

Effect of Educational Intervention for Nurses about Pre and Post-Operative Care on Clinical Outcomes of Patients Undergoing Ureteral Stent Surgery

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Abstract

Ureteral stents represent effective drainage method to preserve renal function, treat pain caused by ureteral obstruction. **Aim:** this study aimed to determine the effect of educational interventions for nurses about pre and post-operative care on clinical outcomes of patients undergoing ureteral stent surgery: **Subject and Method, Design & Setting:** quasi- experimental was conducted in this study in the Urology Department and Outpatient's clinics, At Main Tanta University Hospital. **Sample,** The sample of this study consisted of: All available nurses working in the previously mentioned settings, and purposive sample of 30adult patients undergoing ureter stent surgery. **Tools:** four tools were used for data collection as following **Tool (I)** Structured Interview Questionnaire that was comprised of two parts; Part (1) was Nurses' Socio-Demographic Characteristic. Part (2); Nurse's Knowledge Assessment Sheet. **Tool (II):** Observation Checklist for Nurse's Performance; **Tool (III):** Patient Bio Socio-Demographic Data; It was comprised of two parts; Part (1) Socio-Demographic Characteristics of the Patient; Part (2) Clinical Assessment Data of the Patient. **Tool (IV):** Ureter Stent Symptoms Questionnaire (USSQ) aimed to evaluate patient complications. **Results:** the present study revealed that, the majority of the studied nurses were poor level of knowledge and un satisfactory practice related to ureter stent surgery pre implementation of educational intervention which has been improved immediately post implementation of educational intervention. Furthermore the frequency of studied patients complications were decreased post- implementation of educational intervention. **Conclusion** there were a significant enhancement in nurse's knowledge and clinical practice regarding ureter stent surgery after implementing educational intervention related to ureter stent surgery. **Recommendation** Encouraging continuous in service educational interventions in providing nursing care of patient with ureter stent surgery.

Keywords: ureter stent, Educational intervention, patient's outcomes

Introduction:

Ureteral stents are devices that are inserted into the ureter to maintain or reestablish patency and facilitate flow of urine or debris into the bladder (Nakada and Patel, 2017).

The indications for insertion of stents into the urinary tract has expanded significantly during the last decade stents. Now they are inserted routinely in patients with ureteral obstruction and for the prevention of complications following open or endoscopic procedures.(Paz et al., 2005) Common indications for ureteral stents are to relieve or prevent intraluminal obstruction caused by calculi, stenosis and genitourinary malignancies or extra luminal obstruction caused by compression of the ureter by

malignancy or fibrosis (Fiuk et al., 2015,Nakada and Patel, 2017, Preminger and O'Leary, 2018)

Also, one of the commonest indication for stenting was obstructive uropathy followed by prophylactic stenting. (Kumar, 2019) Absolute and usually emergent indications for DJ stenting are drainage of bilateral obstruction, unilateral obstruction in the absence of a functional contralateral kidney, and ureteral obstruction with infected hydronephrosis due to stone disease, pregnancy and due to a malignant neoplasm. Canadian, American and European urological organizations have all recently published guidelines on the management of ureteral stones and the role of short-term ureteral stents.(Ordon et al., 2015, Türk et al., 2016) Both shockwave lithotripsy

(SWL) and ureteroscopy are common methods for management of ureteral stones. (Brunner et al., 2018) Canadian guidelines recommend that ureteral stents be placed prior to SWL in selected patients such as those who have evidence of obstruction, acute kidney injury. (Matsumoto et al., 2020) Intractable pain, sepsis, or a solitary kidney. The guidelines acknowledge that the optimal duration of ureteral stents in the setting of stones is unknown, but short-term stent placement (less than 14 days duration) is associated with fewer adverse events. (Ordon et al., 2015, Türk et al., 2016)

DJ stenting is also done after surgical procedures e.g. pyeloplasty, ureteral reconstructive surgeries, ureteroscopy, trauma, and an adjunct to ESWL. Stents is widely used in urologic reconstructive surgery for splinting the ureter. Routine prophylactic stenting reduces the incidence of major urologic complications like urinoma, fistula, and stricture. (Pansota et al., 2013)

Ureteral stents are most commonly made from silicone based material, but are also available in other materials such as polyurethane, polyethylene and metal. (Nakada and Patel, 2017) Stent material may also be coated to improve tolerability, be embedded with medication, or be dissolvable. Presently, there is no clear evidence supporting the optimal choice of stent technology.

Most ureteral stent have curled "pigtail" structures on either end. One pigtail sits in the renal pelvis and the other in the urinary bladder. The goal of the curled pigtail ends is to reduce stent migration (Nakada and Patel, 2017, Brunner et al., 2018). The tips of these stents are J-shaped on either side to prevent upward and downward migration and urologists place them endoscopically. (Saltzman, 1988)

Most often stents are placed by a urologist in the operating room under cystoscopic guidance. (Nakada and Patel, 2017) However, recent evidence suggests that stent measurement may be most accurately measured using CT measurement rather than height. (Barrett et al., 2016)

Stents may come with extraction strings attached. In patients who require short-term stent placement, some urologists may leave the

extraction strings in place and secure them to the patient's external anatomy. Extraction strings may also be removed by the urologist at the time of stent placement. It can facilitate stent removal by either the specialist nurse or patient or urologist. However, ureter stent use does not free of complications and problems. Initially, very few side effects were reported. (Murthy et al., 2010) But later on any publications demonstrated that indwelling ureteral stents can cause lower abdominal pain, dysuria, fever and hematuria. (Paz et al., 2005)

Ureteral stents are associated with potential risks and adverse events. Patients have reported irritative symptoms such as urgency and frequency while stent is in situ. Patients may experience pain both during stent placement and while the stent is in place. Common complications of ureteral stents include hematuria, urinary tract infections (Mäkelä-Kaikkonen et al., 2016), stent migration and stent encrustation. (Preminger and O'Leary, 2016, Nakada and Patel, 2017) The risk of stent encrustation increases with the longer the stent remains in the ureter.

The provision of effective preoperative ureteral stent education is vital to the quality of preoperative nursing care and has been a particular concern for nurses. Nurse's knowledge of preoperative teaching readily and effectively enables patients to cope with their surgery, elevates satisfaction, minimizing post-surgical complications. The nurse's role is primarily one of preparing the patient preoperatively for any diagnostic and surgical procedures and providing the immediate postoperative care. (Barrett et al., 2016)

