take all medication as prescribed by doctor after the surgery. Close observation of urine output and color changes and know the patient at home to observe blood in the urine after surgery procedure. This is a temporary condition which clears up after a few days of the surgery, wound care and careful observation for dressing and tube drainage, prevention of infection and prevention and monitoring for postoperative complications (Aminsharifi et al., 2016).

Patient satisfaction is the degree of congruence between a patient's expectation before educational guideline and their perception after receiving educational guideline. The American Nurses Association's definition of patient satisfaction with nursing, the patient's opinion of information received from nurses during their hospitalization, is adapted for our study (Teng & Norazliah, 2018).

Significant of the study:

Kidney disease is widespread in Egypt, causing the death of more than 19,000 people annually, according to the latest statistics of the World Health Organization (WHO). It is the fourth most common cause of death in Egypt after coronary heart disease, stroke and liver disease. 12th globally in death rates from

kidney disease, and seventh in the world in infection rates, and the number of kidney failure patients is more than 52 thousand people annually. In Egypt, Lithotripsy becomes the first line of treatment for renal calculi due to its non-invasiveness and high success rate. Urinary tract calculi are treated with lithotripsy with success rate 92%, and 75% of patients were able to leave the hospital on the same day of the operation (Hafez et al., 2019).

Aim of the study:

The aim of the study was to evaluate the effect of educational guidelines prior nephrolithotripsy on patients' performance and satisfaction.

Research hypotheses:

H1- There would be a significantly improvement of the patients' knowledge among the study group after implementing the educational guidelines than the control group.

H2- Patients' practice would be significantly enhanced among the study group post guidelines than the control group.

H3- Patients' satisfaction would be significantly enhanced among the study group post guidelines .

Subjects and Method

Research design:

Quasi- experimental research design was utilized to achieve the study's aim.

Study setting:

The study was conducted at Urology department affiliated to Benha University Hospital, Benha, Egypt.

Subjects:

A Purposive sample. 80 adult patients who fragment the stones by lithotripsy at mentioned setting during six months were included in this study, and divided randomly into two equal groups (40 study & 40 control groups). Group I (study group): consisted of (40) patients who received the educational guidelines along with the routine hospital

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care. And Group II (control group): consisted of (40) patients who received the routine hospital care only.

Exclusion criteria:

Patients with significant cognitive impairment, pregnant women, patients have kidney cancer, obese patients and patients with liver cirrhosis were excluded from the study.

Tools of data collection:

Four tools were used for data collection

First Tool: “Structured interview questionnaire”

This tool was designed by the researcher and written in simple clear Arabic language after reviewing recent relevant literatures and scientific references. It involved four parts: personal data, to cover the following data:

Part I: Patients' personal data: This part designed to assess personal data of the studied patients. It included 7 questions about patient's age, sex, place of residence, educational level, marital state and occupation.

Part II: Patients' medical history: Designed to assess patients' health history which included; (past, current and family history), patients' health habits, and patients' diagnostic studies for studied subjects and it included 25 questions distributed into four section as the following:

Section I: patients' past medical history: It included 9 multiple choice questions about previous hospitalization, onset of stone occurrence, chronic medical disease, previous management of urinary stones and types of modern device used in treatment of kidney stones.

Section II: patients' current medical history related to patients' health status: It included 5 multiple choice questions about the symptoms

that the patient is experiencing while urinating.

Section III: patients' current medical history related to pain assessment. It included 9 multiple choice questions about complain of pain, type of pain.

Section IV: Family history: It included 2 multiple choice question about presence of family member complaining of kidney stones and type of kinship.

Part III: Patients' health Habits: It aimed to assess patients' health habits and included 8 multiple choice questions about source of water, amount of daily water, amount of daily fluid intake.

Scoring system: Each item in the questionnaire was given score. One score was given for healthy habit and zero score was given for un healthy habit. Then the scores were summed up, the total score in this part was ranged from 0 to 8 scores. The scores were converted into a percent and categorized as follows: more than or equal $\geq 70\%$ (≥ 6 scores) indicated healthy habit while, less than $< 70\%$ (< 6 scores) indicated unhealthy habit.

Part IV: Patients' diagnostic studies: This part designed to assess patients' diagnostic studies and included 13 closed ended questions about lab investigation .

Second Tool: Patients' knowledge assessment sheet (pre/ post implementation of the guidelines)

It was designed to assess patients' knowledge regarding nephrolithotripsy which included 21 questions distributed into three parts as the following:

First Part: patients' general knowledge about nephrolithotripsy: It included 4 questions related to adequacy information about nephrolithotripsy

Second Part: patients' knowledge about types of nephrolithotripsy: It included 10 questions.

