Effect of Pre and Postoperative Nursing Interventions on Clinical Outcomes and Quality of Life for Patients Undergoing Percutaneous Nephrolithotomy

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Abstract

Background: Percutaneous nephrolithotomy is the initial treatment option for complicated kidney stones. **Aim:** This study was conducted to evaluate the effect of pre and postoperative nursing interventions on clinical outcomes and quality of life for patients undergoing percutaneous nephrolithotomy. **Design:** Quasi experimental research. **Setting:** The study was conducted in the Urology Department at Students Teaching Hospital. **Subject:** It consisted of convenience samples of 60 adult patients who were selected and divided into two equal groups. T**ools:** Three tools used in this study for data collection: **Tool I:** Patient's Interview Questionnaire. **Tool II:** Patients' Clinical Outcomes Assessment Tool composed of three parts: Part a: Numeric pain rating scale; Part b: fluid and electrolyte assessment sheet and Part c: Post PCNL Complications Assessment. **Tool III:** Quality of life Assessment questionnaire **Result:** there was improvement in total knowledge level study group who had high level of knowledge (83.3) while control group had (6.7%).There were highly statistically significant differences regarding risks of complications between both groups p value ($<0.001^{**}$), It was noted that control groups had poor quality of life (56.7%) compared to in study group had good quality of life (73.3%). C**onclusion:** Implementation of nursing interventions had a positive impact on clinical outcomes and quality of life. **Recommendations:** Implementation of pre &post operative nursing interventions for patients undergoing percutaneous nephrolithotomy operations upon patients' admission, before discharge and in follow up.

Keywords: Clinical Outcomes, Nursing Interventions, percutaneous nephrolithotomy, Quality of life.

Introduction

Percutaneous Nephrolithotomy (PCNL) is a minimally invasive procedure in which surgeons make a tiny puncture wound up to 1 cm through the skin to remove kidney stones. Percutaneous nephrolithotomy is regarded as the initial treatment option for large or complicated kidney stones. **(Abodief, Azer, Gadelkareem& Desouky., 2023)** With PCNL, a large stone can be removed quickly and completely without the risk of associated fragment passage. Recently, PCNL is frequently a well-tolerated procedure because of newly developed tools and methods that shorten hospital stays and procedure complications **(Kallidonis, Tsaturyan, Lattarulo, & Liatsikos., 2020)**.

Medical treatment for urinary calculi involves surgically excising the stones with techniques such as percutaneous nephrolithotomy, ureteroscopy, and open surgery. When dealing with complex multiple calculi or renal calculi larger than 2 cm, PCNL has been a common surgical procedure since 1976. Reports state that PCNL is the initial treatment option for large kidney stones **(Yuan, 2024).**

The success rate of PCNL is high (85–93%), but the rate of postoperative complications is as high as 18%. According to a UK study, bleeding, adjacent organ injury, residual stone fragmentation and wound infection **(Coman, et al., 2025).**

The development of nursing interventions is one of the most important steps in the PCNL procedure, which includes pre, intra, and postoperative care. Preoperative nursing care includes complete history, physical examination, informed consent; physical preparation includes Preoperative fasting, bowel and skin preparations **(Mousa and Khattab. 2024).** Pre-procedural instructions cover the following topics: definition of percutaneous nephrolithotomy procedure, indication, advantages, necessary investigation, type of anaesthesia, breathing technique, position during operational procedure, and physical preparation prior to the procedure (**Mousa and Khattab., 2024 and Abdallah, Nabih, Bazeed, & Othman, 2024**). Following surgery, the nurse should introduce postoperative care, which involves closely monitoring vital signs and giving all prescriptions as directed by the physician. Urine output and colour changes are closely monitored (**Ibrahim, Talaat Elshamaa, Hamed & Sheta., 2022).** Patients must understand what will happen during the procedure, comply with nursing interventions, and be

given the chance to ask questions. Teach the patient before discharge about wound care, nephrostomy tube care, tube drainage, infection prevention, monitoring for postoperative complications, and noticing blood in the urine following nephrolithotomy procedure **(Sayed, Ahmed & Gadelkareem, 2021)**.

Significance of the study

Open surgery has mostly been replaced by percutaneous nephrolithotomy for the treatment of renal stones, which has less trauma and faster recovery of physical function after surgery. However, without proper nursing intervention patients risk for complications such as bleeding in or around the kidney, infection, bowel perforation or renal dysfunction, which may affect quality of life in a negative manner **(Ali, Dessouky and Ebrahim, 2019)**. The researcher focused in this study on providing pre- and postoperative care targeting improving quality of life, prevention of postoperative complications, positive clinical outcomes and reducing the length of hospital stay.