Ureter stent care include increase amount of fluid intake, monitor fluid intake and output, assess the urine for amount and color for hematuria. Also monitor the absence of the stent by examining the thread hanging from the ureter stent present or not in addition to giving patient medication as antispasmodic, analgesic and antibiotic. Make sure that the connected tubes and catheter are patent and Care for urinary catheterization. (Williams and Hopper, 2015, Spinal, 2019) Because of the patient's quick discharge from the healthcare setting, patient education for care at the home setting is an essential nursing function. Nurses should practice to the full extent of their education and

training (Taguchi et al., 2018). So, the following home care instructions for the client and family should Start Firstly, with the teaching of the importance protecting the kidney by preventing UTI, renal calculi, and trauma. And measures to prevent UTI and calculi. Secondly, maintain a fluid intake of 2000 to 2500 mL per day. This important measure helps prevent dehydration and maintain good urine flow. Thirdly, gradually increase exercise to tolerance, avoiding heavy lifting for a year after surgery. Participation in contacting sports is not recommended to reduce the risk of injury to ureter. Lifting was avoided to allow full tissue healing. Fourthly, teach care of remaining drainage tubes, catheters. This routine postoperative instruction is vital to prepare the client for self-care and prevent complications. Finally, Instruct to report signs and symptoms to the physician, including manifestations of UTI (dysuria, frequency, urgency, nocturia, cloudy, malodorous urine) or systemic infection (fever, general malaise, fatigue), redness, swelling, pain, or drainage any catheter or drain tube site. It is anticipated that this education will result in beneficial outcomes for the patients. Nurses face the challenge of delivering preoperative education within a confined time frame due to shortened length of hospital stays, especially preoperatively. Lack of confidence due to less knowledge, skill and inexperience makes them feel that they are unprepared to conduct patient's education interventions and they may have difficulty in perceiving themselves as a teacher, they are also required to increase their knowledge and awareness through continuous educational intervention. (Joshi et al., 2003, Damiano et al., 2005, Stern and Lockwood, 2005)

Significance of the Study

Urology nurse's role is primarily one of preparing the patient preoperatively for any diagnostic, surgical procedures and providing the immediate postoperative care. Because of the patient's quick discharge from the healthcare setting after ureter stent insertion, patient education for care in the home setting is an essential nursing function especially before discharge (Barnes et al., 2014, Park et al., 2015). Whereas Urology nurse has a vital role in assessing condition of patient, suitable

interventions and evaluating the outcomes, Nurses should achieve higher levels of training and education through a qualified education system that allow higher degree of academic advancement and provide appropriate clinical health care services. Also nurses should practice to the full extent of their training and education. Research priorities assuring universal concerns of healthcare regarding to infection control, patients' safety and preventing possibility of complications related to instruments such as urinary catheters and ureteral stents. (Barnes et al., 2014) This study will supply nurses a base of knowledge related to ureteral stent management, and ensure the highest standards of nursing practice management to improve patients' outcomes. It is expected that this study might help nurses to improve their qualifications and practice in assessment, planning, implementation and evaluation of ureter stent patients. This will be inverted on reduce patient's length of hospital stay. Also, it might precipitate an attentiveness and inducement for further academic researches into nursing management of ureter stent patients. (Koprowski et al., 2016)

The aim of the study is to:

Determine the effect of educational intervention for nurses about pre and post-operative care on clinical outcomes of patients undergoing ureteral stent surgery.

Research Hypothesis:

- 1- Nurses' knowledge and practice exhibit improvement after implementation of Ureter Stent Surgery Educational Interventions.
- 2- Clinical outcomes of patients exhibit improvement after implementation of Ureter Stent Surgery Educational Intervention.

Operational definition:

Patients' clinical Outcomes: It is defined as decrease of patient complications as; Increase irritative voiding symptoms including frequency, urgency, dysuria, incomplete emptying, flank and supra-pubic pain, incontinence, hematuria, urinary tract infections, stent migration, stent encrustation and Stent retention.

Subjects and Methods:

Design: a quasi- experimental was applied.

Setting: the study was conducted at Tanta Main University Hospital in the Urology Department and Outpatient's clinics.

Subjects: The sample of this study was consisted of:

- a) All available nurses working in the previously mentioned settings who are providing direct care for patients Undergoing Ureter Stent Surgery. (The total number is 62 nurses worked in Urology Inpatient ward and relevant Urology Outpatient Clinics).
- b) A convenience sample of (30) adult patients undergoing ureter stent surgery in above mentioned setting; the sample size was calculated based on epidemiological information intervention, according to review of Tanta Educational Hospital Statistical Records.

The studied of (30) patients were received pre and post-operative nursing care by nurses after they received the educational intervention.

Inclusion criteria for patients were as following:

- Patients who have ureter stent surgery for the first time.
- Able to communicate verbally.
- Adult patients both sex (21- 60 years).

Tools of the study:

Four tools were used in this study to evaluate effect of educational intervention for nurses about pre and post-operative care on clinical outcomes of patients undergoing ureteral stent surgery.

Tool (I) "Structured Interview Questionnaire" It was comprised of two parts

Part (1): "Nurses' Socio-Demographic Characteristic." Which includes: nurses code, age, sex, marital status, and level of education, occupation, and their years of experience, residence and previous training about care of patient who were undergoing Ureter Stent Surgery.

Part (2): "Nurse's Knowledge Assessment Sheet." It was constructed by the researcher after reviewing of related literatures (Ashalatha and Deepa, 2014, Vincent et al., 2016, Bontrager and Lampignano, 2017, Suzanne et al., 2018, Badawy et al., 2019, Yousef et al., 2019,

Sali and Joshi, 2020). It was used to assess the nurse's knowledge before and after implementation of pre and post education intervention regarding Ureter Stent Surgery. The assessment sheet was comprised of closed end questions as true and false and multiple choice.

Scoring system for Nurse's Knowledge Assessment Sheet. Each item was scored as following:

- Correct answer takes (1).
- Incorrect answer takes (0).

The total scoring system of the Nurse's knowledge was calculated and classified as the following:

- More than 75% of total score indicate Good knowledge.
- From 60% to 75% of total score indicate fair knowledge.
- Less than 60% of total score indicate poor knowledge.

Tool (II): "Observation Checklist for Nurse's Performance:"

This tools as developed by the researcher based on review of relevant literatures (Netto et al., 2001, Wazir et al., 2011, Duke, 2016, Hu et al., 2016, Bontrager and Lampignano, 2017, Nesbitt, 2018, Brunner et al., 2018). It was used to assess nursing performance before and after implementation of pre and post-operative nursing care educational intervention regarding ureter stent surgery that was comprised of (3) main items:

- 1) Preoperative preparation.
- 2) Immediately post-operative care.
- 3) Routine post-operative care and discharge instructions.

Scoring system for the performance checklist were as the following

- Done practice take (1).
- Not done practice takes (0).

Total level of practice

- From 75% and more of the total score indicates satisfactory performance.
- Less than 75%of the total score indicate unsatisfactory performance.

Tool (III): "Patient Bio Socio-Demographic Data."

Part (1) "Socio-Demographic Characteristics of the Patient." That include: patient code, age, sex, marital status educational level, occupation.

Part (2) "Clinical Assessment Data of the Patient." That include: past medical history, date of admission, date of discharge, duration of hospitalization, diagnosis, chief complains, and drugs used.

Tool (IV): Ureter Stent Symptoms Questionnaire (USSQ).

It is developed by **Joshi et al. (2002)** and was modified by the researcher to assess the presence or absence of signs and symptoms of post-operative stent related symptoms by using an Arabic validated version of Ureter Stent Symptoms Questionnaire (USSQ), which evaluates stent-related morbidity in six sections that developed to cover urinary symptoms, body pain, general health include, work performance, sexual matters and additional problems. The USSQ has been considered a reliable outcome measure in several trials.