Third Part: patients' knowledge after nephrolithotripsy: It included 7 questions.

Knowledge scoring system:

For each question the score was given as 1 scores for right answer, and zero score for wrong answer. Then the scores were summed up, the total score for knowledge was ranged from 0 to 21 score. The scores were converted into a percent and categorized as follows: more than or equal $\geq 70\%$ (≥ 15 score) indicated satisfactory level of knowledge while, less than $< 70\%$ (< 15 score) indicated unsatisfactory level of knowledge.

Third Tool: Patients' practice and behavior checklist (pre/ post implementation of the guidelines)

It was designed to assess patients' practice and behavior which included three parts. Part 1 and 2 are a Likert scale with three choices of always, sometimes and never which included patients' diet and activity as the following;

The first part: assessing the patient's diet included 44 questions about allowed and restricted of fluids as well as allowed and prevented foods. It involved fourth sections, **first section:** contained 5 questions about allowed fluids, **the second section** contained 7 questions about prevented fluids, **third section** contained 13 questions about the allowed food items and **fourth section** contained 19 questions about the food items that should be prevented.

Scoring system:

For each question, the score was given as 2 scores for always, 1 score for some time and zero score for never regarding the allowed foods and fluids, while 2 scores for never, 1 score for sometimes and zero score for always regarding the prevented foods and fluids. Then the scores were summed up, the total score in allowed foods and fluids was

ranged from 0 to 36 score. The scores were converted into a percent and presented in three categories as follows: 36 score indicated that the patients were always eating allowed foods and fluids, while more than score from 18 to less than 36 indicated that patients' were sometimes eating allowed foods and fluids and scores from 0 to less than 18 indicated that their never eating allowed foods and fluids. Total score in prevented foods and fluids was ranged from 0 to 52 score. Scores of 52 indicated that the patients were never eating prevented diet, while scores from 26 to less than 52 indicated that patients' were sometimes eating prevented foods and fluids, scores from 0 to less than 26 indicated that they always eating prevented foods and fluids.

The second part: Questions about assessing the patients' activity included 8 questions about light exercise, walking, swimming, heavy exercise and duration of exercise.

Scoring system:

For each question the score was given as 2 scores for always, 1 score for some time and zero score for never. Then the scores were summed up, the total score in this part was ranged from 0 to 16 score. The scores 16 indicated that patients were always practice the sports activity, while scores from 8 to less than 16 indicated that patients' were sometimes practicing sports activities and scores from 0 to less than 8 indicated that they never practicing the sports activity.

Scoring system for total practice: Total score of practice was (0 - 104) this score was converted into a percent and presented in two categories as follows: Satisfactory level at $\geq 70\% = \geq 74$ scores, and un satisfactory level at $< 70\% = < 74$ scores according to statistical design.

The third part: Questions related to assess patient's behavior to follow-up before and after the nephrolithotripsy. This part contains close ended questions with yes or no, it included 19

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questions and distributed into two sections. **First section** involved 10 questions before nephrolithotripsy which included the follow-up appointments before the nephrolithotripsy. **Second section** involved 9 questions after nephrolithotripsy included the follow-up appointments after the nephrolithotripsy.

Scoring system:

For each question the score was given as 1 score for yes answer of question, zero score for no answer of question by. Then the scores were summed up, the total score in this part was ranged from 0 to 19 score. The scores were converted into a percent and categorized as follows: more than or equal $\geq 70\%$ indicated strong follow up behavior, less than $< 70\%$ indicated weak follow up behavior.

Fourth Tool: Patients' satisfaction assessment scale : This part designed to assess patients' satisfaction with the educational. It was adapted from (Thomas, et al., 1996). It is a Likert like scale with three responses, satisfying, somewhat satisfying and unsatisfying. Items of the scale can be used to monitor patients' satisfaction of the study group on educational guidelines. This part included 18 question about the duration of the educational guidelines.

Scoring system: For each question the score was given as 2 scores for satisfying, 1 score for somewhat satisfying and zero score for unsatisfying. Then the scores were summed up, the total score in this part was ranged from 0 to 36 score. The scores were converted into a percent and presented in three categories as follows: more than or equal 85% (≥ 30 score) indicated that patients were highly satisfied of educational guidelines, while less than 85 % (< 30 score) indicated that they were unsatisfied of educational guidelines.

“Developed educational guidelines booklet:”

It was designed by the researcher and adapted from (Cheungpasitporn et al., 2016) and (Saeed et al., 2018). It consisted of six major parts concerned with providing patient with essential information .

