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# Effect of Educational Guidelines on knowledge and Quality of Life of Patients Undergoing Percutaneous Nephrolithotomy

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***Abstract:*** **Kidney stones are hard deposits made of minerals and salts that form inside the kidneys, the most common symptoms for kidney stone are pain in the back or groin, painful urination, blood in urine and nausea and vomiting, Complications of kidney stone are urinary obstruction, urinary tract infection, and kidney failure. The prevalence of kidney stone disease is expected to increase as the population ages. Aim: The aim of this study was to evaluate the effect of educational guidelines on Patient`s knowledge and quality of life of patients undergoing percutaneous nephrolithotomy. Subjects and Methods: A quasi-experimental design study was used. Setting: The study was conducted at New Emergency Hospital (El Demerdash Hospital) inpatient urological Ward and outpatients clinic Sample: A purposive sample of fifty (50) patients was recruited from the previously mentioned setting. Tools of data collection: (1) Renal stone patient`s Interview questionnaire (2) Wisconsin stone quality of life questionnaire, (3) Patient assessment sheet The previously mentioned tools were used to evaluate the effect of educational guidelines pre, post 1 month and follow up after three months of its implementation. Results: the results of this study revealed that there were significant improvement in patient`s knowledge and quality of life of patients undergoing percutaneous nephrolithotomy, also patient`s symptoms and clinical data are improved. Conclusions: educational guidelines was effective method in improving patients` knowledge and quality of life of patients undergoing percutaneous nephrolithotomy. Recommendations: It was recommended to replicate the current study on a larger probability sample to achieve generalization and periodic education about renal stone disease should be performed for patient with kidney stone.**

***Keywords:*** **educational guideline, quality of life, percutaneous nephrolithotomy.**

## 1. INTRODUCTION

Kidney stones are hard deposits made of minerals and salts that form inside the kidneys, most stones form due to a combination of genetics and environmental factors. Risk factors include high urine calcium levels, obesity, certain foods, some medications, calcium supplements, hyperparathyroidism, gout and not drinking enough fluids **( Sharon, 2015 ).** The five major types of stones are calcium phosphate, calcium oxalate, uric acid, cystine, and struvite (magnesium ammonium phosphate) also they may be classified according their location to nephrolithiasis (stone in the kidney), ureterolithiasis (stone in the ureter), cystolithiasis (stone in the urinary bladder) (**Bhaskar, 2016).**

Kidney stones typically form in the kidney and leave the body in the urine stream, a small stone may pass without causing symptoms, if a stone grows to more than 1-1.5 cm it can cause blockage of the ureter resulting in severe pain (renal colic), blood in urine, nausea and vomiting, and painful urination. The diagnosis of renal stone is usually based on symptoms, urine testing, and medical imaging and blood tests may also be useful **(Sharon, Linda, Shannon, Margaret, and Mariann, 2014).**

Urgent stone removal and treatments are done through open surgery or extracorporeal shock wave lithotripsy (ESWL). Medical and dietary treatments are most important ways to prevent recurrence of stone. The past medical history, family history, and social history are all essential to determine risk factors for each patient after a first stone is passed. These histories are predictors of future recurrent stones and can help to draw conclusions that will aid in behavior modification and metabolic evaluation **(Robert, 2017).**

when a stone causes no symptoms, no treatment is needed, otherwise pain control is usually the first measure, using medications such as nonsteroidal anti-inflammatory drugs or opioids. Larger stones may be helped to pass with the medication or may require procedures such as extracorporeal shock wave lithotripsy, ureteroscopy, or percutaneous nephrolithotomy, in addition, 65.5 % of patients having residual stones after percutaneous nephrolithotripsy and after Percutaneous nephrolithotomy the stone become free after 3 months and no residual stones are present **(Peter, 2017).**

Percutaneous nephrolithotomy is a minimally-invasive procedure to remove stones from the kidney by a small puncture wound up to about 1 cm through the skin. It is most suitable to remove stones of more than 1-1.5 cm in diameter and which are present near the kidney pelvic region; it is usually done under general anesthesia or spinal anesthesia **(Burton, 2009)**. Percutanous nephrolithotomy is considered the first line for management of complex or large renal stones. The main advantage of percutaneous nephrolithotomy is the ability to completely and rapidly clear a large stone without risks of associated fragment passage **(Knoll and Buchholz, 2012).**

Nursing intervention regarding patient with renal stone is very important issue to lower the risk of recurrence, effective teaching to the patients to change life style and dietary habits, adequate fluid intake is important to produce a urine output approximately 2 L/day. Ambulatory person should drink about 3 L/ day, while this amount is decreased for sedentary or immobile person. **(Bucher, 2014)**

Also**,** teach the patient the dosage, scheduling, and potential side effects of drugs, to ensure safety, tell the patient not to walk while experiencing acute renal colic, particularly if opioid analgesics are being given **(Sharon, 2015)** Patients' education is defined as any set of planned educational activities developed to improve health behaviors, health status, quality of life, or slow deterioration of disease. Informed and educated patients can actively participate in their own treatment, improve outcomes, help in identifying errors before they occur, and reduce their length of hospital stay **(Ahmed et al, 2017)**

Quality of Life (QOL) means many things but most important, it means continuing to live life to the fullest extent possible, regardless of age or physical challenges**;** urolithiasis is a chronic disease to have a significant impact on the quality of life of the sufferers **(Standing Stone Care and Rehabilitation Center, 2018).**

**Significance of the study:**

Renal stone disease is a systemic disorder associated with chronic kidney disease and resulting in significant morbidity as bone disease, coronary artery disease, hypertension, type 2 diabetes mellitus, and the metabolic syndrome (MS). It has a significant economic burden for both developing and developed nations **Tang et al, (2013)**. Also, renal stone disease increasing its incidence and prevalence, it is affecting about 12% of the world population, and each year an estimated 1 million to 2 million people in the United States have kidney stone disease, it has been associated with an increased risk of end-stage renal failure **Aggarwal et al, (2017).**

Regarding statistical analysis obtained from **Ain Shams University Center, (2017)**, 1435 cases are admitted from January 2016 to November 2017 in urological Ward at Ain Shams University Hospital. The increased prevalence of kidney stone disease is pandemic and without medical treatment, nephrolithiasis is a chronic illness with a recurrent rate greater than 50% over 10 years. Recent studies have reported that the prevalence of urolithiasis has been increasing in the past decades in both developed and developing countries. This growing trend is believed to be associated with changes in lifestyle modifications such as lack of physical activity and dietary habits. In Indian population, about 12% of them are expected to have urinary stones and out of which 50% may end up with loss of kidney functions **(Alelign and Petros, (2018**

**Aim of the study:**

This study performed to achieve the following aims:

1. Assess knowledge of patients with renal stone undergoing percutaneous nephrolithotomy
2. Assess quality of life of patients with renal stone undergoing percutanous nephrolithotomy
3. Implement the educational guidelines
4. Evaluate the effect of educational guidelines on patient`s knowledge and his quality of life
5. **Research hypothesis**

The researchers hypothesized that there will be a positive change in patient's knowledge and quality of life post implementation of the guidelines and this affected positively on patient`s symptoms and clinical data.