Content validity: all tools were tested for content validity by nine jury of experts in the field of medical surgical nursing at Faculty of Nursing and urology professors and accordingly needed modifications were done.

Ethical consideration: informed consent was obtained from every nurse and patients included in the study, privacy of the studied patients was maintained and confidentiality and autonomy were maintained by the use of code number instead of name.

Reliability of the tools:

- Cronbach's alpha for tool I is 0.925 for 64 items applied on 6 nurses.
- Cronbach's Alpha for tool II is 0.834 for 144 items applied on 6 nurses.
- Cronbach's Alpha for tool III is 0.839 for 12 items applied on 3 patients.
- Cronbach's alpha for tool IV is 0.901 for 30 items applied on 3 Patients.
- Cronbach's alpha for the sheet in total is 0.876 for 250 items applied on both 6 nurses and 3 patients

Pilot study: it was conducted before the actual study on six nurses and 3 patients undergoing ureter stent surgery after taking their oral approval in order to test the clarity, feasibility and applicability of the different items and needed modifications were done.

The study was conducted in duration of time from April 2019 to October 2019.

Field work: "The present study was conducted in 3 phases as the following":

I- Assessment phase

a-For Nurses:

Assessment nurses are related to knowledge before educational intervention by using Tool (I) part (2) This tool was used to assess and evaluate the nurses' knowledge on two phases as the following:-

First phase: pre implementation teaching intervention.

Second phase: immediately post teaching intervention.

Assessment was filled by the nurses and the researchers to collect base line data.

Tool II

- Observational check list for nurses it was used to observe nurses practice two times by the same manner on two phases.

b-For Patients

Tool (III) was used at the first time of patient's admission for collection of patient's data and assessed the patient who met the inclusion criteria and was included in the study.

II-Planning phase:

This phase was formulated based on data from the assessment phase, literature review priorities, goals, determined needs, baseline measures, and expected outcome criteria were taken into consideration when planning patients care.

In order to be implemented, using various methods includes handout, power point, doll and real material (e.g. urinary catheter, anti-septic solution), and a booklet containing diagrams and pictures which was designed by the researcher in Arabic Language and given to the nurses as a guideline. In order to get clear picture of all aspects related to ureter stent, It covered knowledge regarding ureter stent, ureter stent surgery, and nursing care of patients before and after ureter stent surgery, pre-discharge instructions for patients, and follow-up for postoperative ureter stent patients.

Expected outcomes:

1-

improvement of nurses' knowledge and

practice about pre and post-operative preparation of ureter stent surgery.

- 2- improvement of nurses' knowledge and practice about pre-discharge instructions for patients, and follow-up for postoperative ureter stent patients.
- 3- educating risk of postoperative patient's complications as include dysuria, hematuria, urinary frequency, pain and urgency, urinary tract infections, stent migration and stent encrustation.

III- Implementation Phase:

Educational intervention for nurses regarding pre and post-operative care of ureter stent surgery was developed and implemented by the researchers based on determining needs, baseline measures, relevant literature, and expected outcomes. Motivation and reinforcement during training sessions were used in order to enhance motivation for the sharing in this study, in order to implement educational intervention, using various methods of teaching.

Educational methods and aids:

- **Teaching methods** and aids were used during the session that cover three domains of education. It included: Group discussions, demonstration and re-demonstration.
- **Teaching aids include:** Arabic language booklet, Data show presentation, dolls. Power point prepared by the researchers based on literature reviews. The booklets distributed to the studied nurses at the end of sessions.

Educational session:

Educational sessions were given to all nurses included in the study and it was implemented, over (3) sessions (1) theory, and (2) practical. Each session taking 30-50 minutes duration for each one, it included 5 -10 minutes for discussion and feedback for 2 days per a week. Sessions were being given to (5) groups (12) nurses in each group. Each session started by pre-test & ended by post-test. Sessions for nurses were carried out during the morning and afternoon shift.

The content of each session was divided as following:

First session:

The aim of this session is to orient the nurses about the importance, its sessions and expectations of each session.

Objectives: nurses should be able to identify intervention orientation and title expectation, anatomy and function of the kidney, ureter and urinary bladder, indications and contraindications, types and characteristic of ureter stent and complications of ureter stent.

Contents:

- Program orientation and title expectations.
- An overview of simple anatomy and function of the kidney, ureter and urinary bladder.
- Definition of ureter stent.
- Indications and contraindications of ureter stent.
- Types and characteristic of ureter stent.
- Complications of ureter stent.

Second session:

The aim of this session is to help the participants to identify the preparation regarding pre and immediate postoperative expectations.

Objectives: nurses must be able to apply nursing interventions for patients who have ureter stent.

Contents:

- Preoperative preparation and care.
- Immediate Postoperative care.

Third session:-

The aim of this session is to help the participants to identify the behaviors and activities that promote health and prevent complications.

Objectives: nurses must be able to identify routine postoperative care and inform patient with discharge instructions before discharge from hospital to prevent complications.

Content: It included the following:

- Routine postoperative care
- Discharge instructions about activities of daily living (ADL), medication, exercises, diet and

reporting unusual signs and symptoms and time of follow – up.

IV - Evaluation Phase:

I) For Nurses:

Tool (I) and **Tool (II)** were used before and after implementation of pre and post-operative ureter stent surgery education intervention and finally a comparison were done between the results of both pre and post-test immediately to evaluate effect of pre and post-operative education intervention on nurses' knowledge, practice and patients clinical outcomes undergoing ureter stent surgery.

II) For Patients:

Patients who received pre and post ureter stent surgery teaching by the nurses were evaluated using **Tool (III)** and **Tool (IV)** to evaluate (post-operative complications) as an impact on nurses' knowledge and practice. **Tool (IV)** were used immediately post ureter stent surgery, and two week post-surgery in outpatient clinics as an impact on patient's outcomes based on nurses' knowledge and practice of educational intervention.

Limitations of the study:

- The field of work was overcrowded. There was no special room for ureter stent follow up in outpatient's clinic, so the follow up was more difficult for the researcher. The place for nurses was narrow so, the researcher divided the groups into “sub groups”

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 25. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, comparison was done using Chi-square test (χ^2). For comparison between means for two groups, independent samples T-test was used. For comparison between means for variables pre and post intervention in a group, paired samples T-test was used. For comparison between means for variables during three periods of intervention in a group, or for more than two variables, the F-value of analysis of variance (ANOVA) was calculated. Correlation between variables was evaluated using Pearson and Spearman's correlation coefficient r. A significance was adopted at $P < 0.05$ for interpretation of test results significance (*). Also, a highly significance

was adopted at $P < 0.01$ for interpretation of results of tests of significance (**).

Results:

Table (1): Illustrates the distribution of studied nurses according to their socio demographic characteristics.

As regards age of the studied nurses, it was noticed that less than two thirds of the studied nurses (61.3%) ranged from (40- <50) years old with Mean+SD 43.29 ± 7.473 . Concerning the marital status, it shows that majority of the studied nurses (95.2%) were married. Regarding education, more than three quarters of the studied nurses (82.3%) had Diploma in nursing followed by (11.3%) of them had Bachelor degree in nursing, while the minority (6.5%) of them had technical health institute.