The first part: covered structure of the urinary system, the function of the urinary system, the most common diseases of the urinary system and ways to keep the kidneys healthy.

The second part: Covered knowledge about kidney stones, definition of urinary stones, how stones form inside the urinary system and kidneys, types of urinary stones, signs and symptoms of urinary stones, factors that increase the risk of developing urinary stones, causes of stones in the urinary system and methods of diagnosing stones in the urinary system

The third part: Covered methods of treating kidney stones, how to treat small stones, treating large stones that cause pain in different ways. Shock waves lithotripsy, Percutaneous nephrolithotomy (surgical nephroscopy), ureteroscopy lithotripsy, and complications of fragmentation methods.

The fourth part: Covered nursing care pre- and post-nursing care of nephrolithotripsy: Preparations - instructions and nursing instructions followed before and after nephrolithotripsy.

The fifth part: Covered the importance of sports to prevent recurrence of stones, the importance of exercise and its benefits for patients with urinary stones and types of exercise suitable for patients with urinary stones.

The six part: Covered diet to prevent recurrence of kidney stones after nephrolithotripsy, diet to prevent the formation of oxalate or phosphate stones, diet

to prevent the formation of uric acid stones, diet to prevent the formation of struvite stones, diet to prevent cystine stones and foods that improve kidney function and help break up stones.

Tools Validity:

The tools of data collection were submitted to a panel of five Nursing experts in the field of Medical Surgical to test the content validity, modification were carried out according to the panel' judgments on clarity of sentences and the appropriateness of content. The reliability was done by Cronbach's Alpha coefficient test which revealed that each of the four tools consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool .

Tools Reliability:

Reliability was testing statistically to assure that the tool was reliable before data collection, and it was evaluated using test-retest method. Internal consistency reliability of the tools was tested using " Cronbach Alpha Test". The reliability scores of the tools were r coefficient for knowledge (r=0.841%), for practice was (r=0.870%) for behavior (r=0.806%) and for satisfaction was (r=0.824%), which denotes the high internal consistency of the used tools.

Ethical considerations:

Official permissions for data collection were generated from hospital directors and head managers of the urology department . Once the researcher was granted approval, patients' approval was taken after an explanation the aim of the study; they were also informed that their participation is optionally, and that they have the right to withdraw at any time without any consequences. Then, verbal consent was obtained from each participants enrolled into the study. The researcher was assured

maintaining anonymity and confidentiality of data. All information was gathered used only for their benefit and for the purpose of the study.

Pilot Study:

Pilot study was carried out on 8 patients (10%) of total study patients who receiving nephrolithotripsy in order to test the clarity and applicability of the study tools and the guidelines, to estimate the time required for interview as well as to identify any possible obstacles that may hinder data collection. Based on the results of the pilot study, the necessary modifications and clarifications of some questions were done to have more applicable tools for data collection. Patients involved in the pilot study were excluded from the main study and replaced by others. The pilot study was done two weeks before starting the study.

Field Work

Data collection of the current study was carried out through six months, from the end of October, 2020 to end of April 2021. The process of data collection was achieved through: (pre-test): The study was conducted through the following three phases:

Phase I: assessment phase:

Pre-test questionnaire was administered to the study patient to examine their actual level of knowledge of nephrolithotripsy, practice and behavior of patients that causes formation of kidney stones. Each patient was interviewed before applying educational guidelines in order to collect the baseline patient's data (study and control groups) on socio-demographic data, health habits, as well as medical and family history using (**Tool I**). Assess the patient's data about nephrolithotripsy knowledge (**Tool II**). Assess the patient's data about practice and behavior regarding nephrolithotripsy (**Tool III**).

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Phase II: Implementing phase:

1. The guidelines implementation was carried out into four sessions, that included completely theoretical sessions. Time of each session took according to the topics included in the session, including periods of discussion according to the patients' progress and feedback.

2. The patients (40) (study group) were divided into 13 small groups, each group consist of 3 patients, different teaching and learning methods were used during the sessions which included; group discussions, brain storming, to learn patients about nephrolithotripsy and recurrence of kidney stones.

3. The guidelines booklet was given to each patient in the study group in order to help for reviewing and support teaching it was written in a simple Arabic language and supplemented by photos and illustrations to help the patient understanding of the content. The booklet was given to patients in the control group at the end of data collection to benefits from

4. At the beginning of the first session, patients were oriented regarding the guidelines contents, its purpose and its impact on his condition. Patients were informed about the time of the next session at the end of the sitting.