The aim of this study was to: Evaluate the effect of pre and postoperative nursing interventions on clinical outcomes and quality of life for patients undergoing percutaneous nephrolithotomy.

Research Hypotheses

- Nursing interventions are expected to improve clinical outcomes as reduce pain, complications, length of hospital stay and improve laboratory investigations for patients undergoing percutaneous nephrolithotomy.
- Nursing interventions are expected to improve quality of life for patients undergoing percutaneous nephrolithotomy.

Subjects and Methods

Design: Quasi experimental design was used in this study.

Settings

The study was conducted in the Urology Department at the Students Teaching Hospital Affiliated to the Ministry of Higher Education and Scientific Research.

Study Subjects

A purposive sampling of (60) adult patients who are fulfilling the inclusion and exclusion criteria was calculated based on an Epidemiological Information Program based on total patient admitted for percutaneous nephrolithotomy per year (2023) according to review of Students Teaching Hospital statistical records as the following parameters

-Total target population size (200) per year. Confidence limit =95%,

Accepted error =5%, Power of the study =86%.

The sample was selected and divided into two equal groups as follows.

Control Group: 30 who received routine hospital care from nursing staff.

Study Group: 30 who received nursing intervention proposed by the researcher and routine hospital care.

-Inclusion criteria of subjects

-Patients able to communicate verbally and willing to participate in the study.

-Patients age range from (21-60).

-Both sexes.

-Exclusion criteria were as follows

-Bleeding tendencies patients.

-Psychiatric patients.

-Pregnant women.

-Unconscious patients.

Tools of data collections

Three tools were used in this study; these tools were aimed at evaluating the effect of Pre and Postoperative Nursing Interventions on Clinical Outcomes and Quality of Life for Patients Undergoing Percutaneous Nephrolithotomy.

Tool I:"Percutaneous Nephrolithotomy Patient's structured Interview.

This tool was developed by the researcher based on related literature Review **(Hinkle and Cheever 2014 and Ali, Dessouky and Ebrahim, 2019)**. It included: Three parts as follows: -

Part (a) Patient's socio demographic which include: -age, sex, marital status, level of education, occupation, and residence data.

Part (b) Patients' Clinical Data: which include patient diagnosis, past medical and surgical history, family history and current medication.

Part(c) Patients' Knowledge Assessment Sheet regarding percutaneous nephrolithotomy.

This tool was developed by researchers based on literature reviews **(Hinkle and Cheever 2014)** to assess patient's knowledge regarding percutaneous nephrolithotomy procedures. It consisted of 30 multiple choose questions that concerned with patients' knowledge regarding Site of stone, definition of percutaneous nephrolithotomy procedure, indications, benefits, investigation needed before procedure, type of anesthesia used during procedure, physical preparation before procedure, position of patient during procedure, recovery period and patient knowledge about discharge instructions.

Total Scoring system

-Low level of knowledge allocated score less than 50%.

-Moderate level of knowledge allocated score equal to 50% - 75%.

-High level of knowledge allocated score more than 75%.

Tool II: "Patients' Clinical Outcomes Assessment Tool" This tool consisted of three parts as follows:

Part (A): Numeric pain rating scale:

This scale was developed by **(Duncan Bushnell and Lavigne, 1989)** and it was translated into Arabic and adopted by researchers to assess patients' level of pain. Assessment scales with patients are instructed to indicate a point on the linear line indicating the severity of pain, and ranges from 0 (no pain) to 10 (sever pain).

Total scoring system

No pain allocated score (0), Mild pain allocated score (1-3), Moderate pain allocated score (4-6), Sever pain allocated score (7-10).

Part(B): Fluid Electrolyte assessment sheet: This tool was developed by researcher based on a recent literature review to assess fluid balance that consists of two parts

a: **Intake and output assessment chart** was used to assess oral intake plus post IV fluid such as crystalloid and colloids. Also, recording the output as urine through 24 hours of output.

b:Laboratory Investigations: Laboratory investigation includes (haemoglobin, prothrombin time, sodium Na, potassium K and renal function testes). **Scoring system** of Fluid & Electrolyte assessment were scored according to normal and abnormal range in which the normal range was given score (0), and abnormal range was given score (1).