Regarding years of nurses' experience in urology nursing department, it was noticed that same results, less than two thirds of the studied nurses (64.5%) had experience <1 years, while less than one third (29.0%) of them had experience >5 years of experience.

Regarding the training course. It was found that the majority of the studied nurses (98.4%) did not have any previous training course related to ureter stent surgery and other general training course.

Finally, regarding Sources of information about caring ureter stent surgery patient was found that less than two thirds of the studied nurses (64.5%) were have the information from Physician and less than one third (32.3%) from Previous experience and less than 2% from the books and other sources.

Table (2) Illustrates Mean scores of the total knowledge domains of the studied nurses about ureter stent surgery pre and post educational intervention

It was observed that there were a highly statistical significant differences regarding total knowledge domains of the studied nurses about ureter stent surgery pre and immediately post implementation of educational intervention as P value = 0.000. It was noticed that the highest mean score post implementation of educational intervention related to ureter stent knowledge (13.34 ± 2.758) compared to preimplementation among studied nurses (2.31 ± 2.895) followed

by mean score of Discharge instruction for patients after ureter stent surgery pre implementation of intervention, (1.71 ± 2.505) to enhanced mean score post- implementation of teaching intervention (11.40 ± 2.831).

Table 3 Percent distribution of the studied nurses regarding their performance about postoperative routine nursing care pre and post educational intervention

showed that, the minority of nurses had satisfactory performance before implementation of educational intervention, regarding ureter stent nursing care about drink a large amount of liquids from 8 to 9 cups of water and juices, cleaning and disinfecting the perineum area, cleaning and disinfecting the urinary catheters daily if present, assess urine for, consistency, clarity and odor and Perform urinary culture monthly representing (3.2%, 9.7%, 1.6%, 9.7% and 3.2%) respectively while one third of studied nurses had satisfactory performance regarding Give the solutions as doctor ordered representing (37.1%). Also, Regarding Observation of the urinary systems' complications the minority of studied nurses pre-implementation of educational intervention had doing assessment of the urine for amount and color for hematuria, monitor the absence of the stent, monitor symptoms of urinary tract irritation monitor pain on the flank area, monitor pain above the pubic lower abdomen, monitor of incontinence. The presence of nocturia was (8.1%, 1.6%, 1.6%, 9.7%, 8.1%, 1.6%, 1.6%, 1.6%) respectively.

On the same line, Regarding reduce complications after surgery about encouraging patient to move out of bed early, Massage and foot exercises, Encouraging the patient to perform coughing and deep breathing exercises was (9.7%, 1.6%, 3.2%) respectively.

Finally, it was found that there were statistical significance differences among studied nurses' performance pre and immediately post implementation of educational intervention related to assessment, The patient position, Ureter stent nursing care, Observation of complications of the urinary system, reduce complications after surgery as p value = (0.000) except measuring the vital signs as p value = (1.00).

Table (4): Percent comparison and correlation between total knowledge level

and total performance level of the studied nurses about ureter stent surgery pre and post educational intervention.

It was noticed that there were none significant positive correlations between total level of knowledge and total level of performance among the studied nurses pre and immediately post educational intervention for $r = (0.036)$, $p = (0.782)$ and $r = (0.107)$, $p = (0.407)$ respectively.

Table (5): Percent distribution of the studied patients according to their socio-demographic characteristics.

It reveals that, one thirds (36.7%) of the studied patients, in age, ranged between ≥ 50 years. And more than half of patients (60.0%) were males. Concerning the marital status, it shows that (86.7%) of the studied patients were married. Moreover, regarding education, it was found that one third (66.7%) of the studied patients learned in Secondary/technical education. Regarding occupation, it showed that (60.0%) of them were Employee. Also there were none significance differences among patients socio-demographic characteristics as p value more than < 0.05 .

Table (6): Percent distribution of the studied patients according to their clinical data.

As regard to Symptoms after insertion of ureter stent all of studied patients (100%) had Dysuria and the majority (93.3%) of studied patients suffering from pain in the flank and superapubic area, three quarter (70.0%) of studied patients had Headache or Blurred vision.

Table (7): Percent distribution of the studied patients regarding urinary symptoms pre, immediately and after three month of ureter stent surgery

Regarding urinary symptoms This table illustrated that, There were statistical significance differences among studied patients pre educational intervention regarding Number of times doing to urinate during the day, Number of times doing to wake up and go to urination at night, Rush to the bathroom when want to urinate, Getting some urine spots before reaching the bathroom, Urinary incontinence without going to the bathroom, Feel urine in the bladder after finished urinating directly, feel pain during urination,

See blood in the urine, Amount of the blood seen in the urine as p value= (0.000). Finally, patient's urinary symptoms were improved.

Table (1): Percent distribution of the studied nurses according to their socio-demographic characteristics.

Characteristics	The studied nurses (n=62)	
	N	%
Age (in years)		
• (20-<30)	5	8.1
• (30-<40)	6	9.7
• (40-<50)	38	61.3
• ≥50	13	21.0
Range	(26-58)	
Mean ± SD	43.29±7.473	
Gender		
• Female	62	100.0
Marital status		
• Single	1	0.6
• Married	59	95.2
• Widow	2	3.2
Educational level		
• Diploma in nursing	51	82.3
• Technical health institute	4	6.5
• Baccalaureate degree	7	11.3
Occupation		
• Nurse	56	90.3
• Supervisor	6	9.7
Experience in urology department (in years)		
• <1	40	64.5
• (1- 5)	4	6.5
• >5	18	29.0
Residence		
• Rural	18	29.0
• Urban	44	71.0
Training course		
• No	61	98.4
• Yes	1	1.6
Sources of information about caring ureter stent surgery patient		
• Physician	40	64.5
• Previous experience	20	32.3
• Books	1	1.6
• Others	1	1.6

Table (2): Mean scores of the total knowledge domains of the studied nurses about ureter stent surgery pre and post educational intervention

Knowledge domains	The studied nurses		T P
	Range		
	Pre Mean ± SD	Post Mean ± SD	
1. Anatomy and physiology of kidney ureter and bladder	(0-10) 1.69±2.532	(2-11) 9.23±2.922	15.34 0.000*
2. Ureter stent	(0-11) 2.31±2.895	(8-15) 13.34±2.758	21.73 0.000*
3. Nursing care of patient before ureter stent surgery	(0-6) 1.92±1.910	(3-8) 7.03±1.708	15.71 0.000*
4. Nursing care of patient after ureter stent surgery	(0-4) 0.84±1.270	(2-5) 4.34±1.173	15.94 0.000*
5. Ureter stent surgery complications	(0-3) 0.44±0.822	(1-3) 2.61±0.732	15.57 0.000*
6. Discharge instruction for patients after ureter stent surgery	(0-9) 1.71±2.505	(5-13) 11.40±2.831	20.19 0.000*

* Significance at level $P < 0.05$.