5. Each session was started by a summary about what has been discussed in the previous session and the objectives of the new session, using simple Arabic language, also, the session ended by a summary of its contents and feedback from the patients was obtained to ensure that he/ she got the maximum benefit.

Guidelines sessions: were carried out into 4 theoretical sessions. That included the following:

Session (1): (introductory session) orientation and explanation of reasons and importance of educational guidelines and give an explanation about the objectives of educational program. It covered items related to anatomy of urinary system, the function of the urinary system, the most common diseases of the urinary system and ways to keep the kidneys healthy.

Session (2): It covered items related to information about kidney stones, definition of urinary and kidney stones, how stones form inside the urinary system and kidneys, types of kidney stones and urinary system, signs and symptoms of kidney and urinary system stones, factors that increase the risk of developing urinary and kidney stones, causes of stones in the urinary system and kidneys and methods of diagnosing stones in the urinary system and kidneys.

Session (3): It covered items related to methods of treating kidney stones, how to treat small stones, treating large stones that cause pain in different ways. The first method: shock waves lithotripsy, how to break up stones with shock waves, indication and contraindications for using this method. The second method: percutaneous nephrolithotomy (surgical nephroscopy), how to extract stones in this way, indication for using this method and the benefits of using lasers in traditional and flexible endoscopes. The third method: ureteroscopy lithotripsy, how to break up the stones in this way, indication for this method and complications of fragmentation methods, preparations - instructions and nursing instructions followed before and after nephrolithotripsy.

Session (4): It covered items related to the importance of sports to prevent recurrence of stones, the importance of exercise and its benefits for patients with urinary and kidney stones, types of exercise suitable for patients

with urinary and kidney stones and diet to prevent recurrence of each type of kidney stones after nephrolithotripsy.

*The researcher carried revision and reinforcement according to patients' needs. Also the researcher answered questions.

Phase III: Evaluation phase:

It aimed to evaluate the effect of nursing guidelines on the patients' knowledge and practice regarding nephrolithotripsy, recurrence of kidney stones and patients' satisfaction toward the educational guidelines. It was investigated the differences between pre and post implementation of the performing guidelines. The evaluation was done by using the same study tools of the pretest through the following phases:

Phase 1: it was done immediate post guidelines implementation to evaluate patients' knowledge (**tool II**) for study and control group related to nephrolithotripsy and to evaluate the satisfaction using (**tool IV**) of patients toward educational guidelines for study group. Comparison between patients' pre-test and post-test finding was done. This interview took about 20 to 30 minutes.

Phase 2: it was done two months later following implementing the guidelines. Each patient was interviewed individually after applying educational guidelines for doing post-test, to evaluate the effect of the educational guidelines on patients' practices and behavior. An evaluation was done by using a (**tool III**) for study and control group in order to compare the change in the studied patients' practices.

Statistical analysis:

The collected data were organized, categorized, tabulated and analyzed using the number and percentage distribution. Statistical analysis was computed by Statistical Package for Social Sciences (SPSS 20.0). Data were presented using descriptive statistics in the form of percentages, mean

degree and standard deviation (SD). Chi square test (χ^2) were used for comparisons between qualitative variables to find out relations. Independent t test used to differentiate between quantitative data of different groups before and after implementation of health educational guidelines. Relation between different numerical variables was tested using Pearson product-moment correlation coefficient.

Results:

Table (1): Reveals that there was no significant statistical difference between study and control groups regarding their personal data with ($p > 0.05$). Where, 37.5% & 35% of the study and control groups age ranged between 40 to less than 50 years old with Mean \pm SD 43.99 \pm 5.24 & 44.7 \pm 5.09 years respectively, while 52.5% & 55% of study and control groups were males respectively. As well, 45% & 50% of both groups had intermediate educational level respectively, 77.5% of study & 80% of control group were married respectively. Moreover, and 60% of study and 55% of control groups lived in rural areas respectively, 72.5% & 65% of both groups are working respectively and 75.9% & 69.2% of them have office work.

Figure (1): Displays that 12.5% of the study group had satisfactory level of knowledge about nephrolithotripsy pre educational guidelines. While, 87.5% of the study group had satisfactory level of knowledge post educational guidelines, while 15% of the control group had satisfactory level of knowledge pre educational guidelines and 16% of the control group had satisfactory level of knowledge post educational guidelines.