**Study design:**

A quasi experimental study was utilized to meet the aim of this study.

**Subjects and methods will be discussed within the following:**

I. Technical design.

II. Operational design.

III. Statistical design.

IV. Administrative design.

**I. Technical Design:**

The technical design includes research setting, subjects, and tools of data collection.

**Research Setting:**

The present study was conducted in inpatient urological Ward and outpatients clinic in New Emergency Hospital affiliated to Ain Shams University, Cairo, Egypt. The inpatient Ward is present in the fourth floor of the hospital, it consists of 8 rooms, 3 of them specialized for female patients and the others for male patients the capacity of beds are 29 beds. The outpatient clinics present in the ground floor which works two days a week (Tuesday and Thursday) from 9 am to 2 pm.

**Study Sample:**

The study was conducted on a purposive sample of fifty patients diagnosed as renal stone disease who have been selected fulfilling the stated criteria from inpatient urological Ward of the previously mentioned hospital. This sample is according to power analysis test depending on the patient flow through the last year.

**Inclusion criteria:**

- Patient has stone larger than 1-1.5 cm in the kidneys
- Patient has complicated stone as staghorn shaped stone
- Patient has blocking the flow of urine out of the kidney
- Patient has stone not broken up by extracorporeal shock wave lithotripsy (ESWL).

**Tools of data collection:**

Data were collected through using the following tools:

1. Renal stone patient`s Interview questionnaire
2. The Wisconsin stone quality of life questionnaire
3. Patient assessment sheet

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1. **Renal stone patient' Interview questionnaire**

It was developed by the researchers to assess patient's knowledge regarding renal stone disease pre, post and follow up phase of educational guidelines. It was constructed in simple Arabic language and reviewed utilizing the relevant literature **Bare, (2010), Bruder, (2011), Bertino, (2011) and Hinkle and Cheever (2014)**

It was included six parts:

**Part 1:** It was concerned with socio-demographic characteristics of the patients under study as: age, gender, level of education, marital status, occupation, type of family, housing, and total family income

**Part 2:** It was concerned with patient`s present medical history **Part 3**: It was concerned with patient`s past medical history

**Part 4**: this part included assessing family history

**Part 5**: it was concerned with dietary assessment for patient with renal stone (24 marks)

**Part 6:** It included patients' knowledge regarding renal stone disease (13 marks)

**Scoring system**:

The total score for patient's knowledge (37 marks) it was considered that one grade for the correct answer and zero for incorrect one. A satisfactory total score started from 70% and above, while the unsatisfactory one was below 70% (25.9 marks). The first, second, third, and fourth part of this tool were used to assess the patients' sociodemographic characteristics, present medical history, past medical history, and family history before the guidelines implementations, while fifth and sixth part of this tool were used to assess patient`s knowledge regarding renal stone pre, post phase (after one month) and follow up phase (after three months) of the educational guidelines implementation.

2. **The Wisconsin Stone quality of life questionnaire**

It is used to assess quality of life for patient with renal stone disease pre, post and follow up phases of educational guidelines. It is standardized tool adopted from **American Urological Association Education and Research, (2013),** it is consisted of seven parts, **part 1**: physical activity, **part 2**: trouble sleeping, **part 3**: limits on travel, **part 4**: diet and medication, **part 5**: physical symptoms **part 6**: less interest in sex, **part7**: frustration and anxiety. The scale ranging between 1 to 5 degree 1 degree means lowest level quality of life and 5 degree means highest level quality of life

**3. Patient assessment sheet**

This tool used to assess the effect of the educational guidelines on the patient`s symptoms and clinical data, it was developed by the researcher based on recent literature **Rodman, Sosa and Seidman, (2007),Brunner and Suddarth, (2010), Hinkle and Cheever (2014), American Association of Urology, (2015),** pre, post &follow up phase. It included the following parts:

1. Assessment for voiding symptoms for patient with renal stone disease such as dysuria, frequency and urgency, and other symptoms as loin pain, nausea and vomiting**.**
2. Assessment of laboratory investigation for patient with renal stone disease as kidney function tests
3. Assessment for imaging studies for patient with renal stone disease related to urology imaging

**Operational Design:**

**A. Preparatory phase:**

It included reviewing of the most recent literature and different studies related to the renal stone and the theoretical knowledge of various aspects of care using books, articles, periodicals, internet and magazines to develop tools for data collection.

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**B. Tools validity and reliability:**

The content and face validity was ascertained for layout, consistency, and scoring system by a group of 7 experts including (5) professors and assistant professors of Medical Surgical Nursing Department and (2) from Faculty of Medicine Ain Shams University specialized of urological disorders. The content validity of the tools was tested regarding to the knowledge accuracy, relevance and comprehensiveness.

**Test - retest**: the tools were tested for reliability on a sample of 10 subjects; the results revealed that all items were significant. And has a correlation coefficient above the significance level r = 0.8

**Pilot study:**

A pilot study was carried out on 10% of patients to test the clarity and applicability of the tools. Subjects included in the pilot study were excluded from the main study Subjects, there was no modifications needed.

**C. Field work:**

The study was started at October 2017 until November 2018. It was divided into 4 phases: assessment, implementation, first evaluation (post phase after one month) and second evaluation (follow up phase after 3 months).

- After the official permission was taken from the study setting the researchers visit the ward to identify the patients' flow rate and ward set up and appropriate time for data collection determined according to free time for the patient and basic activities and routine care in the Ward.

- The researchers specify Saturdays and Monday of every week from 9 am - 12 pm regarding urological Ward, and outpatient clinics Tuesday and Thursday weekly.

**Assessment phase:**

- Assessment was done through filling the interview questionnaire sheets and assesses using the previously mentioned tools, from the patients after explaining the purpose of the study and formal consent to be involved in the study was taken.