Part C:" Post percutaneous Nephrolithotomy Complications Assessment: Clavien-Dindo grading system for the classification of surgical complications, this tool developed by **Dindo, Demartines and Clavien, (2004).** It was translated into Arabic and was adopted by researcher to classify complications into grade I, II, III, IV, and V according to CDCS.

Scoring system

It was graded according to severity into 4 grades (0, I, II, ≥III) which in each grade, it was determined according to incidence of either of the sub scaled complications in term of yes (1)/ No (0).

Tool III: Percutaneous Nephrolithotomy Quality of life Assessment questionnaire. For patients, using Rand short form 36 items questionnaire. This tool was developed by **Ware & Sherbourne, (1992)** and was re-evaluated by **Abdelmowla, Hussein, Shahat, Ahmed,, (2017).** It was translated into Arabic and was adopted by the researcher to assess quality of life for

patients undergoing percutaneous nephrolithotomy procedure.

Total scoring system

- Poor QOL allocated score less than 60%.
- Fair QOL allocated score equal to 60% - 75%.
- Good QOL allocated score more than 75%.

-Ethical consideration

The Ethical committee of the Faculty of Nursing at Tanta University approval was obtained in 20/3/2024, code number 422-3-2024. Informed consent was taken from every patient after clarifying the procedures and the purpose of participating in the study. They were informed about confidentiality of data collection, their right to refuse participation and to withdraw at any time without any consequences. A code number was used instead of a name.

- An official permission was obtained to conduct this study from the faculty authorities and from the Manager of Student Teaching Hospital of Tanta University.

Methods of data collection

Tools development

Three tools were utilized in this study. Tool one Percutaneous Nephrolithotomy Patient's Interview Questionnaire include three parts, part one patients sociodemographic data, part two patients clinical data and part three patient knowledge assessment sheet. Tool two post percutaneous nephrolithotomy clinical outcome assessment tool, this tool include three parts, part one Numeric pain rating scale and part three post percutaneous nephrolithotomy complications assessment and finally tool three the Rand Short Form 36 (SF-36) Quality of Life Questionnaire.

Content validity

All tools were tested for content validity and clarity of questionnaire by five experts in the Medical Surgical Nursing at the Faculty of Nursing and urology specialist to check content validity and clarity of questionnaire.

A pilot study

Pilot study was carried out on (10 %) of patients to test the feasibility and applicability of the developed tools, accordingly, needed modification was done. The sample was excluded from the study.

Reliability of the tool: All tools of the study were tested for reliability by using alpha Cronbach's test. Tool I Part A = 0.883, Tool I part B=0.849, Tool I part C=0.879, Tool II part 1=0.863, Tool II part 2=0.841, Tool II part 3=0.859, Tool III=0.839.

Data collection

-Data were collected over a period of 6 months, starting from September 2023 to February 2024.

-Implementation of pre and post operative nursing interventions was conducted in four phases as follows

A- Assessment Phase

An initial assessment was carried out by the researcher for all the study subjects in both control and study groups to assess the patients who met the inclusion criteria of this study using Tool I Part A Patients 'Sociodemographic, Part B Patient's Clinical Data and using part C to make collection of baseline data pertinent for both groups.

- Both control and study groups assessed quality of life by using tool III.

B-Planning Phase

Expected outcomes were included as improved knowledge, quality of life, Decrease the patient's level of pain as well as to reduce the level of complications and length of hospital stay for patients undergoing percutaneous nephrolithotomy.

- The health teaching was applied to study group in 5 sessions; each session was expected to take duration of 20-30minutes, the teaching method was included: teaching booklet, demonstration and redemonstration.

-An illustrative structured booklet was prepared in a simple Arabic language supported by illustrative pictures as a guide for the patients, and different methods of teaching were used such as video, group discussion and presentation for theoretical part and demonstration & re-demonstration for the practical part. A booklet was given to each patient during sessions to refresh their knowledge and skills. Determine the suitable time for data collection through exploratory visit to the settings

C-Implementation Phase

Group I (control group)

Control group receive routine hospital care as provided by urology staff and consist of routine pre and post nursing care.

Group II (study group)

Nursing intervention for **Study group** patients undergoing percutaneous nephrolithotomy was implemented by the researcher during period of hospitalization after obtaining acceptance of responsible physician. The contents of the nursing intervention were included preoperative care, postoperative care with special emphasis on nephrostomy tube care, deep breathing exercises and postoperative instructions.