Table (2): Illustrates that, there was no significant statistical difference between study and control groups regarding their practice of nephrolithotripsy pre guidelines at ($p > 0.05$), where 15%, 20%, 22.5% & 17.5% in

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study group and 20%, 15%, 17.5% & 20% in control group had satisfactory level regarding fluids intake, allowed foods, avoided foods as well as sports activities pre educational guidelines. While 82.5%, 87.5%, 90% & 85% of them in study group had satisfactory level regarding fluids intake, allowed foods, avoided foods and sport activity after guidelines with highly significant statistical difference between study and control groups (post guidelines) at ($P = \leq 0.001^{**}$).

Figure (2): Illustrates that 12.5% of study group and 15% of control group had positive (strong follow up) behavior about nephrolithotripsy pre educational guidelines, but 82.5% in study group & 15.50% in control

group had positive (strong follow up) behavior about nephrolithotripsy post educational guidelines.

Table (3): Illustrates that , shows correlation between studied variables among study group, it was noticed that there were a highly significant and positive correlation between total knowledge and total practice, total behavior and total satisfaction with each other at p value ($<0.001^{**}$)

Figure(3) : Illustrates that 85% of the study group were highly satisfied with educational guidelines, while 15% of them were unsatisfied with educational guidelines

Table (1): Distribution of both groups according to their personal data (n=40).

Patients' personal data	Variables	Study group N=40		Control group N=40		X ² tests P Value	
		N	%	N	%	X ²	P
Age (year)	20-<30	8	20	7	17.5	1.209	0.076 >0.05
	30-<40	8	20	9	22.5		
	40-<50	15	37.5	14	35		
	50-60	9	22.5	10	25		
	Mean SD	43.99±5.24		44.7±5.09		T=0.614	0.538 >0.05
Sex	Male	21	52.5	22	55	1.711	0.080 >0.05
	Female	19	47.5	18	45		
Educational level	Illiterate	4	10	4	10	1.008	0.089 >0.05
	Read and write	14	35	13	32.5		
	Intermediate	18	45	20	50		
	University	4	10	3	7.5		
Marital status	Single	7	17.5	6	15	1.009	0.089 >0.05
	Married	31	77.5	32	80		
	Divorced	2	5	1	2.5		
	Widow	0	0	1	2.5		
Residence	Rural	24	60	22	55	1.335	0.073 >0.05
	Urban	16	40	18	45		
Occupation	Working	29	72.5	26	65	1.232	0.077 >0.05
	Not Working	11	27.5	14	35		
Type of work	N=29		N=26				
	Manual work	7	24.1	8	30.8	1.055	N=26
	Office work	22	75.9	18	69.2		

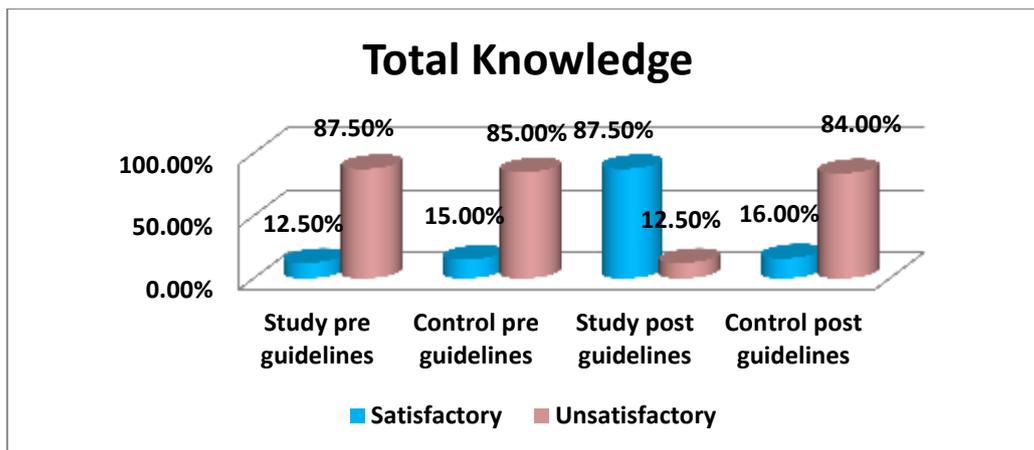


Figure (1): Comparison between study and control groups related to their total knowledge levels.

Table (2): Comparison between study and control groups related to their total practices of nephrolithotripsy (n=40).