- The educational guidelines were prepared based on the determined patients' needs using the related literatures **Bare, (2010), Bounds, (2010), and Haewook et al, (2015) Peter, (2017), William, (2017),** It included knowledge about renal stone disease included anatomy and physiology of the kidney, definition of disease, causes, signs and symptoms, complications, management, and dietary assessment. The teaching media was prepared which included; Booklet, posters and pictures added to that related videos. Its content validity was tested through experts opinions

**Implementation phase:**

- The study subjects were divided into 10 groups of patients, the group consisted of (5) patients for each educational session.

- The researchers demonstrated the component of the educational guidelines to the patient through theoretical session every session take time 30-40 minutes, the total sessions were 3 sessions for each patient's group.

- The handout was distributed to all patients included in the program in the first day of starting guidelines implementation.

**Evaluation phase:**

Evaluation was done one month (post phase) and after three months (follow up phase) of educational guidelines. Reassessment of the patients under study was done through using the previously used tools.

**IV. Administrative Design:**

An official permission was obtained from the Director of New Emergency Hospital affiliated to Ain Shams University and the head of inpatient Ward and clinic outpatients in which the study was conducted.

**Ethical considerations:**

The aim of the research was explained to the participants. Verbal consent was obtained from each patient to participate in the study, after clarifying the procedures of the study. Participants were informed about their right to refuse participation and to withdraw at any time without any consequences. Confidentiality of data was ensured.

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## 2. RESULTS

**Table (1): Number and Percentage Distribution of Patients According to their Sociodemographic Characteristics (n=50)**

| Sociodemographic characteristics | No | % |
|---|---|---|
| **Age (years)** | | |
| <20 | 17 | 34 |
| 20- < 30 | 15 | 30 |
| 30- < 40 | 11 | 22 |
| 40+ | 7 | 14 |
| Mean ±SD | 36.60±5.49 | |
| **Gender** | | |
| Female | 19 | 38 |
| Male | 31 | 62 |
| **Level of education** | | |
| Illiterate | 13 | 26 |
| Primary school | 5 | 10 |
| Secondary school | 23 | 46 |
| High education | 9 | 18 |
| **Marital Status** | | |
| Single | 10 | 20 |
| Married | 30 | 60 |
| Widowed | 10 | 20 |
| **Housing** | | |
| Urban | 24 | 48 |
| Rural | 26 | 52 |
| **Income** | | |
| Adequate | 26 | 52 |
| Not adequate | 24 | 48 |
| **Type of family** | | |
| Nuclear (live alone) | 23 | 46 |
| Family (live with family) | 27 | 54 |
| **Occupation** | | |
| Worker | 18 | 36 |
| Technician | 22 | 44 |
| House wife | 10 | 20 |

Table (1) shows that the mean and SD of the study sample was 36.60±5.49 and 62% of the study sample were male, 46% of them were had level of education secondary school, 60%of the sample were married. 52% of them their housing rural area, and had adequate income, and 54% of them were live with family, and 44% of the study sample their occupation were technician.

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**Figure (1):** Number and Percentage Distribution of Patients According to Present History (n=50).

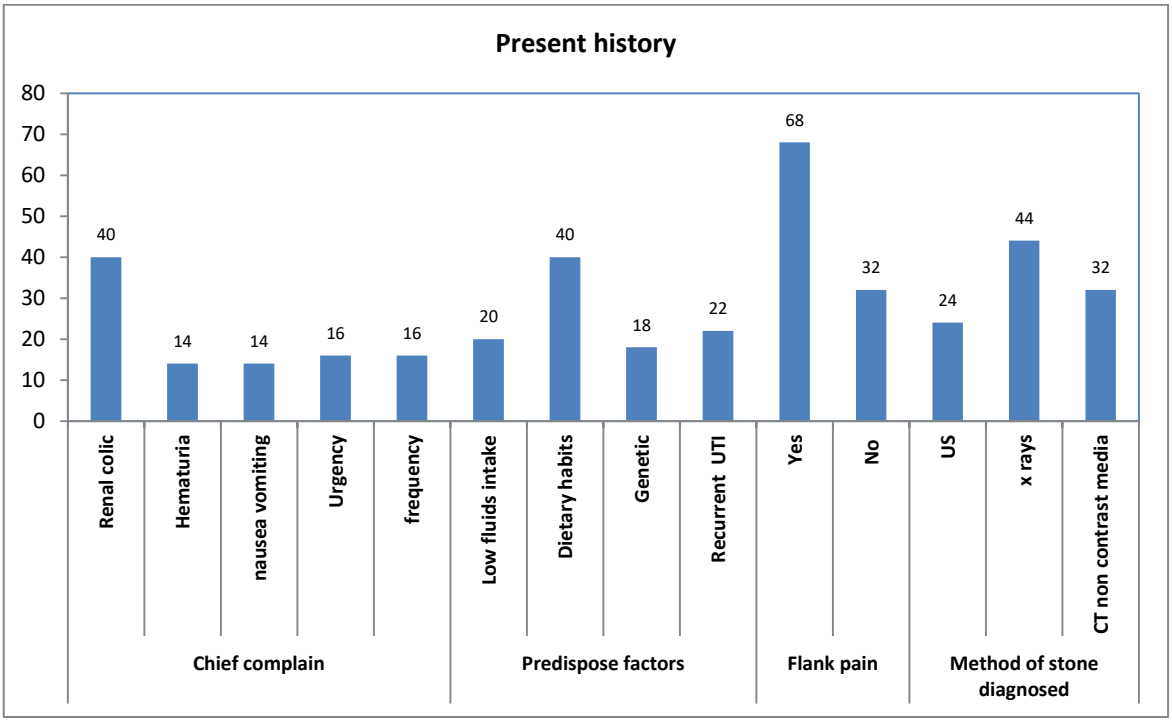


Figure (1) shows that, 40% of the study sample had renal colic as a chief complain of renal stone disease, 40%of them their predisposing factors of stone formation were dietary habits, 68% of the sample had flank pain. Regarding methods of stone diagnosis 44% of the study samples were diagnosed by X rays.