Table (3): Percent distribution of the studied nurses regarding their performance about postoperative routine nursing care pre and post educational intervention

Postoperative routine nursing care	Pre %	Post %	FE P
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A- Assessment	98.4	96.8	1.0
1. Measuring the vital signs.	0	48.4	0.000*
2. Physical assessment of all body system.	1.6	62.9	0.000*
3. Assess the patient's level of pain.	19.4	77.4	0.000*
B - The Patient position: Put the patient on the back			
C-Ureter stent nursing care	37.1	96.8	0.000*
1. Give the solutions as doctor ordered.	3.2	83.9	0.000*
2. Drink a large amount of liquids from 8 to 9 cups of water and juices.	17.7	100	0.000*
3. Monitor fluid intake and output	25.8	96.8	0.000*
4. Give patient medication.	9.7	90.3	0.000*
5. Cleaning and disinfecting the perineum area.	1.6	82.3	0.000*
6. Cleaning and disinfecting the urinary catheters daily if present	3.2	72.6	0.000*
7. Assess urine for, consistency, clarity and odor.	9.7	71	0.000*
8. Perform urinary culture monthly			
D-Observation of the urinary systems' complications	8.1	96.8	0.000*
1. Assess the urine for amount and color for hematuria	1.6	90.3	0.000*
2. Observe the absence of the stent.	1.6	90.3	0.000*
3. Observe symptoms of urinary tract irritation	9.7	98.4	0.000*
4. Monitoring pain on the flank area.	8.1	96.8	0.000*
5. Monitoring pain above the pubic lower abdomen	1.6	90.3	0.000*
6. Obtains of incontinence	1.6	91.9	0.000*
7. Observe The presence of nocturia			
E. Checking signs and symptoms of UTI	0	71	0.000*
1. High temperature	1.6	80.6	0.000*
2. A foul smell of urine	1.6	80.6	0.000*
3. Dysuria when urinating	1.6	71	0.000*
4. The presence of anorexia and vomiting	9.7	95.2	0.000*
F. Reduce complications after surgery	1.6	69.4	0.000*
1. Encourage patient to move out of bed early.	3.2	74.2	0.000*
2. Massage and foot exercises.			
3. Encouraging the patient to perform coughing and deep breathing exercises.			

FE: Fisher's Exact test

* Significance at level $P < 0.05$.

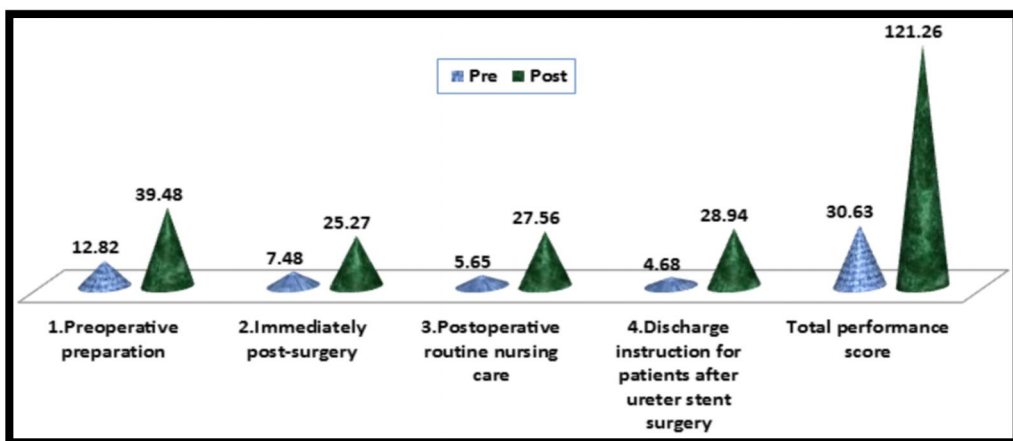


Figure (1): Mean scores of the total performance domains of the studied nurses about ureter stent surgery pre and post educational intervention

Table (4): Percent comparison and correlation between total knowledge level and total performance level of the studied nurses about ureter stent surgery pre and post educational intervention

Total Knowledge Level	Total nurse practice level (n=62)							
	Pre				Post			
	Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory	
	N	%	N	%	N	%	N	%
▪ Poor	58	93.5	0	0.0	7	11.3	4	6.5
▪ Fair	4	6.5	0	0.0	2	3.2	4	6.5

▪ Good	0	0.0	0	0.0	21	33.9	24	38.7
χ^2, P		-				1.622, 0.444		
r, P		0.036, 0.782				0.107, 0.407		

Table (5): Percent distribution of the studied patients according to their socio-demographic characteristics.

Characteristics	Study patient (n=30)		χ^2 P
	N	%	
Age (in years)			
▪ (20-<30)	5	16.7	2.236
▪ (30-<40)	8	26.7	0.525
▪ (40-<50)	6	20.0	
▪ ≥ 50	11	36.7	
Range	(20-56)		t=0.835
Mean \pm SD	42.03\pm10.89		P=0.407
Gender			
▪ Male	18	60.0	FE
▪ Female	12	40.0	0.438
Marital status			
▪ Single	2	6.7	
▪ Married	26	86.7	1.553
▪ Divorced	0	0.0	0.670
▪ Widow	2	6.7	
Educational level			
▪ Illiterate	6	20.0	
▪ Preparatory education	1	3.3	2.391
▪ Secondary/technical education	20	66.7	0.495
▪ University	3	10.0	
Occupation			
▪ None employee	12	40	6.458
▪ Employee	18	60	0.374

FE: Fisher's Exact test

* Significance at level $P < 0.05$.

Table (6): Percent distribution of the studied patients according to their clinical data.

Clinical data	The studied patients (n=30)		χ^2 P
	N	%	
# Previous disease			
▪ Hypertension	13	43.3	1.643
▪ D.M	9	30.0	0.596
▪ Heart disease	0	0.0	
▪ Kidney stone	29	96.7	
▪ Absent	0	0.0	
Patient current history			
1. Duration of hospitalization (in days)			
Range	(2-7)		t=1.395
Mean \pm SD	3.93 \pm 1.17		P=0.168
2. # Diagnosis			
▪ Strictures	4	13.3	4.286
▪ Stone in ureter	30	100	0.112
▪ Right kidney stone	6	20	
3. Family history of stenosis or obstruction of the ureter	10	33.3	FE 0.567
4. # Chief complains			
▪ Presence of kidney stone	28	93.3	
▪ Ureter stenosis	16	53.3	5.492
▪ Rupture or injury of the ureter	1	3.3	0.026*
▪ Urinary tract infection	29	96.7	
▪ congenital anomalies in the ureter	2	6.7	
5. # Symptoms after insertion of ureter stent			
▪ Dysuria	30	100.0	
▪ Urine output less than 500ml during 24h	7	23.3	8.456
▪ Swelling around the eye and edema of the lower leg	9	30.0	0.004*
▪ Pain in the flank and superapupic area	28	93.3	
▪ Headache or blurred of vision	21	70.0	
▪ Dyspnea	5	16.7	
6. # Drugs used			
▪ Insulin	9	30.0	1.253
▪ Cardiac agents	0	0.0	0.792
▪ Antihypertensive drug	13	43.3	

▪ anti hypotensive drug	0	0.0
▪ corticosteroids	0	0.0
▪ None	16	53.3

More answer was chosen FE: Fisher's Exact test*Significance at level P< 0.05.