Providing preoperative nursing care as; preoperative assessment, document patient's history, physical examination, lab investigations, teach the patient to stop eating and drinking from midnight according to

physician orders and reassure the patient about surgical incision. In addition to teach patient about the potential complications as bleeding, infection of wound and other complications.

Providing immediate preoperative measures as; patients prepared preoperative through measuring vital signs, showering with disinfectant solutions, putting on operative gown, and ensure the site of procedure is marked.

Providing immediate postoperative care as; patient assessed immediately with focus on airway, breathing, circulation. Check level of consciousness, monitor vital signs, monitor intake and output, close observation of urine color changes, nephrostomy tube, careful observation for wound (observe discharge for color, amount, odor and consistency) and also observe intravenous infusions, type, patency of IV site.

Providing postoperative care as; After procedure patients administered prescribed medications, postoperative early ambulation, inspect surgical dressing for any bleeding, wound care, nephrostomy tube care, postoperative exercises, dietary planning, Also indwelling urinary catheter assessed, perform catheter care, empty the bag and measure the volume of urine produced, patients guided after surgery to increase water intake (8 to 10 cups), careful monitoring and management of postoperative complications, factors affecting postoperative quality of life assessed, and reported any abnormality to the surgeon.

Health teaching implementations

The health teaching to the patient's pre- and post-operative percutaneous nephrolithotomy was implemented through 5 sessions; each session was taken 20-30 minutes.

Session one

- It was started during pre-operative period after assessment of patient's level of knowledge about procedure.

-It focuses on patients' basic information about percutaneous nephrolithotomy as definition, function of kidney, indications, advantages, complications and specific pre-operative preparation for operation.

Session two

-It was started during pre-operative period after assessment of patient's level of knowledge about procedure.

-It focuses on patients' basic information about post-operative care and expected complications for patients who are undergoing percutaneous nephrolithotomy.

Session three

-It started immediately pre-operatively. In this phase, all patients

in the study group are taught how to perform preoperative relaxation techniques such as deep breathing exercise which help patients relax and comfort before and after the procedure, reduce level of anxiety and improve respiratory functions. It was demonstrated by the researcher, demonstrated and re-demonstrated by the patient until the patients were performed the technique efficient and correct.

Session four

-It was performed second day post operative. It concentrated on discharge instructions about (medication, renal diet, intake and output of liquids, activity, expected and warning symptoms, showering, nephrostomy tube care and follow up appointment

Session five

-It was performed on second day post operative. It concentrated on teaching patients how to perform wound dressing care and nephrostomy tube care.

D-Evaluation Phase

After implementation of nursing interventions, the researcher carried out a comparison between both groups to determine patients' Knowledge regarding percutaneous nephrolithotomy by using tool I part three, also using tool II Part A, B and C to evaluate the effect of nursing interventions on clinical outcomes for patients undergoing PCNL and also using tool III to assess quality of life for studied patients.

Statistical analysis of data

Data were analyzed using Statistical Program for Social Science (SPSS), the full detailed form is SPSS 24, IBM, Armonk, NY, United States of America. Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

Results

Table 1: Distribution of studied patients undergoing percutaneous nephrolithotomy pre and post implementation of nursing interventions according to sociodemographic data (n = 60).

It reveals that 76.6% of study group and 66.7% of control group in youth that is to say middle adulthood stage for both groups respectively. Regarding Sex, more than half in control group 60% were females, and more than half in 60% study group were males. Regarding Marital Status**,** about 76.7% of control groups and 83.3% study groups were married respectively. Educated patients represent 73.3% of control groups, 77.7 in study groups most of them had moderate level of education. As for occupation**,** the majority of studied patients including control and study group were

working. Finally, in relation to Residence area**,** the majority of the control and the study group 73.3%, 90.0% respectively were lived in rural area.

Table 2: Distribution of studied patients undergoing percutaneous nephrolithotomy pre and post implementation of nursing interventions according to total level of knowledge (n = 60).

It shows that the majority of control group 90% and study group 100 % had low level of knowledge about the procedure before giving the nursing interventions.. **On The Other hand,** it was noted that the study group had a high level of knowledge 83.3% compared to control group 6.7% after giving nursing interventions. There were statistically significant differences between both studied group post giving nursing interventions at P Value = 0.001*

Table 3: Distribution of studied patient undergoing percutaneous nephrolithotomy pre and post implementation of nursing interventions regarding Numeric pain rating scale (NPRS-11) (n= 60).