**Figure (2):** Number and Percentage Distribution of Patients According to their Past Medical History and Family History (n=50)

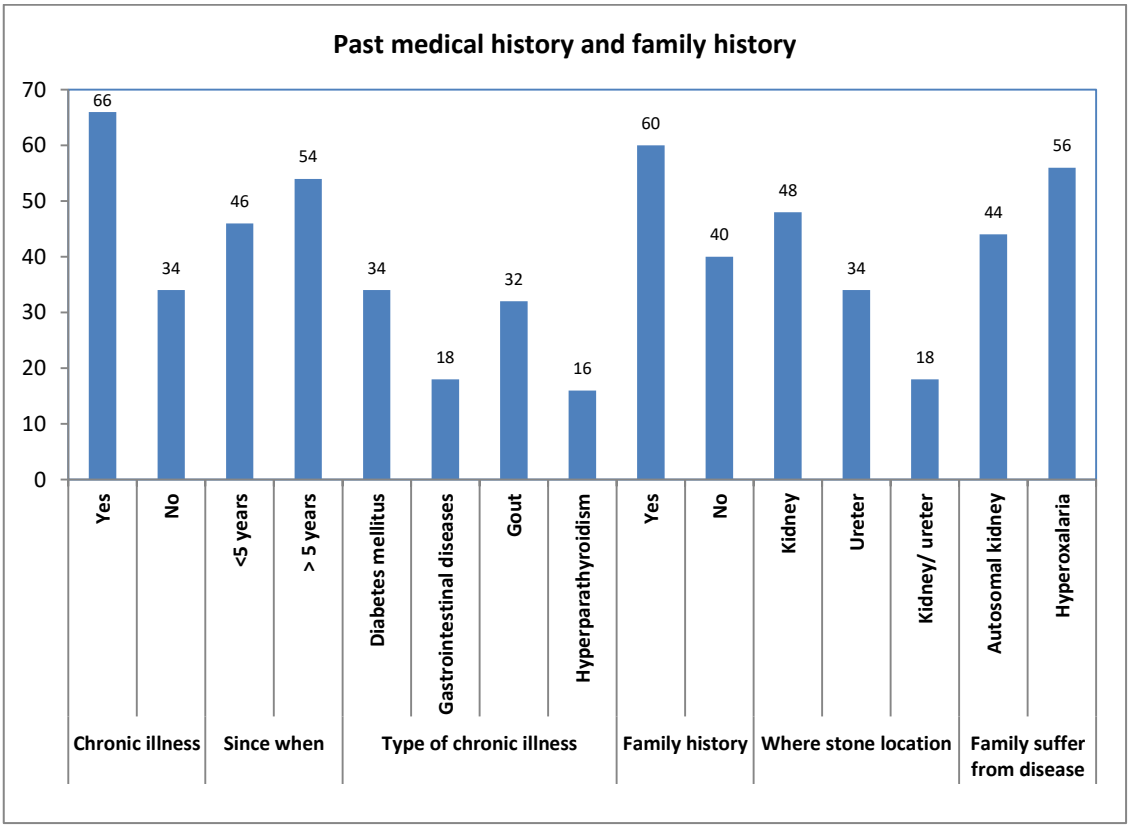

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Figure (2) reveals that, 66% of the study sample had chronic illness, 54% of them had chronic illness since 5 years ago, and 34% of the study sample their chronic illness were diabetes. Also, regarding family history of patients, 60% of the sample had family history of stone disease, 48% of them had kidney stone, 56% of them their family suffer from hyperoxilaria.

**Table (2): Comparison between patients' Satisfactory Knowledge regarding to stone disease throughout guidelines Implementation Phases in relation to Pre- Implementation phase(n=50).**

| knowledge regarding stone disease | Pre | | Post(after1month) | | Follow up (after 3 months) | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | x2 | p-value |
| -Anatomy of the kidney | 22 | 44 | 36 | 72 | 39 | 78 | 14.414 | <0.001** |
| -Function of the kidney | 21 | 42 | 35 | 70 | 23 | 46 | 9.200 | 0.011* |
| -Definition of stone disease | 25 | 50 | 32 | 64 | 32 | 64 | 2.708 | 0.258 |
| -Causes of stone formation | 19 | 38 | 32 | 64 | 32 | 64 | 9.117 | 0.011* |
| -Signs/symptoms | 22 | 44 | 32 | 64 | 32 | 64 | 5.451 | 0.046* |
| -Types of stones | 22 | 44 | 32 | 64 | 29 | 58 | 4.262 | 0.119 |
| -Complications of stone | 22 | 44 | 32 | 64 | 29 | 58 | 4.262 | 0.119 |
| -Chances with stone increased with age | 22 | 44 | 35 | 70 | 18 | 36 | 12.640 | 0.002* |
| -Warm climate lead to stone formation than hot areas | 18 | 36 | 32 | 64 | 36 | 72 | 14.608 | <0.001** |
| -UTI may lead to stone | 18 | 36 | 32 | 64 | 35 | 70 | 16.131 | <0.001** |
| -Persons with kidney stone should go regular follow up | 18 | 36 | 36 | 72 | 39 | 78 | 21.902 | <0.001** |
| -Less number of voids can lead stone | 18 | 36 | 37 | 74 | 28 | 56. | 14.620 | <0.001** |
| -Gout can also cause stone | 19 | 38 | 32 | 64 | 32 | 64 | 9.117 | 0.011* |
| -Stones more than 5 mm need surgery | 19 | 38 | 32 | 64 | 27 | 54 | 6.891 | 0.032* |
| **-Total knowledge** | **14** | **28** | **36** | **72** | **29** | **58** | **20.271** | **<0.001**** |

Not significant (p>0.05) statistically significant (p< 0.01) highly statistically significant (p<0.001)

Table (2) shows that, there were significant improvement in patient`s knowledge about stone disease post and follow up phases in relation to pre phase in which highly statistically significant differences found pre & post and follow up phases of guidelines implementation at (p value < 0.001) and no significant improvement found regarding(definition, types, and complications of stone disease)

**Table (3): Comparison between patients' Satisfactory Knowledge Regarding to Dietary Assessment throughout Guidelines Implementation Phases in Relation to Pre- Implementation phase (n=50)**

| Knowledge regarding Dietary assessment | Pre | | Post(after 1 month) | | Follow up (after 3 months) | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | x2 | p-value |
| -Dietary modifications are control stone | 29 | 58.0 | 42 | 84.0 | 37 | 74.0 | 8.532 | 0.014* |
| -Minerals causing stones | 29 | 58.0 | 43 | 86.0 | 37 | 74.0 | 9.935 | 0.007* |
| -Green leafy vegetables rich in oxalate can lead to stone | 22 | 44.0 | 43 | 86.0 | 34 | 68.0 | 19.786 | <0.001** |
| -High non vegetarian diet can causes stone | 27 | 54.0 | 39 | 78.0 | 36 | 72.0 | 7.169 | 0.028* |
| -High consumption of tea and coffee increase risk of stone | 27 | 54.0 | 38 | 76.0 | 29 | 58.0 | 5.870 | 0.043* |
| -Food rich in calcium | 27 | 54.0 | 40 | 80.0 | 30 | 60.0 | 8.111 | 0.017* |
| -Drinking about 2 liters prevent | 31 | 62.0 | 37 | 74.0 | 33 | 66.0 | 1.697 | 0.428 |