Table (7): Percent distribution of the studied patients regarding urinary symptoms.

Urinary symptoms	Study patient (n=30)						χ^2 P
	Pre		Immediately post		Post 3 Months		
	N	%	N	%	N	%	
1. <u>Number of times doing to urinate during the day</u>							
▪ Every four hours	3	10.0	0	0.0	20	66.7	
▪ Every three hours	4	13.3	13	43.3	10	33.3	90.11
▪ Every two hours	4	13.3	16	53.3	0	0.0	0.000*
▪ Every hour	19	63.3	1	3.3	0	0.0	
2. <u>Number of times doing to wake up and go to urination at night</u>							
▪ None	0	0.0	0	0.0	9	30.0	87.11
▪ Once	1	3.3	6	20.0	16	53.3	0.000*
▪ Twice	3	10.0	19	63.3	5	16.7	
▪ Three	25	83.3	5	16.7	0	0.0	
▪ Four and more	1	3.3	0	0.0	0	0.0	
3. <u>Rush to the bathroom when want to urinate</u>							
▪ Never	0	0.0	0	0.0	17	56.7	104.48
▪ Rarely	0	0.0	14	46.7	11	36.7	0.000*
▪ Sometimes	4	13.3	14	46.7	2	6.7	
▪ Often	21	70.0	2	6.7	0	0.0	
▪ Always	5	16.7	0	0.0	0	0.0	
4. <u>Getting some urine spots before reaching the bathroom</u>							
▪ Never	0	0.0	0	0.0	23	76.7	115.58
▪ Rarely	1	3.3	18	60.0	5	16.7	0.000*
▪ Sometimes	4	13.3	10	33.3	2	6.7	
▪ Often	16	53.3	2	6.7	0	0.0	
▪ Always	9	30.0	0	0.0	0	0.0	
5. <u>Urinary incontinence without going to the bathroom</u>							
▪ Never	1	3.3	2	6.7	22	73.3	90.02
▪ Rarely	3	10.0	19	63.3	6	20.0	0.000*
▪ Sometimes	3	10.0	7	23.3	1	3.3	
▪ Often	13	43.3	1	3.3	1	3.3	
▪ Always	10	33.3	1	3.3	0	0.0	
6. <u>How often Feel urine in the bladder after finished urinating directly</u>							
▪ Never	0	0.0	1	3.3	22	73.3	114.24
▪ Rarely	1	3.3	16	53.3	8	26.7	0.000*
▪ Sometimes	4	13.3	12	40.0	0	0.0	
▪ Often	13	43.3	0	0.0	0	0.0	
▪ Always	12	40.0	1	3.3	0	0.0	
7. <u>How often feel pain during urination</u>							
▪ Never	0	0.0	0	0.0	2	6.7	101.89
▪ Rarely	0	0.0	1	3.3	17	56.7	0.000*
▪ Sometimes	1	3.3	23	76.7	11	36.7	
▪ Often	7	23.3	5	16.7	0	0.0	
▪ Always	22	73.3	1	3.3	0	0.0	
8. <u>See blood in the urine</u>							
▪ Never	0	0.0	1	3.3	29	96.7	132.82
▪ Rarely	1	3.3	1	3.3	0	0.0	0.000*
▪ Sometimes	0	0.0	18	60.0	1	3.3	
▪ Often	9	30.0	9	30.0	0	0.0	
▪ Always	20	66.7	1	3.3	0	0.0	
9. <u>Amount of the blood seen in the urine</u>							
▪ None	0	0.0	0	0.0	30	100.0	154.13
▪ Simple	1	3.3	25	83.3	0	0.0	0.000*
▪ Medium	6	20.0	4	13.3	0	0.0	

- large
- Large accompanied by blood clots

21	70.0	1	3.3	0	0.0
2	6.7	0	0.0	0	0.0

* Significance at level $P < 0.05$.

Discussion:

The present study reveals that there was an improvement in nurses' knowledge and performance regarding ureter stent surgery after implementing educational interventions. In addition, educational intervention shows improvements in patients' outcomes post ureter stent surgery as the frequency of patient's complications associated with ureter stent placement was decreased.

Regarding socio demographic characteristics of the studied nurses, the finding of current study revealed that the age and sex of the studied nurses two thirds (61.3%) ranged from (40- <50) years old. This might be due to most of studied nurses had diploma level of education and work in general medical surgical unit and all of them were female. Similar demographics findings were reported in other studies as Gouda et al. (2019) who conducted study about Factors Affecting Postoperative Nursing Performance in The Surgical Units. It revealed that less than half of the studied nurses 'ages (42.7%) were between 31 to 45 years. This might explain that they are adult and tolerate the nature of the work. Also this finding revealed that more than half of the studied nurses were females (61.3%). This is may be due to the greater fraction of the nurses in Egypt were females and may also related to the studying of nursing in Egyptian university were exclusive for females only till few years ago.

On the other hand, this result was disagreed by Yousef et al. (2019) who conducted study about The effect of nursing educational intervention on knowledge and practice of nurses regarding infection control measures for children under hemodialysis, reported that (62.5%) of the nurses were between 20 and 30 years of age and all of them were females. Also Saleh, (2018) who conducted study about Nurses Compliance to Standards of Nursing Care for Hemodialysis Patients reported that more than one third of study participants were ranged age from 30 to 40 years, and all of them were females, nearly half of nurses had nursing school diplomas. Moreover Ahamed & Sallam, (2018) who conducted study about The effect of nursing

instructions on nurses' knowledge, practice and suggestions regarding adverse events in hemodialysis reported that nearly three quarters of studied nurses ages were between (30-<40) and (88.5%) of them were females.

As regarding years of experiences for nurses at urology department the finding of the present study revealed less than two thirds of the studied nurses (64.5%) had experience <1 years, while less than one third (29.0%) of them had experience >5 years of experience. It could be explained as the urology department recruiting new staff after renewing of the urology department. And This finding is congruent with Badawy et al. (2019) who conducted study about Effect of Nursing Staff Development Regarding Ureteral Stent Management on Nurses' Knowledge and Practice who reported that years of experience, less than half of studied nurses (45.7%) had less than six years of experience, while 37.2% had more than 10 years. Also Yousef et al. (2019) was reported that 43.4% of the nurses had a work experience of less than 5 years. On the other hand Bayoumi & Mahmoud, (2017) who conducted study about Effect of education intervention on nurses' knowledge and practice regarding care of central venous line in pediatric hemodialysis: clarify In relation to the years of experience more than half of the studied nurses (55%) had 10 and more years of experience. Furthermore Ahamed & Sallam, (2018) reported that (57.7 %) of the studied sample had an experience from 8 to less than 15 years.

As regarding attendance of nurses' training courses, the present study showed that the majority of the studied nurses (98.4%) did not have any previous training course related to ureter stent surgery and other general training courses. This may be due to the majority of studied nurses are diploma degree and more than half of the studied nurses (64.5%) had experience less than one years, although the policy of the hospitals were not preparing educational interventions to improve the nurses skills and knowledge in many areas as renal ward. This finding agreed with the study conducted by Saleh, (2018) who report that more than half of nurses

(61.0% -56.1%) hadn't attended conference during the past 5 years and attended hadn't educational lectures respectively. Moreover, no nurses reported attending a unit- or hospital-based staff development intervention.