Practice items related to nephrolithotripsy		Study groups (pre guidelines) N=40		Control groups (pre guidelines) N=40		Study groups after 2 months' post guidelines N=40		Control groups (post guidelines) N=40		X ² test P value (1)	X ² test P value (2)
		N	%	N	%	N	%	N	%		
Fluids intake:	Satisfactory (>70%)	6	15	8	20	33	82.5	9	22.5	0.87 0.350 ^{n.s}	72.18 <0.001 ^{**}
	Unsatisfactory (≤ 70%)	34	85	32	80	7	17.5	31	77.5		
Nutrition allowed	Satisfactory (>70%)	8	20	6	15	35	87.5	7	17.5	0.87 0.350 ^{n.s}	98.25 <0.001 ^{**}
	Unsatisfactory (≤ 70%)	32	80	34	85	5	12.5	33	82.5		
Nutrition avoided	Satisfactory (>70%)	9	22.5	7	17.5	36	90	7	17.5	0.78 0.377 ^{n.s}	105.72 <0.001 ^{**}
	Unsatisfactory (≤ 70%)	31	77.5	33	82.5	4	10	33	82.5		
Sports activity	Satisfactory (>70%)	7	17.5	8	20	34	85	8	20	0.21 0.646 ^{n.s}	84.71 <0.001 ^{**}
	Unsatisfactory (≤ 70%)	33	82.5	32	80	6	15	32	80		

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Table (3): Correlation between studied variables among study group (n=40).

		Total knowledge	Total practice	Total behavior	Total satisfaction
Total knowledge	R		0.788	0.615	0.724
	p		<0.01**	<0.01**	<0.01**
Total practice	R			0.623	0.711
	p			<0.01**	<0.01**
Total behavior	R				0.635
	p				<0.01**
Total satisfaction	R				
	p				



Figure (2): Distribution of study group patients related to their total satisfaction with the post educational guidelines (n=40).

Discussion:

Urinary stones are the third common problem in urology hospitals after urinary tract infections and prostate disease; with a prevalence of more than 10% and a recurrence rate about 50%, urinary stones has important effects in health care system and patients' quality of life. The main goal of surgical management for renal stones is complete stone free. In the last few decades, nephrolithotripsy has replaced open renal surgery and became the first line for management of small and complex or large renal stones (Raja et al., 2020). The results of the present study showed that more

than one third of study and control groups were aged from 40 to less than 50 years old with mean age of 43.99±5.24 and 44.7±5.09 years respectively. The reason for this finding may be related to the fact that prevalence of urolithiasis increased with aging. This result is agreeing with a study carried out by **Abdelmowla et al., (2017)** about "Impact of nursing interventions and patient's education on quality of life regarding renal stones treated by percutaneous nephrolithotomy" mentioned that, stones affect people in the peak age at onset from 30-50 years old.

While another study done by **Rashid & Yahya (2018)** about "Percutaneous Nephrolithotomy in Obese Patients, Is There Any Challenge?" mentioned that, stones affect people in the peak age at onset from 40-59 years old. While another study done by **Pahira and Razack (2019)** about "genetic disorders and urolithiasis" revealed that, most of patients were in group from 30 - 60 years old.

This result is inconsistent with another study done by **Luck man et al., (2019)** in their book about "medical surgical nursing, psychophysiological approach" stated that, early middle adulthood between the 20-40 years old urinary stones occurred. This may be attributed to that people depend on delivery and fast food in this age.

The result of the current study found that more than half of study and control group were males. The reason for this may be attributed to lower serum testosterone level may contribute to the protection factor for women against oxalate stone disease and increased urinary citrate concentrations This result is in line with a study carried out by **Breslaw and Coe (2016)** in their book about "kidney stones, medical and surgical management of idiopathic hypercalciuria" reported that, the majority of urinary stone patients were males.

Another study done by **Rashid & Yahya (2018)** mentioned that, more than half of studied patients were males. This finding agrees with **Raja et al., (2020)** about "The impact of urinary stone disease and their treatment on patients' quality of life" reported that, about two thirds of studied patients (study and control group) were males.

Regarding to their level of education and residence, the current results stated that nearly half of the study group and half of the control group respectively had intermediate

education. This result may be attributed to the fact that more than half of the patients in both groups were lived in rural area in where people preferred to finish education early to convert their effort to agricultural work. This finding was in consistent with **Abdelmowla et al., (2017)** reported that, more than half of studied patients (study and control group) had intermediate education.

Another study done by **Abd-Elaziz (2018)** in their study about "biochemical relationship between urine composition and urinary stone formation in stone forming patients" revealed that, it found that more than half of studied patients were living in rural areas and had intermediate education.

Concerning marital status; The present study revealed that the majority in study and control groups were married. This result may be related to the Egyptian culture that encourage marriage. This result is in the same line with study done by **Sofia et al., (2017)** about "Prevalence and risk factors of kidney stone" reported that, the majority of studied samples (study and control groups) were married. Another study contrast with a study done by **Abd-Elghani (2020)** "Effect of an Educational Program on Patients' Urinary Stones Recurrence" found that, the more than half of studied samples were married.