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| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| stone formation | | | | | | | | |
| -Food rich in fiber are good for stone sufferers | 31 | 62.0 | 39 | 78.0 | 30 | 60.0 | 4.380 | 0.112 |
| -Use of fruit juices prevent stone | 31 | 62.0 | 37 | 74.0 | 30 | 60.0 | 2.531 | 0.282 |
| -Citrus fruits are good for stone sufferers | 28 | 56.0 | 37 | 74.0 | 35 | 70.0 | 4.020 | 0.134 |
| -Total knowledge about dietary assessment | 22 | 44.0 | 33 | 66.0 | 28 | 56.0 | 5.909 | 0.046* |

Not significant (p>0.05) statistically significant (p< 0.01) highly statistically significant (p<0.001)

Table (3) shows that, there were significant improvement in patient`s knowledge regarding dietary habits of stone disease. and statistically significant differences found between pre & post and follow up phase of guidelines implementation, at (p<0.001) and non-significant difference found regarding drinking about 2 liters prevent stone formation, food rich in fiber are good for stone sufferers, use of fruit juices prevent stone and Citrus fruits are good for stone sufferers.

**Table (4): Comparison of Patient`s Quality of Life Through Guidelines Implementation in Relation to pre Phase Under Study (n=50).**

| quality of Life | Pre | | Post(after 1 month) | | Follow up(after 3 months) | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | x2 | p-value |
| **(1)Physical activity** | | | | | | | | |
| **(A) my energy level during the day less than usual** | | | | | | | | |
| Very true | 23 | 46 | 0 | 0 | 0 | 0 | | |
| Mostly true | 21 | 42 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 6 | 12 | 18 | 36 | 0 | 0 | 161.209 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(B) I feel very tired or fatigue** | | | | | | | | |
| Very true | 23 | 46 | 0 | 0 | 0 | 0 | | |
| Mostly true | 18 | 36 | 0 | 0 | 0 | 0 | | |
| Somewhat true | 5 | 10 | 13 | 26 | 0 | 0 | 135.15 | <0.001** |
| A little true | 4 | 8 | 21 | 42 | 24 | 48 | | |
| Not at all true | 0 | 0 | 16 | 32 | 26 | 52 | | |
| **(c) my activity is limited** | | | | | | | | |
| Very true | 23 | 46 | 0 | 0 | 0 | 0 | | |
| Mostly true | 18 | 36 | 0 | 0 | 0 | 0 | | |
| Somewhat true | 5 | 10 | 13 | 26 | 0 | 0 | 134.717 | <0.001** |
| A little true | 4 | 8 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 16 | 32 | 25 | 50 | | |
| **(2)Trouble sleeping** | | | | | | | | |
| **(A) trouble getting to sleep** | | | | | | | | |
| Very true | 23 | 46 | 0 | 0 | 0 | 0 | | |
| Mostly true | 21 | 42 | 0 | 0 | 0 | 0 | | |
| Somewhat true | 6 | 12 | 13 | 26 | 0 | 0 | 148.354 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 16 | 32 | 25 | 50 | | |
| **(B)needing to get up frequently while sleeping to urinate** | | | | | | | | |
| Very true | 23 | 46 | 0 | 0 | 0 | 0 | | |
| Mostly true | 21 | 42 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 6 | 12 | 18 | 36 | 0 | 0 | 161.209 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(c) poor quality sleep or not feeling rested** | | | | | | | | |

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| quality of Life | Pre | | Post(after 1 month) | | Follow up(after 3 months) | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | x2 | p-value |
| **after sleeping** | | | | | | | | |
| Very true | 23 | 46 | 0 | 0 | 0 | 0 | | |
| Mostly true | 21 | 42 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 6 | 12 | 18 | 36 | 0 | 0 | 161.209 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(D) difficulty returning to sleep** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(3)Limit on travel** | | | | | | | | |
| **(A) I don't feel the usual freedom to travel or to attend or participate in social events** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(B)I force myself to go to work or school, to exercise, to fulfill other responsibilities** | | | | | | | | |
| Very true | 23 | 46 | 0 | 0 | 0 | 0 | | |
| Mostly true | 21 | 42 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 6 | 12 | 18 | 36 | 0 | 0 | 161.209 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(C )I have missed work or family time, or lost leisure or recreation time** | | | | | | | | |
| Very true | 32 | 64 | 0 | 0 | 0 | 0 | | |
| Mostly true | 18 | 36 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 190.556 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(D) I make frequent adjustments or changes to my daily schedule** | | | | | | | | |
| Very true | 32 | 64 | 0 | 0 | 0 | 0 | | |
| Mostly true | 18 | 36 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 190.556 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(E) I have less ability than usual to focus on my work, family, or other commitments or interests** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(4)Diet/ medication** | | | | | | | | |
| **(A) problems/ difficulties sticking to the diet recommendations** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | 197.087 | <0.001** |

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| quality of Life | Pre | | Post(after 1 month) | | Follow up(after 3 months) | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | x2 | p-value |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | | |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(B) problems tolerating or taking prescription medications as directed** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(c ) concern about my general health** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(5) Physical symptoms** | | | | | | | | |
| **(A) nausea, stomach upset or cramps** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(B) physical pain** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(C) urinary frequency(feeling like you have to go more than usual)** | | | | | | | | |
| Very true | 28 | 56 | 0 | 0 | 0 | 0 | | |
| Mostly true | 22 | 44 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 187.522 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(D) urinary urgency (sudden or unstoppable urge to urinate)** | | | | | | | | |
| Very true | 28 | 56 | 0 | | 0 | 0 | | |
| Mostly true | 22 | 44 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 187.522 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(6)Less interest in sex** | | | | | | | | |
| **(A) I have less interest in sex or less sexual contact than usual** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(B) I need to make special arrangements** | | | | | | | | |