It depicted that the majority of control groups 80% had severe pain while 53.3% of study group had moderate pain immediate post implementations of nursing interventions. There were statistically significant differences between both studied groups at **p** value= 0.007. **On the Other hand,** there was improvement in intensity of pain for both studied groups after two weeks of operation which are 60% of control group and 86.7 % of study group had mild pain. There were statistically significant differences between both groups at p value 0.020*. **Finally, after four weeks** there was an improvement in intensity of pain for both studied groups, which more than half of control group 53.3% had mild pain, however majority of study group 83.3 % had no pain. There were highly statistically significant differences between both studied groups at P Value = 0.001*.

Table 4: Percent distribution of Clavien-Dindo grading system for the classification of total surgical complications among studied patients undergoing percutaneous nephrolithotomy pre and post implementation of nursing interventions (n= 60)

It revealed that more than half of control group (60%) had minor complications compared to study groups which about two thirds (66.7%) had no complication **immediate post operatively nursing interventions**. There was a highly statistically significant difference

among both groups at P value= 0.001*.

After two weeks, half of control group (50%) had minor complications, while most of the study group (80%) had no complication with highly statistically significant difference among both groups at P value= 0.001.**Finally, after four weeks**, more than half of control group (60%) and majority of study group (93.3%) had no complication with statistically significant difference among both groups at P value= 0.009.

Figure 1: Distribution of studied patient undergoing percutaneous nephrolithotomy pre and post implementation of nursing interventions regarding length of hospital stay (n= 60). It illustrates the length of hospital stay for both groups, of which more than half of control groups 56.3% stayed in hospital more than three days while the majority of study groups 83.3% stayed from 1-3 days post operatively. There was a statistically significant difference among both groups at P value= 0.003*.

Figure 2: Percent distribution of the studied patients with percutaneous nephrolithotomy pre and post implementation of nursing interventions of total quality of life (n=60). It shows that majority of both control 80% and study groups 83.3% had poor total quality of life preoperative nursing intervention respectively. After four weeks of intervention (73.3 %) the study group had good total quality of life dimensions compared to (56.7%) of control group had poor total quality of life dimensions. There was a highly statistically significant difference among studied patients at P value= 0.001*.

Table 1: Distribution of studied patients undergoing percutaneous nephrolithotomy pre and post implementation of nursing intervention according to sociodemographic data (n = 60).

Sociodemographic data	The studied groups				χ^2	P value
	Control (n=30)		Study (n=30)			
	N	%	N	%		
Age						
19 – < 30	0	0	1	3.3	2.429	0.488
30 – < 40	10	33.3	6	20		
40 – < 50	9	30	12	40		
50 – 60	11	36.7	11	36.7		
Sex						
Male	12	40	18	60	2.400	0.121
Female	18	60	14	40		
Marital status						
Single	2	6.7	1	3.3	1.417	0.702
Married	23	76.7	25	83.3		
Divorced	1	3.3	0	0		
Widow	4	13.3	4	13.3		
Education level						
Illiterate	8	26.7	7	23.3	4.800	0.441
Read and write	3	10	7	23.3		
Basic education	1	3.3	1	3.3		
Diplome	16	53.3	14	47.7		
Secondary education	2	6.7	0	0		
University education	0	0	1	3.3		
Occupation						
Working	28	93.3	29	96.7	0.352	0.554
Not working	2	6.7	1	3.3		
Residence						
Rural	22	73.3	27	90	2.783	0.095
Urban	8	26.7	3	10		

Table 2: Distribution of studied patients undergoing percutaneous nephrolithotomy pre and post implementation of nursing intervention according to total level of knowledge (n = 60).

Knowledge	The studied groups				χ^2	P
	Control (n=30)		Study (n=30)			
	N	%	N	%		
Pre						
Low	27	90	30	100		
Moderate	3	10	0	0	3.158	0.076
High	0	0	0	0		
Range	9 – 34		11 – 27		T: 0.239	
Mean ± S. D	18.93 ± 6.51		19.27 ± 3.99		P: 0.812	
Post						
Low	24	80	0	0		
Moderate	4	13.3	5	16.7	43.702	0.001*
High	2	6.7	25	83.3		
Range	20 – 48		36 – 57		T: 13.706	
Mean ± S. D	29.33 ± 5.03		45.83 ± 4.26		P: 0.001*	
χ^2	2.321		60.001			
P	0.314		0.001*			

Table 3: Distribution of studied patient undergoing percutaneous nephrolithotomy pre and post implementation of nursing intervention regarding Numeric pain rating scale (NPRS-11) (n= 60).