Regarding to occupation, the present result revealed that about three quarter of the study group and nearly two thirds of control group respectively were worker and highest percentage of them had office work. This result is in the same line with study done by **Abd-Elghani (2020)**, found that more than half of studied patients were office worker. The result was also in the same line with study done by **Khalili et al., (2021)** about "Risk factors of kidney stone disease: a cross-sectional study in the southeast of Iran" reported that, more than

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half of the total subjects (case and control groups) were worker and they had office work.

The current study, illustrates that the majority of the studied patients in study group had satisfactory knowledge after educational guidelines, while the majority of the studied patients in control group and study group had unsatisfactory knowledge pre educational guidelines. This result could be related to the effort that exerted by the researcher to explain all needed information to patients in the study group simply using the proper teaching materials.

This is in agreement with these results of **Mohammed et al., (2016)** about " Impact of Health Education Program for Elderly Patients Undergoing Extracorporeal Shock waves Lithotripsy on Clearance of Urolithiasis", who reported a great lack of studied patients' knowledge about urinary tract stone disease, causes, risk factors, signs & symptoms, methods of treatment and disease prevention(pre application of educational program)and patient's knowledge was significantly improved after implementation of the educational program for the study group.

This finding agrees with **Abdelmowla et al., (2017)** who found that all patients in both groups had unsatisfactory level of knowledge. There was a high significant improvement on patients' knowledge for study group patients after introduce the teaching booklet. Quality of life for both groups were improved after treatment of renal stones however, study group patients have better quality of life than control group patients due to the effect of nursing interventions and patients' education (teaching booklet).

The total stone free rate in both groups were improved but still higher in study

group than control group due to the effect of patient's education on study group. Providing nursing interventions and improving patients' level of knowledge had a significant effect on reducing or preventing postoperative complications and improving quality of life. So, patients after percutaneous nephrolithotomy are in essential need for special nursing interventions and education to help them to avoid many postoperative complications and thus improve their health.

The present study found that, there was no significant statistical difference between study and control groups regarding their total level of practice regarding nephrolithotripsy pre guidelines at ($p > 0.05$), While the majority of study group had satisfactory level regarding fluids intake, allowed foods, avoided foods and sport activity after guidelines with highly significant statistical difference between study and control groups (post guidelines). Additionally, there was marked improvement in study group regarding total practice about nephrolithotripsy post guidelines compared to control group as observed .

This finding is in accordance with **Nalini & Thomas (2016)** who found that significant relationship between high intake of animal protein, sodium, sugar, coffee and tea. But they not found a significant relationship between soft drinks and kidney stone. Diet plays an important role in the development of kidney stones, especially in patients who are predisposed to this condition. A diet high in sodium, fats, meat and sugar, low in fiber, vegetable protein and unrefined carbohydrates are increase the risk of kidney stones.

This was in agreement with **Saeed et al., (2018)** in a study about "Awareness about Symptoms and Role of Diet in Renal Stones among General Population of Albaha City", who reported that most respondents

agreed that a certain diet could prevent formation of renal stones (post program). Beneficial changes in the diet of renal stone formers included: increased intake of fluids, vegetables and citrus fruit (orange juice and home-made lemonade); decreasing animal protein, sodium, oxalate (avoidance of spinach, tea, and nuts), refined sugars; and optimizing dietary calcium intake. Dietary calcium restriction can increase the risk of stone formation and lead to bone demineralization. that there high statically scientific difference between pre and post group after implement of program.

These finding in the same line with **Wang et al., (2021)** who conducted a study about " effect of different dietary interventions for the prevention of recurrent stone formation and the changes in urine compositions in patients with urinary stone disease", who indicated that increase water intake can reduce stone recurrence after nephrolithotripsy. Meanwhile low protein with or without fiber does affect recurrence comparing with control groups with significant heterogeneity among the studies. But normal-calcium, low protein, low-salt diet had recurrences did reduce the recurrence compared to normal-calcium diet. And the fluid intake has a positive effect on prevention of recurrent stone formation, but low Na, normal Ca diet has a marked reduction effect on recurrence. While study group had satisfactory practice regarding fluid and diet after intervention.

Regarding to correlation between studied variables among study group, it was noticed that there was a highly significant positive correlation between Total knowledge and Total practice, Total behavior and Total satisfaction among the studied patients', furthermore with high statically scientific difference at p value (<0.01**).