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| quality of Life | Pre | | Post(after 1 month) | | Follow up(after 3 months) | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | x2 | p-value |
| **when travelling** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(C) I have less interest than usual in socializing/ being around others** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(7)Frustration** | | | | | | | | |
| **(A) frustrated with my situation** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(B) worried about what is wrong now** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(C) anxious or nervous about what might go wrong in the future** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |
| **(D) annoyed at the nuisances and inconveniences of my situation** | | | | | | | | |
| Very true | 24 | 48 | 0 | 0 | 0 | 0 | | |
| Mostly true | 19 | 38 | 2 | 4 | 0 | 0 | | |
| Somewhat true | 7 | 14 | 18 | 36 | 0 | 0 | 152.326 | <0.001** |
| A little true | 0 | 0 | 22 | 44 | 25 | 50 | | |
| Not at all true | 0 | 0 | 8 | 16 | 25 | 50 | | |
| **(E) reduced ability, compared to usual, to cope with every day issues or responsibilities** | | | | | | | | |
| Very true | 24 | 48 | 0 | 0 | 0 | 0 | | |
| Mostly true | 19 | 38 | 2 | 4 | 0 | 0 | | |
| Somewhat true | 7 | 14 | 18 | 36 | 0 | 0 | 152.326 | <0.001** |
| A little true | 0 | 0 | 22 | 44 | 25 | 50 | | |
| Not at all true | 0 | 0 | 8 | 16 | 25 | 50 | | |
| **(F) more irritable than usual** | | | | | | | | |
| Very true | 38 | 76 | 0 | 0 | 0 | 0 | | |
| Mostly true | 12 | 24 | 11 | 22 | 0 | 0 | | |
| Somewhat true | 0 | 0 | 18 | 36 | 0 | 0 | 197.087 | <0.001** |
| A little true | 0 | 0 | 21 | 42 | 25 | 50 | | |
| Not at all true | 0 | 0 | 0 | 0 | 25 | 50 | | |

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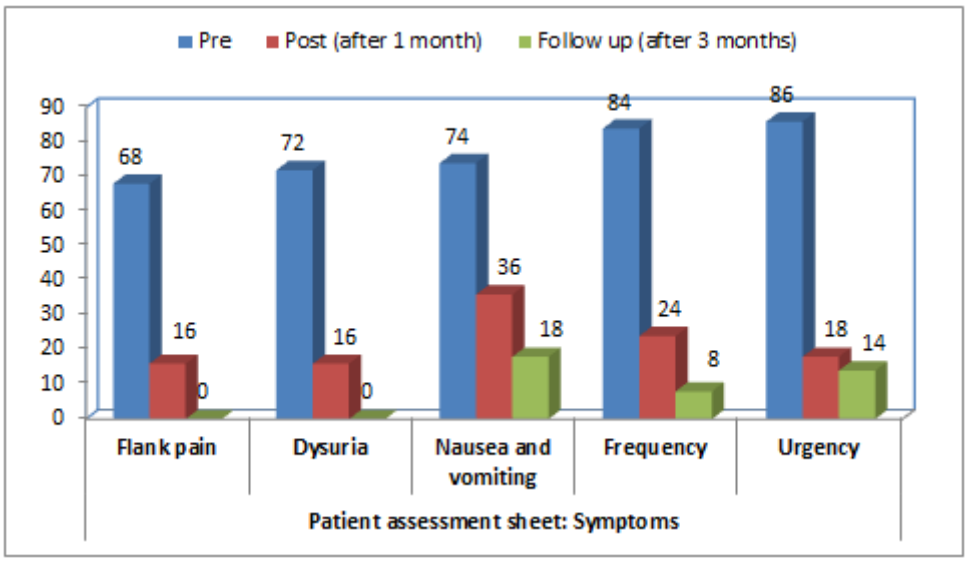
Table (4): regarding patient`s quality of life this table showed that there were great improvement in patient`s quality of life after percutaneous nephrolithotomy through guidelines implementation phases in which highly statistically significant differences found pre, post and follow up phase at ($p < 0.001$).

**Figure (3):** Comparison between pre, post and follow up phases of guideline implementation regarding patient's assessment sheet and their symptoms (n=50)




This figure illustrated that, there were significant improvement in patient's symptoms post and follow up phase in relation to pre phase in which highly statistically significant differences between pre, post and follow up phases of guidelines implementation at ($p < 0.001$)

**Table (5): Comparison Between Patients' Laboratory Investigation and Imaging Studies Results Throughout Guidelines Implementation Phases in relation to Pre- Implementation phase (n=50).**

| Laboratory investigation | Pre | | Post (after 1 month) | | Follow up (after 3 months) | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | x2 | p-value |
| **Blood urea nitrogen (BUN)** | | | | | | | | |
| <20 | 0 | 0 | 0 | 0 | 43 | 86 | 36.158 | <0.001** |
| 20- < 30 | 0 | 0 | 50 | 100 | 7 | 14 | | |
| 30- < 40 | 42 | 84 | 0 | 0 | 0 | 0 | | |
| 40+ | 8 | 16 | 0 | 0 | 0 | 0 | | |
| **Creatinine clearance (ml/min)** | | | | | | | | |
| 80< 100 | 41 | 82 | 0 | 0 | 0 | 0 | 32.156 | <0.001** |
| 100 <120 | 9 | 18 | 50 | 100 | 5 | 10 | | |
| 120 < 140 | 0 | 0 | 0 | 0 | 33 | 66 | | |
| 140 + | 0 | 0 | 0 | 0 | 12 | 24 | | |
| **Serum creatinin (mg/dl)** | | | | | | | | |
| <1.2 | 0 | 0 | 17 | 34 | 35 | 70 | 41.46 | <0.001** |
| 1.2- < 2 | 0 | 0 | 26 | 52 | 15 | 30 | | |
| 2- < 4 | 25 | 50 | 7 | 14 | 0 | 0 | | |
| 4- 6 | 25 | 50 | 0 | 0 | 0 | 0 | | |
| **Imaging studies** | | | | | | | | |
| Not improved | 50 | 100 | 13 | 26 | 9 | 18 | 14.169 | <0.001** |
| Improved | 0 | 0 | 37 | 74 | 41 | 82 | | |

**Statistically significant ($p < 0.01$) highly statistically significant ($p<0.001$)**

**Normal range of BUN**=7-20mg/dL **creatinin clearance** = 80-140mL/min **serum creatinin**= 0.6-1.2mg/dL

Table (5) reveals that, there were significant improvement in patient`s laboratory investigation and imaging studies results post and follow up phase of guidelines implementation in relation to pre phase and there were highly statistically significant differences between three phases of guidelines at (p value < 0.001.