Regarding total level of knowledge, the current study revealed that the majority of the nurses have poor knowledge level pre implementation of educational intervention. This might be related to the fact that the majority of the nurses had only diploma in nursing education in which the educational content was limited in their curriculum and did not obtain any previous training education intervention about care of patients undergoing ureter stent. In addition, reduction of nurses' knowledge may be due to lack of updating knowledge and overlapping working area. Furthermore decrease of nurses' knowledge may due to the majority of nurses newly assigned to urology department from general wards.

This result was supported by Badawy et al. (2019) who revealed that none of the nurses in the study sample had satisfactory total knowledge and practice at the pre-intervention implementation. Although few of them had satisfactory knowledge regarding some aspect, the majority had unsatisfactory knowledge regarding ureteral stent management, patient's teaching and stent removal which shows that there is a need of educational intervention in order to improve their knowledge level.

Also the present study showed that, pre implementing a designed teaching protocol showed unsatisfactory level of nurse's knowledge about anatomy and physiology of kidney ureter and bladder, ureter stent, nursing care of patient before and after ureter stent surgery, ureter stent surgery complications and discharge instruction for patients after ureter stent surgery. This deficiency in knowledge is due to one or more of the following reasons, lack of orientation educational intervention before starting of their work as well lacking of in service education workshops with availability of procedure materials prepared specially for the ureter stent care and lack of directions from the head nurses. Also Taha, (2017) who mentioned that pre implementing a designed teaching protocol showed unsatisfactory level of nurse's knowledge. This deficiency in knowledge is due to one or more of the following reasons, lack of

orientation intervention prior to work as well lacking of attending conferences.

This result was supported by Saleh, (2018) there were statistically significant improvement in the mean scores of nurses' knowledge immediately post and follow-up intervention after implementation of intervention. Finally, there were increasing percent in nurses achieved very good and excellent overall total knowledge in the post-test and the follow-up compared with the pre -test periods. This might be due to the comprehensive content of the educational intervention, its relevance to the field of their work, the written handbook of the intervention, which serves as an ongoing reference also contribute to improvement in the total knowledge scores of them.

Additionally, implementation of the educational intervention lead to obvious enhancement in nurses' knowledge, nearly all of studied nurses had good level of knowledge post implementation of educational intervention. This enhancement might be due to the majority of nurses who are keen to learn and have highly expressed need to learn more about ureter stent surgery. This finding exhibit that educational intervention had a usefulness impact on refinement nurses' knowledge, due to the brief presentation of each session using simple Arabic language, apparent educational methods and instructional media and the availability of researcher in the field for more representation, and repetition frequently to confirm the knowledge.

Furthermore Nasser & Tag, (2017) who conducted study about Impact of Protocol of Care of Patients Undergoing Urinary Catheterization on Nurses, practice reported that there were statically significant difference in the total score of nurses' knowledge regarding urinary catheter care throughout the protocol intervention between posttest, pre protocol, first follow 60 and pre, second follow up, and pre protocol. **Finally** Bayoumi & Mahmoud, (2017) was reported a highly statistically significant improvement in total knowledge level of nurses immediately after and after 6 months of implementation of teaching guidelines.

The improvement in nurses' knowledge score, is very important to illustrate positive outcomes for patients. Similar findings published by Hussein et al. (2019) who stated that

increasing nurses' knowledge of proper care of hematuria, can translate into evidence-based practice changes and improve patient outcomes. Also agreed with Ahamed & Sallam, (2018) who stated that one of the important strength points for the instruction intervention as it contributed to clarify how the nurse took actions correctly in the adverse events which also led to reduce the risk of these events and also help in maintaining the safety of the patient. Finally Eid and Abd El Aziz, (2013) who reported that all of nurses had poor score before intervention implementation which become 61% of nurses had good score after implementing intervention. All health care practitioners required to have good knowledge to safely provide patient care.

As regarding performance about postoperative routine nursing care. The present study illustrate that there were statistical significance differences among studied nurses' practices pre and immediately post implementation of educational intervention related to Ureter stent nursing care, Observation of complications of the urinary system, reduce complications after surgery as p value = (0.000).

As regard Ureter stent nursing care, This result in agree with Kumar, (2019) who conducted study about Double J stent: double edged sword stated that the stent should be monitored while in place, promptly removed when no longer needed, and changed periodically if chronically indwelling. Risk factors for complications should be minimized with high fluid intake, prompt evaluation of clinical complaints, and aggressive treatment of documented infection. Also this result in the same line with Omondi, (2016) who reported that daily meatal care, hand hygiene, emptying the urine drainage bags and securing the catheter. Urinary catheter care should always be practiced while taking care of patients. Also this author revealed that meatal care should be performed at least daily with soap and water. While Hussein et al (2019) who showed that majority of studied nurses did not note characteristics and amount of urine in drainage bag after irrigation and there was a significant difference between pre and post teaching intervention regarding all items of hematuria. Additionally Algarnis et al (2019) who conducted study about Nurses knowledge and Practices Toward Prevention Of Catheter-Associated Urinary Tract Infection revealed that

the majority of nurses had poor practices toward Catheter associated urinary tract infection prevention.

As regard Observation of the urinary system complications, Kumar, (2019) reported that Hematuria, urgency, frequency, dysuria, superapupic and flank pain are the most common stent related symptoms. Irritation of the bladder mucosa, especially the trigone by the distal portion of the stent, reflux of urine, and smooth muscle spasm are thought to contribute to these symptoms. As regard reduce complications after surgery also Gouda et al (2019) stated that the reduction and early detection of postoperative complications Nurses are supportive and educative while caring for patients.

Regarding nurses performance about discharge instruction for patients ; the present study represent that there were statistical significance difference among studied nurses pre and immediately post implementation of educational intervention, regarding, Daily perineal care, Permissible activities, correct position, Exercises, Sexual activity, Food regimen, Postoperative, Medications, Inform the doctor immediately if the following unusual signs and symptoms occur and Follow – up visits as p value = (0.000). This may be due to lack of training courses, lack of job description, lack of motivation, lack of interest and shortage of nursing staff that lead to work overload.

This result in the same line with Gouda et al. (2019) who revealed that all of the studied nurses had unsatisfactory practice regarding patients' teaching during discharge (wound care – medications – activities – nutrition -symptoms to be reported - follow-up-community resources).

While Majholm et al. (2012) conducted a study about partners' experiences of post discharge period after day surgery, and found that, the nurses had knowledge about the peri-operative experience and patient teaching. Their clinical practices often bridge inpatient and outpatient setting, giving them an understanding of what patients learned in the hospital, what they didn't learn and how they prefer to learn.

As regarding total nurses' performance scores level. It was found that, there were statistical significance differences between studied nurses pre and post- implementation of

teaching intervention related to all items of the practice as p value = (0.000).