These finding was congruent with **Mattia et al. (2018)** in a study about " Dietary and lifestyle recommendations for urolithiasis prevention ", who illustrated that correlations between liquid and food consumption (total practice) , knowledge about treatment of urolithiasis and/or its recurrences, nutritional education that aims at modifying the dietary habits of patients and their families and healthy behaviors and encouragement of regular and continuous exercise, can be effective in prevention and reducing recurrences of studied groups.

The present study showed that the majority of studied patients in study group had satisfied by educational guidelines with the amount of information provided to them about their condition and its treatment, the extent to which the educational guidelines are important, the readiness to answer their questions and inquiries and the educational guidelines met needs as well as readiness to answer questions and inquiries and rest of them unsatisfied with educational guidelines. This result indicated the effectiveness and success fullness of the educational guidelines.

The present study agreed with **Andrew et al., (2016)** in this study about "Educating Patients about CKD: The Path to Self-Management and Patient-Centered Care" who found that the most of study group-based education program with patients with treatment of kidney stones improved satisfaction of knowledge perceptions toward educational program compared with a control group.

These finding agreed with **Nouri et al., (2018)** in their study about "Satisfaction and perceptions of patients toward kidney stones disease management ",who show that more than half of the respondents were satisfied with educational program toward their treatment of urolithiasis, while the

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satisfaction was related to treatment success rather than treatment choice. The satisfaction towards the treatment of kidney stones is associated with aspects including opinions of patients on effectiveness of treatment, their conditions after the treatment, perceptions towards the treatments, preferences on the types of treatment and the effects of medicine.

Conclusion:

Implementation of educational guidelines had been proven to be significantly effective in improvement of patients' performance (study group) regarding kidney stones, nephrolithotripsy, fluids intake, allowed foods, avoided foods as well as sports activities as illustrated from total knowledge level; total practice level; total follow up behavior after nephrolithotripsy that lead to prevent urinary stone recurrence and total satisfaction mean scores post guidelines implementation were higher statistically significant than pre guidelines. As well as, a significant positive correlation was found between total knowledge and total practice; total behavior and total satisfaction mean scores pre and post the implementation of educational guidelines that supports the study hypotheses.

Recommendation:

- 1- Encourage nurses for using new technologies as new strategies of education such as computer, and internet for up to date all information related to management of patients with urolithiasis and nephrolithotripsy.
- 2- Health care personnel must provide continuous patient educational program for instruction to prevent urinary stones recurrence after nephrolithotripsy and the program should be revised, updated, and available in urology unit in both Arabic and English languages.
- 3- Application of health educational guidelines for urinary stones patients and nephrolithotripsy for large sample from different geographical areas, for generalization of results.
- 4- Continuous evaluation of patient's knowledge about nephrolithotripsy, identify their needs, and barriers that hinder healthy habits to prevent urinary stones recurrences.

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تأثير البرنامج الإرشادي على تحسين اداء ورضاء مرضى تفتيت حصوات الكلى

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تفتيت حصوات الكلى هو إجراء غير جراحي لعلاج حصوات الكلى الذي يكسر الحصوات إلى أجزاء صغيرة. يساعد التثقيف حول تفتيت حصوات الكلى للمرضى على الحصول على أفضل أداء (المعرفة والممارسة والسلوك) لتلبية احتياجات الرعاية الصحية المستمرة. لذا هدفت هذه الدراسة الي تقييم تأثير الإرشادات التعليمية عن تفتيت حصوات الكلى على أداء المرضى ورضاهم. حيث أجريت الدراسة في قسم المسالك البولية بمستشفى جامعة بنها ، محافظة القليوبية ، مصر على عينة قصدية مكونة من ٨٠ مريضا بقسم المسالك البولية وشملت (عينة الدراسة) ٤٠ مريضا و ٤٠ مريضا (عينة الضابطة). حيث أظهرت النتائج أظهرت تحسناً معنوياً إحصائياً في مستوى المعرفة الكلي للمرضى حول تفتيت حصوات الكلى إلى ٨٧.٥٪ ، وزيادة متوسط درجات ممارسة المرضى والأطعمة والأنشطة الرياضية وزيادة سلوك المتابعة الإجمالي للمرضى إلى ٨٢.٥٪ في مجموعة الدراسة عن المجموعات الضابطة بعد تنفيذ الإرشادات التعليمية. كما اوصت الدراسة الي التقييم المستمر لمعرفة المريض حول تفتيت حصوات الكلى ، وتحديد احتياجاته ، والحوجز التي تعيق العادات الصحية لمنع تكرار حصوات المسالك البولية.