**Table (6): Relation between patients knowledge about dietary assessment and their patients assessment sheet (n=50).**

| Patient assessment sheet | Unsatisfactory knowledge dietary assessment | | Satisfactory knowledge dietary assessment | | Chi-square test | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | x2 | p-value |
| **Symptoms** | | | | | | |
| **Flank pain** | | | | | | |
| No | 4 | 23.5 | 4 | 12.1 | 1.086 | 0.297 |
| Yes | 13 | 76.5 | 29 | 87.9 | | |
| **Dysuria** | | | | | | |
| No | 2 | 11.8 | 6 | 18.2 | 0.344 | 0.558 |
| Yes | 15 | 88.2 | 27 | 81.8 | | |
| **Nausea and vomiting** | | | | | | |
| No | 7 | 41.2 | 11 | 33.3 | 0.300 | 0.584 |
| Yes | 10 | 58.8 | 22 | 66.7 | | |
| **Frequency** | | | | | | |
| No | 5 | 29.4 | 7 | 21.2 | 0.414 | 0.520 |
| Yes | 12 | 70.6 | 26 | 78.8 | | |
| **Urgency** | | | | | | |
| No | 7 | 41.2 | 2 | 6.1 | 9.374 | 0.002* |
| Yes | 10 | 58.8 | 31 | 93.9 | | |
| **Imaging studies** | | | | | | |
| **Imaging Study** | | | | | | |
| Not improved | 7 | 41.2 | 6 | 18.2 | 3.083 | 0.049* |
| Improved | 10 | 58.8 | 27 | 81.8 | | |
| **Laboratory investigation** | | | | | | |
| **Blood Urea Nitrogen** | | | | | | |
| ≤20 | 0 | 0 | 0 | 0 | 0.000 | 1.000 |
| >20-30 | 17 | 100 | 33 | 100 | | |
| >30-40 | 0 | 0 | 0 | 0 | | |
| >40 | 0 | 0 | 0 | 0 | | |
| **Creatinine clearance (ml/min)** | | | | | | |
| <70 | 0 | 0 | 0 | 0 | 0.000 | 1.000 |
| 70-< 80 | 17 | 100 | 33 | 100 | | |
| 80-< 90 | 0 | 0 | 0 | 0 | | |
| 90-< 100 | 0 | 0 | 0 | 0 | | |
| **Serum creatinin (mg/dl)** | | | | | | |
| ≤1.7 | 6 | 35.3 | 11 | 33.3 | 0.378 | 0.828 |
| 1.7- < 2 | 8 | 47.1 | 18 | 54.5 | | |
| 2- < 4 | 3 | 17.6 | 4 | 12.1 | | |
| 4-6 | 0 | 0 | 0 | 0 | | |

Statistically significant (p< 0.05)

Table (6) shows that, there were statistically significant difference between patient`s knowledge regarding dietary assessment and their patient assessment in relation to urgency and imaging studies in which (p value < 0.01)

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**Table (7): Relation between patient`s quality of life and patient`s assessment sheet post guidelines under study (n=50)**

| Patient Assessment Sheet | | Total patient`s quality of Life | | | | | Chi-square test | |
|---|---|---|---|---|---|---|---|---|
| | | Very true | Mostly true | Somewhat true | A little true | Not at all true | x2 | p-value |
| **Flank pain** | | | | | | | | |
| No | **No.** | 0 | 0 | 2 | 3 | 3 | 3.284 | 0.511 |
| | **%** | 0 | 0.0 | 25 | 10 | 30 | | |
| Yes | **No.** | 1 | 3 | 6 | 25 | 7 | | |
| | **%** | 100 | 100 | 75.0 | 89.3 | 70 | | |
| **Dysuria** | | | | | | | | |
| No | **No.** | 0 | 0 | 1 | 5 | 2 | 1.026 | 0.906 |
| | **%** | 0 | 0.0 | 12.5 | 17.9 | 20 | | |
| Yes | **No.** | 1 | 3 | 7 | 23 | 8 | | |
| | **%** | 100 | 100 | 87.5 | 82.1 | 80 | | |
| **Nausea and vomiting** | | | | | | | | |
| No | **No.** | 0 | 0 | 5 | 12 | 1 | 8.194 | 0.048* |
| | **%** | 0 | 0.0 | 62.5 | 42.9 | 10.0 | | |
| Yes | **No.** | 1 | 3 | 3 | 16 | 9 | | |
| | **%** | 100 | 100 | 37.5 | 57.1 | 90 | | |
| **Frequency** | | | | | | | | |
| No | **No.** | 0 | 0 | 4 | 6 | 2 | 4.417 | 0.352 |
| | **%** | 0 | 0 | 50 | 21.4 | 20 | | |
| Yes | **No.** | 1 | 3 | 4 | 22 | 8 | | |
| | **%** | 100 | 100 | 50 | 78.6 | 80 | | |
| **Urgency** | | | | | | | | |
| No | **No.** | 0 | 0 | 0 | 4 | 5 | 9.834 | 0.043* |
| | **%** | 0 | 0 | 0 | 14.3 | 50 | | |
| Yes | **No.** | 1 | 3 | 8 | 24 | 5 | | |
| | **%** | 100 | 100 | 100 | 85.7 | 50 | | |
| **Imaging study** | | | | | | | | |
| No | **No.** | 1 | 0 | 3 | 6 | 3 | 4.837 | 0.304 |
| | **%** | 100. | 0 | 37.5 | 21.4 | 30 | | |
| Yes | **No.** | 0 | 3 | 5 | 22 | 7 | | |
| | **%** | 0 | 100 | 62.5 | 78.6 | 70 | | |
| **Bun** | | | | | | | | |
| >20-30 | **No.** | 1 | 3 | 8 | 28 | 10 | 0.000 | 1.000 |
| | **%** | 100 | 100 | 100 | 100 | 100 | | |
| **Creatinine clearance** | | | | | | | | |
| >=70-80 | **No.** | 1 | 3 | 8 | 28 | 10 | 0.000 | 1.000 |
| | **%** | 100 | 100 | 100 | 100 | 100 | | |
| **Serum creatinin** | | | | | | | | |
| >2-4 | **No.** | 1 | 3 | 8 | 28 | 10 | 0.000 | 1.000 |
| | **%** | 100 | 100 | 100 | 100 | 100 | | |

Table (7) showed that, there was positive relation between patient quality of life and patient assessment sheet regarding (nausea and vomiting – urgency) in which (p >0.5)

## 3. DISCUSSION

Patients with renal stone disease have severe symptoms and their quality of life usually affected by the disease. An educational guideline of renal stone can helps the patients to improve their quality of life, relive the symptoms and prevent recurrence rate **(Penniston and Nakada, 2013)**

Based on the results of the study, the mean age of the study sample was 36.60 years, this result is agreed with **Motaz, (2013)** who stated that kidney stone may present at any age however young and middle aged adults are more common affected especially in hot climates, and this results also agreed with **Suzanne, (2016)** who stated that the majority of patients with stone formation are between 20 and 55 years of age. These results are similar to results proved by **Patel and Mehta, (2014)** when proved in his study that kidney stone prevalence is higher in men in compare to females and common with age group 31-40 years.