Numeric pain rating scale	The studied groups				χ^2	P value
	Control (n=30)		Study (n=30)			
	N	%	N	%		
Pain immediate						
No	0	0	0	0	7.177	0.007*
Mild	0	0	0	0		
Moderate	6	20	16	53.3		
Severe	24	80	14	46.7		
Pain after 2 weeks						
No	0	0	0	0	5.452	0.020*
Mild	18	60	26	86.7		
Moderate	12	40	4	13.3		
Severe	0	0	0	0		
Pain after 4 weeks						
No	3	10	25	83.3	24.052	0.001*
Mild	16	53.3	5	16.7		
Moderate	11	36.7	0	0		
Severe	0	0	0	0		

Table 4: Percent distribution of Clavien-Dindo grading system for the classification of total surgical complications among studied patients undergoing percutaneous nephrolithotomy pre and post implementation of nursing intervention (n= 60)

Complication	The studied groups				χ^2	P
	Control (n=30)		Study (n=30)			
	N	%	N	%		
Immediate postoperative						
No	5	16.7	20	66.7	15.618	0.001*
Minor	18	60	8	26.7		
Major	7	23.3	2	6.7		
After 2 weeks						
No	12	40	24	80	10.859	0.001*
Minor	15	50	6	20		
Major	3	10	0	0		
After 4 weeks						
No	18	60	28	93.3	9.512	0.009*
Minor	10	33.3	2	6.7		
Major	2	6.7	0	0		

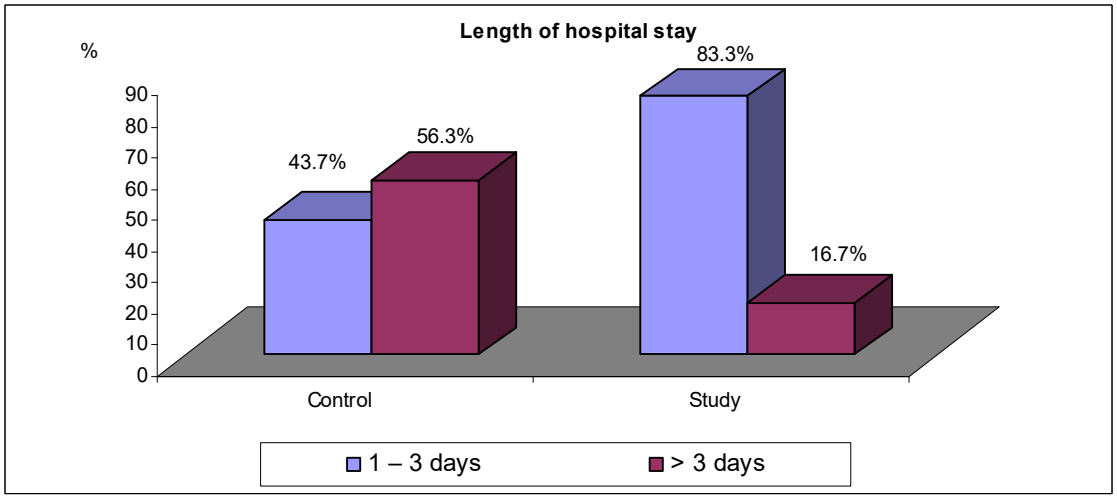

Figure 1: Distribution of studied patient undergoing percutaneous nephrolithotomy pre and post implementation of nursing intervention regarding length of hospital stay (n= 60).