These results may be explained that preparation of a designed protocol was successful in achieving better information and performance levels between nurses furthermore these findings indicated that skills can be easily improved, particularly if matched with nurses relevant scientific base of knowledge. Therefore, the course was successful in improving nurses' knowledge and performance, which could be attributed to the structure, content and process of the intervention.

Also Saleh, (2018) stated that there were significant improvement in overall performance of health education in post and follow-up tests at ($P < 0.001$) and there were increasing percent in nurses achieved very good and excellent overall total performance in the post-test and the follow-up compared with the pre -test periods. **Additionally** Hussein et al. (2019) reported that the project can contribute to positive social change by improving nursing practice through increasing nurses' knowledge of proper care of hematuria, which can translate into evidence-based practice changes and improve patient outcomes.

Regarding correlation between total knowledge score and total performance score of the studied nurses about ureter stent surgery It was noticed that there were none significant positive correlations between total level of knowledge and total level of performance among the studied nurses pre and immediately post educational intervention for $r = 0.036$, $p = 0.782$ and $r = 0.107$, $p = 0.407$ respectively.

This result was inconsistent with the result of study conducted by Ahmed & Sallam, (2018) who discovered that there was positive correlation (total knowledge and practice) pre and post intervention ($r = 0.051$ & 0.164). Also, Gouda et al. (2019) reported that there was moderate positive correlation between studied nurses' knowledge regarding management of patients after surgery in the surgical units and total score of practice. Moreover Taha, (2017) showed that, knowledge was correlated with practice scores among nurses. In contrast Abass et al. (2015) stated that the statistical significant relation was found between nurses' knowledge and performance and their level of education.

Finally the result of the present study documented that the educational intervention has a useful effect in enhancement the nurses' knowledge and skilled performance. They also recommended that educational interventions should be prepared organized according to the assessment of the needs of nurses with continuous appraisal to enhancement of patient outcome. This agrees with Costa, (2001) who documented that the in-service training intervention has a beneficial effect in improving the nurses' knowledge and skills. They also recommended that educational interventions should be organized according to the needs of nurses with continuous evaluation. Moreover Hussein et al. (2019) supported the research hypothesis that nurses in urology ICU who received the teaching intervention about hematuria care showed a high score of knowledge and practice after test than that before.

Regarding Symptoms after insertion of ureter stent in the present study showed that all of studied patients (100%) had Dysuria and the majority (93.3%) of studied patients suffering from Pain in the flank and superapupic area, three quarter (70.0%) of studied patients Headache or Blurred of vision. This result is agreed by Regan et al (2009), Kumar, (2019), who reported that Hematuria, urgency, frequency, dysuria, suprapubic and flank pain are the most common stent related symptoms.

Also Singh, (2003), Balaji et al (2020), stated that Double J stent often leads to morbid lower urinary tract symptoms (Lower Urinary Tract Symptoms) such as frequency (50% - 60%), urgency (57% - 60%), dysuria (40%), flank pain (19% - 32%), supra-pubic pain (30%), and hematuria (25%). Finally Nesbitt, (2018) has well documented that patients with ureteric stents in situ suffer from lower urinary tract symptoms including urinary frequency, urgency, flank pain and hematuria.

As **regarding urinary symptoms** the present study clarify that there were statistical significance differences among studied patients during educational intervention regarding Number of times doing to urinate during the day, Number of times doing to wake up and go to urinate at night, Rush to the bathroom when want to urinate, Getting some urine spots before reaching the bathroom, Urinary incontinence without going to the bathroom, Feel urine in the

bladder after finished urinating directly, feel pain during urination, See blood in the urine, Amount of the blood seen in the urine as p value= (0.000). Finally, patients urinary symptoms were improved post implementation of educational intervention.

Regarding ureter stent symptoms; Effect of internal ureter stent. Indwelling double J (DJ) stents are an integral part of endo-urological procedures for relief or prevention of ureteral obstruction. However many patients develop stent-related symptoms (SRS) which may lead to morbidity and reduced QoL.(Nabhani et al., 2016). Where as Taguchi et al. (2019) who investigated the effect of ureteral stent diameter on urinary symptoms by excluding differences in the stent position, this study showed that there were significant association between ureteral stents with a larger diameter and worse urinary symptoms. Ureteral stents with smaller diameters are recommended to minimize ureteral stent-related symptoms by using USSQ.

Also in support of the present study Koprowski et al. (2016) reported that Urologists commonly employ ureteral stents, and ureteral stent pain is a well-known side effect of stent placement. Care should be taken to prevent placement of stents if possible, with continual reassessment of indications to maintain stents in patients. This study explain the importance of nursing education not only the urologists toward the care of urinary stent and can be appeared with the results of nursing protocol educated to nurses.

Similarly Beysens et al. (2018) add that the main approaches for prevention and treatment of Stent Related Symptoms and complications are stent design and drug therapy. Other focuses are stent positioning, patient education and intravesical drug application, also reported when planning to stent, the patient should be informed of the possible side-effects of this treatment as part of the informed consent.

Moreover Nesbitt, (2018) who reported that Since the operation ureteric stent patient had experienced some urinary frequency and hematuria likely secondary to the ureteric stent, but this was unchanged with the new development of incontinence.. Also, added that medical staff working in emergency departments, as well as general surgery trainees who may cover on-call urology should be aware of

common and expected symptoms associated with ureteric stent placement.

Based on the results of this study; we concise and conclude that, Knowledge and information of educational intervention are, beneficial, and its application in the clinical practice very valuable and important. For this reason, only knowledge without practical application has no beneficial effect. Moreover, new advanced trends depend on enhancing as well as improving nurses' knowledge through standards of nursing care could improve their knowledge and consequently enhance their clinical practice.

Conclusion:

Based on the finding of the present study it can be concluded that:

- There was an enhancement in nurse's knowledge and performance regarding ureter stent surgery after implementing educational intervention. It was noticed that the overall total knowledge score of majority of the studied nurses were poor before implementing educational intervention while enhanced immediately after implementing of educational intervention. The majority of them were obtaining good score. The present study concluded greatly importance for nurse, patient and overall advanced profession nursing personnel.

Recommendations:

Up on the completion of this study, it can recommend that:

I- For nurses:

- Encouraging nurses to read textbooks and periodical, attend scientific meeting and conferences
- Urology nurses must receive continence and periodic in-services educational intervention to update, improve, refresh their knowledge, information and clinical practical skills regarding nursing care about ureter stent surgery and new devices that will be used in the urology department.
- Encouraging continuous, guidance, supervision, assessment and evaluation of nurses clinical performance in providing nursing care of patient with ureter stent surgery in clinical setting, hospitals to

maintain and achieve the best clinical and profession nursing care to the patient.

II- For patient

- All patients had ureter stent should be given verbal and written information about perineal care physical activity, diet, sexual activity, signs and symptoms of complication of ureter stent and follow up schedule.
- Discharge instruction booklet is of great beneficial to the patient.

III -For administration

- Written policies and strategies for perineal care, physical activity and diet regimen to all post-operative patient must be available in the clinical setting and hospital
- Nurse's instructional booklet is of great value in both the urologic department and the outpatient clinic.
- Training intervention for safe practice should be available for nurses concerning the essential nursing measure and with long term follow up can validate and help generalize the results.

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