In relation to gender, about two thirds of study subjects were male and this is agreed with **Brunner and Suddarth, (2016)** who stated that about 80 percent of kidney stones occur in men and stone disorders are more common in men than in women. Regarding level of education, about one half of the study sample were had level of education secondary school. About two thirds of them were married and these results similar to results done by **Kaladhar et al, (2012)** when proved in his study that most married people are positive towards the occurrence of kidney stones than not married. More than one half of the study sample their housing was rural area, and had adequate income, and more than one half of them were live with family , and nearly one half of them their occupation were technician.

Regarding present medical history, the results study showed that, almost one third of the study sample had renal colic as a chief complain of stone disease and this is agreed with **Glenn, (2018)** who stated that, pain is the most common symptom when passing a kidney stone and it occurs with obstruction, in which the urine cannot pass freely from the kidney to the bladder and if be worsen called renal colic.

Also, about one half of the samples their predisposing factor of stone disease was dietary intake, and this results is agreed with **Boulder Medical Center, (2016)** who stated that eating more fast food and high fructose corn syrup as well as climate change have been suggested as a possible link to kidney stone formation. Almost three quarters of the study sample had pain. Regarding methods of stone diagnosis, the results showed that about one half of the samples used X rays methods to diagnose the disease. In addition, more than one half of them their treatment need surgery.

In relation to past medical history the findings of the results reveals that, , almost three quarters of the study sample were had chronic illness, and more than one half of them had chronic illness since 5 years ago, and almost one third of the sample their chronic illness were diabetes mellitus. This study is similar to study done by **Nerli et al, (2015)** when proved that, there is a strong association between type 2 diabetes and uric acid stone formation.

Regarding family history, the results of the study showed that, about two thirds of the samples were had family history of renal stone disease, this result is agreed with study done by **Gary, Walter, Erice, and Meir, (2010)** who stated that kidney stones develop more frequently in individuals with a family history of kidney stones than in those without a family history. Added to that, nearly one half of them, their family were had kidney stone and more than one half of them their family suffer from hyperoxilaria. This result is agreed with study done by **Andreas, Michael, Thomas, Kemal, Christian, Ales, and Christian, (2014)** who stated that, enteric hyperoxilaria is a particularly problematic condition in patients with intestinal malabsorption of fat and this abnormality is associated with a high risk of stone formation.

The present study revealed that, there were significant improvement in patient`s knowledge about stone disease post and follow up phases in relation to pre implementation phase in which there were highly statistically significant differences between pre & post and follow up phases, this reflects that educational guidelines has good effect in improving patient`s knowledge and this could be attributed to the clarity of the module materials, the use of simple language, the clear of educational methods and instructional media.

Regarding patient`s knowledge about dietary assessment the results of the study revealed that, there were great improvement in patient`s knowledge regarding dietary habits about stone disease and statistically significant differences found between pre & post and follow up phase, this results is supported by **Lotan, Jiménez and Wijnkoop (2012)** who stated that, lacking knowledge regarding kidney stone disease have large impact on perceived barriers by patient in diet modification.

Also, **Taylor and Stampfer, (2011)** stated that, dietary factors remain an entity attributed to a kidney stone and thus renal stone becomes more of a 'lifestyle' disease relying more on prevention than advanced and specific treatment modalities.

In addition, the results of the study revealed that, there were significant improvement in patients symptoms post and follow up phase in relation to pre phase in which highly statistically significant differences found between pre and post and follow up phases of guidelines implementation and this is agreed with **Taylor, (2015)** patient symptoms after percutanous nephrolithotomy are usually well controlled with oral narcotic pain medication.

The results of the study showed that, there were great improvement in patient's imaging studies and patient`s laboratory investigation post implementation of guidelines in which there was highly statistically significant difference found between pre, post and follow up phase and this results might be due to percutanous nephrolithotomy surgery don`t leave any residual stone fragments or gravels after stone removed, that may lead to improvement in patients investigations.

Regarding patient`s quality of life the present study showed that, there were great improvement in patient`s quality of life after percutanus nephrolithotomy through guidelines implementation phases in which highly statistically significant differences found pre, post and follow up phase, this is agreed with **Fentes, Gude and Blanco (2015)** who proved through his study that there is overall improvement on quality of life for patients after percutaneous nephrolithotomy, and agreed also with study done by **Ahmed et al, (2017)** who proved in their study that quality of life for study group patients was found to be significantly higher than control group regarding domains of the short form 36 items questionnaire except emotional role limitation and social functioning.

While, this results are not agreed with study done by **Dincher, (2011)** who showed that there were no statistical significant differences on quality of life for patients with stone.

there was positive relation between patient assessment sheet (symptoms) and patient`s satisfactory knowledge regarding urgency symptoms and imaging studies in which statistically significant differences found pre and post phase. And this is indicator to reflect that, effective teaching through educational guidelines increases patients` knowledge, increases patient motivation to follow prescribed instructions and finally patient's symptoms are improved.

In addition, there was statistically significant relation between patient`s quality of life and patient`s symptoms after guidelines regarding for nausea and vomiting, and urgency symptoms and this results might be due to

## 4. CONCLUSION

Based on the result of the present study, it can be concluded that there were significant improvement in patient`s knowledge regarding renal stone disease, and dietary habits. In addition, there was significant improvement in patient`s quality of life post implementation of guidelines and patient`s clinical data and symptoms post implementation of guidelines.

## 5. RECOMMENDATIONS

1. Further researches are needed to fully understand the associations between patients' quality of life and effect of patient education.

2. Particular efforts must be focused on renal stone risk groups to increase their awareness regarding prevention of recurrence and early detection of the disease.

3. Continuous educational programs should be constructed to increase the level of patient's knowledge regarding renal stone which can be provided in the clinics using simple booklets and brochures.

4. Self learning package about renal stone disease should be done to nurses who caring patient undergoing percutanous nephrolithotomy

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