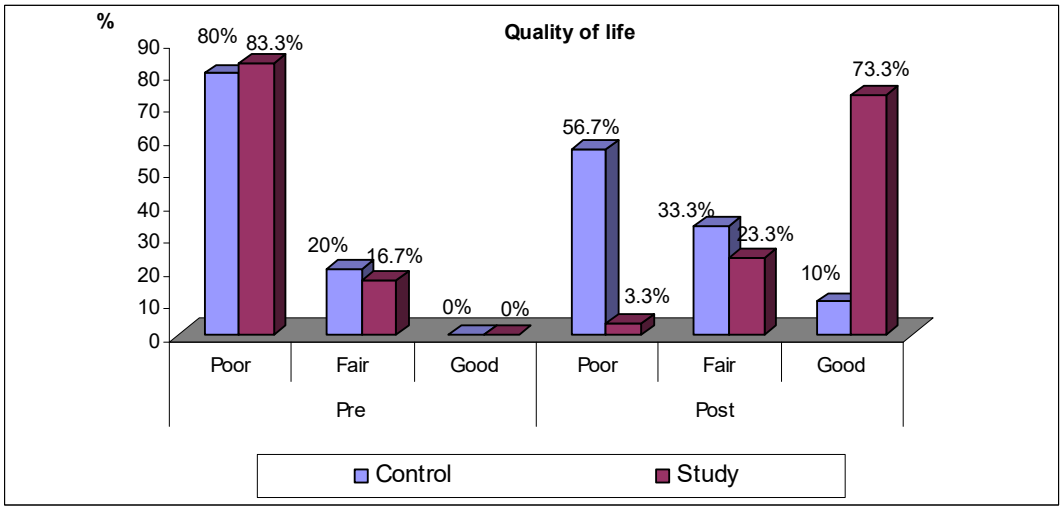

Figure 2: Percent distribution of the studied patients with percutaneous nephrolithotomy pre and post implementation of nursing intervention of total quality of life 36 questionnaire along the study period (n=60).

Discussion

Nursing is considered a key component of improving patients' health outcomes. The success of percutaneous nephrolithotomy surgery depends on pre- and post-operative nursing care as well as health education **(Mahmoud et al., 2020)**.Percutaneous nephrolithotomy patients are at risk for preoperative anxiety due to unknown fear, postoperative pain, and complications. This negative perception of what will happen after surgery can affect recovery, resulting in a poor outcome and longer hospitalisation. Therefore, it is crucial for nurses and other care providers to inform patients about surgery, pain management, and postsurgical self-care practices during the preoperative phase. This can help patients to improve clinical outcome as reduce pain, complications and length of hospital stay, and also improve quality of life **Di Marco et al., 2021).**

In the current study the findings of sociodemographic data regarding both studied groups, clarified that two third of control group and three quarter of study group in youth that is to say middle adulthood stage for both groups respectively. This finding agrees with the findings of the study conducted by (**Baset Buttisha, Tolba and mohamed 2020)**, who mentioned that about three quarters of studied patients aged in youth. Also, this study is supported by (**Pahira & Razack., 2019**) about revealing that most of patients were in groups from thirty-sixty years old. On the other hand, these results were disagreed with (**Luck man, Black, Jacobs, and Sorensen., (2019)** who stated that, early middle adulthood between the twenty-forty years old urinary stones occurred.

In relation to sex, the present study revealed that more than half in control group were females and more than half in study group were males, this is in line with **(Shen & zhong.,2024)** who reported that more than half in control group were females and more than half in study group were males. This result was disagreed with the finding of (**Mostafa, Abouzeid, Hammady& Elmoghazy., 2020)**, who mentioned that the majority of the studied patients were male.

Concerning marital status, the current study revealed that the majority of studied patients of control and study group were married with no statistically significant difference observed

between the two groups. From the researcher's point of view, this might be because most of the studied patients' older age ranged between forty- sixty years old. This result was supported by **(Mohamed, Hamed & Mohamed., 2023)** who revealed that the majority of studied patients were married. On the other hand, these results were disagreed with **(Sahin and Basak, 2020)** who reported that more than half of studied patients and nearly half of the control group are single.

Concerning educational level, the current study revealed that about half of study and control groups had diploma. These findings are in the same line with **(Abdel-Aziz., 2018)** who revealed that more than half of the patients studied had a diploma.

In concerns of occupation of studied patients, the finding of the present study clarified that most of both groups are working. These results were supported by **(Sobhy et al., 2020)** who revealed that most of studied were working, while **(Abodief etal, 2023)** disagreed with those who reported that most of the studied patients were unemployed.

The residence of studied patients indicates that majority of control and study group were live in rural area. This result was in the line with **(Mahmoud, Hassanin and Shady., 2025)** who reported that that majority of studied patients were live in rural area. This result disagrees with the finding of the study that done by **(Ketsuwan et al., 2021)**, who mentioned that most of the studied patients were live in urban areas.

As regards total level of knowledge for both studied groups regarding percutaneous nephrolithotomy, it was obvious that before giving the nursing intervention the majority of both groups had low level of knowledge about the procedure. These results supported by **(Abdelwahab, Alaa El-deen, Rezian & Elhkouly.,2021)** who reported that the majority of studied patients had low level of knowledge. This result was inconsistent with the finding of **(Salah El-din, Mahmoud & Said, 2022)**, who mentioned that more than one third of studied patient had moderate level of knowledge and minority of them had good level of knowledge before the intervention.

As regards the total level of knowledge post implementations of nursing interventions**,** this study revealed that the majority of control groups had low levels of knowledge compared to the study group that

majority had high levels of knowledge. These results were supported by **(Gonella etal. 2021)** who reported that postoperative educational intervention was associated with improved total patient knowledge in study group compared to control group.

Regarding pain at immediate interventions post percutaneous nephrolithotomy, this study discovered about three quarter of control groups and about half of study group had severe pain immediate post percutaneous nephrolithotomy. This is in the same line with **(Mohammed, Belal and Mohammed., 2021)** who stated that about two third of control group and half of study group had severe pain.

Regarding to pain two week post percutaneous nephrolithotomy, there was improvement in intensity of pain for both study groups after 2 weeks of operation which less than two thirds of control groups and majority of study group had mild pain. This is in the same line with **(Mosa and Shehata., 2019)** who stated that there was improvement in intensity of pain for both studied groups after Nursing Program.

Regarding to pain four week post percutaneous nephrolithotomy there was an improvement in intensity of pain for both study groups, of which more than half of control groups had mild pain, and about the majority of study groups had no pain. This is in the same line with **(Elsayed., 2019)** who stated about two thirds of intervention group had no pain, while more than half of control group had mild pain. This result was inconsistent with the finding of (**Mahmoud et al., 2020)**, who mentioned that about three quarters of studied group had mild pain and about half of control group had moderate pain after four weeks of operation.

Regarding the incidence of complications immediate post percutaneous nephrolithotomy, the current study found that near to two third of control group had mild complications compared to study group which more than two third of them had no complications after implementing the nursing intervention immediate post procedure. These findings were strongly confirmed by **(Kumar et al., 2020)** who observed that the majority of patients had minor complication while a minority had major problem with statistically different between the two groups.

Regarding the incidence of complications two weeks post

percutaneous nephrolithotomy, the current study found that about half of control group had mild complications compared to study group which the majority of them had no complications after implementing the nursing intervention. These findings were in the same line of **(Jamal et al., 2024)** who revealed that minor complication is common than major complications among studied patients which therefore fever, hematuria, and pain were observed in less than one quarter of the studied patients.

Regarding the incidence of complications four weeks post percutaneous nephrolithotomy, the current study found that the majority of study group had no complications compared to control group which less than two third of them had no complications with statistically significant between both groups. These findings in the agreement with **(El-Meghawry, Ibrahim and Al Sebaee., 2023)** who concluded that designated nursing instruction had a positive effect on the incidence of complications for study group compared to control group with statistically significant between both groups after implementing the nursing intervention.

Concerning length of hospital stay, the current study showed that the majority of study group had length of hospital stay from one to three days postoperatively compared to the control groups which more than half of them stayed more than three days. This finding was in the same line with (**Yeo & Park., 2023)** who reported that, the intervention group participants had shorter hospital stays Compared with the control group.

Concerning patient total quality of life post four weeks of nursing interventions, the current study showed that more than half of control group had poor total quality of life compared to study groups which nearly three quarter of them had good quality of life. This finding was supported with (**Sharaf., 2018)** who stated that quality of life score was statistically significantly higher in all dimensions of SF 36 questionnaire for the patients undergoing percutaneous nephrolithotomy.

-the result of fining of this study accepted the hypothesis one and two since there was improvement in patients' knowledge, quality of life and clinical outcome as pain, laboratory investigation, length of hospital stays and complications.

Conclusion

Based on the find of the current study, it can be concluded that: The designed pre and post operative nursing interventions lead to improvement of knowledge (83.3%), clinical outcomes, quality of life (73.3%). and decrease the length of hospital stay (83.3%) for patients undergoing percutaneous nephrolithotomy procedures as well as reducing post operative complications especially fever, infections and bleeding.

Recommendations

Based on the findings of the current study, the following recommendations are derived and suggested:

A-Recommendation for patients

1- Pre & post operative care that developed by the researcher should be implemented upon patients' admission, before discharge and in follow up.

2-A printed copy of an Arabic booklet with simple language and images should be made available and distributed to all patients planned on having PCNL.

3-Life style modifications for all patients discharged with nephrostomy tube should be maintained.

C-Recommendations for future research

-Educational program for patients undergoing percutaneous nephrolithotomy about over the counter drugs and effects on kidney damage.

-For generalization the study must be applied to larger samples and different settings.

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