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Effect of implementing nursing guidelines on reduction of acute Complications for patient with Percutaneous nephrostomy admitted to emergency unit

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Abstract
Aim of the study: Investigate the effects of implementing nursing guidelines on acute Complications for patients with Percutaneous nephrostomy admitted to emergency unit. **Setting:** This study was carried out at Emergency unit at urology Hospital at Assuit University Hospital. **Sample:** A randomized controlled experimental study in which sixty patients were selected by convenience sampling of patients diagnosed with acute percutaneous nephrostomy complication, and assigned into two equal groups (30 patients each). **Tools:** four tools were used to collect the data in this study which are**: Tool I:** patient assessment sheet, **Tool II:** fluid electrolyte assessment sheet, **Tool III:** Tube Assessment and **tool IV:** patient outcomes. **Results:** There is a highly statistical difference between study and control groups concerning (Fluid & Electrolyte assessment (Intake and output)) with p-value (0.000) during all three days and there is very highly statistical difference between study and control groups regarding hospital stay with p-value (0.000). **Conclusion:** application of the nursing guidelines impact positively on patients' outcomes of who have percutaneous nephrostomy complication. **Recommendations:** A hard copy of nursing guidelines should be distributed among patients underwent percutaneous nephrostomy tube.

Keywords: Nursing guidelines, Patients' outcomes & Percutaneous nephrostomy complication

Introduction
When the usual flow of urine is obstructed, a surgical hole between the kidney and the skin known as a nephrostomy enables direct drainage of urine from the higher section of the urinary system. A catheter is inserted into the renal collecting system under picture guidance during percutaneous nephrostomy (**Wah, & Weston, 2017).**

To offer permanent or temporary urine drainage after an operation or to relieve ureteric obstruction, nephrostomy tubes are implanted in the operating room or radiology department. If there is no urine in the drainage system, there is blood in the urine, or there is flank pain, irrigation of a nephrostomy tube is advised **(Tuttle, & Yeh, 2018)**. The following provide nephrostomy tube implantation indications: Removing renal calculi, relieving an obstructed system, maintaining or improving renal function after ureteric obstruction, and gaining access to the renal pelvis for radiological treatments like the placement of an antegrade stent are all examples of procedures that may be performed (**Mostafa & Abbaszadeh, 2018)**

Indications against Percutaneous Nephrotomy, There are typically no absolute contraindications, and Relative contraindications include severe pulmonary disease, a patient who won't cooperate, an untreatable bleeding disorder, and abnormal coagulation indices (**Darryl A. Zuckerman, 2011).**

Hemorrhage, hematuria, infection, septicemia, urinoma, obstruction, catheter dislodgment, or post-obstructed diuresis are complications that can affect individuals who have undergone percutaneous nephrostomy. In 4 to 8% of PCNs, complications arise that necessitate specialised care or lengthy hospitalisation. (**Barnard Health Emergency Medicine- 2019).** Urinary output and electrolytes should be closely monitored, and vital signs should be taken every half-hour for the first six hours following the treatment. Resuming the pre-procedural diet is indicated along with bed rest for about 4 hours. A broad spectrum injectable antibiotic is administered around-the-clock if sepsis is suspected. Periodically check the patency of the nephrostomy tube; if obstructed, gently wash with a diluted 5 mL betadine/antibiotic solution (**Ota, et al., 2015)**

Intensive care Nurses play an important role before, during, and after the treatment. The skin around the nephrostomy tube insertion site should be kept clean, and a sterile dressing should be placed around the site where the tube exits the skin to prevent infection. The dressing should be changed at least twice a week, more frequently if it becomes damp.

The drainage bag and connection tubing should be changed regularly. Patients may shower and bathe 48 hours after the tube is put, but they should endeavor to keep the tube site dry. While washing or bathing, wrap your skin in plastic wrap to protect it. After 14 days, the patient may shower without any tube protection. Please keep in mind to keep the tube secure at all times. Swimming is not advised while the tube is in place (**British Association of Urology Surgeons 2016).**

Significance of the study

Complications rates for Percutaneous nephrostomy reportedly range from 20-83% the true complication rates of PCN are difficult to determine and compare because most contemporary reviews of PCN outcomes report only rates of specific complications of the procedure. Other authors have attempted to standardize the reporting of complications of PCN by utilizing the modified Clavien complication grading system, or by assigning Clavien grading system scores to the complications most commonly associated with PCN **(Shin, 2011).** This study aimed to evaluate the effect of implementing nursing guidelines on reduction of acute complications for patient with Percutaneous nephrostomy admitted to emergency unit.

The Aim of the Study:

This study aimed to evaluate the effect of implementing nursing guidelines on reduction of acute complications for patient with Percutaneous nephrostomy admitted to emergency unit.

Research hypothesis:

1) There is will be a significance difference in length of hospital stay for the study group was being lesser than the control group.
2) There is will be a significance difference in hemodynamic stability for the study group will being better than the control group.
3) There is will be a significance difference in hemorrhage occurrence for the study group will be lesser than the control group.
4) There is will be a significance difference in infection occurrence for the study group was being lesser than the control group.
5) There is will be a significance difference in catheter obstruction occurrence for the study group will be lesser than the control group.

Subjects and Method:

Research design: Quise experimental research design was used to conduct this study.

Setting of the study: This study was carried out at the emergency unit at urology Hospital at Assuit University

Subjects: A convenient sample of 60 adult patients. diagnosed with acute Percutaneous nephrostomy complication, including both sex, their age arranged from (18-65years old) and admitted to the Previously mention settings were included in the study They was divided equally into two equal groups (30 patients as control group who received routine hospital care and 30 patients as study group who received care nursing guidelines).The patients with coagulation abnormalities and pregnant women were excluded from the current study.

Study tools:

Three tools were used to collect the data in this study and were develop by researcher based on the related literatures) Lewis, Heitkemper, (2016)

Tool one; patient assessment sheet for patient with percutaneous nephrostomy tube:

This tool will develop by the researcher, to assess the patient it was consist of two parts.

Part I: Socio demographic data and clinical data sheet:

Social demographic data about the patient such as patient's code, age, sex clinical data as diagnosis,hospital stay, cause and type of acute complication, past history of obstruction, hospital arrival methods, date of admission, date of discharge and past medical history to assess health .

Part II: Assessment of the vital signs and hemodynamic state;

This part was developed by the researcher to assess the vital signs and hemodynamic state it includes: respiratory rate, and rhythm, blood pressure, temperature, heart rate and rhythm, and the mean arterial blood pressure taken from the bed side monitor , central venous pressure and tissue perfusion using capillary refill and skin perfusion to evaluate hemodynamic state and perfusion .

Tool two: Fluid Electrolyte assessment sheet:

This tool was developed by the researcher and review of literature to assess fluid balance consist of two parts.

Part I: Intake and output assessment sheet:

To assess patient intake, output and type of fluids using, crystalloid (normal saline (NS), lactated ringers (LR), colloids, and whole blood or blood products.

Part II: Laboratory investigations :

Laboratory investigation include (ABGs, hemoglobin, hematocrit, blood glucose level, prothrombine time and concentration, serum electrolytes, sodium Na, potassium K, renal and liver function testes).

Tool three: Assessment of complications:

This tool was developing to assess percutaneous nephrostomy Tube for the following:

Assess tube for S&S of infection as redness , hotness , pain and assess cause of obstruction , assess any

type of complications to evaluate patient condition , asses urine output if (clear, turbid, bloody).

Method

The study was conducted throughout three main phases, which were preparatory phase, implementation phase and evaluation phase:

Preparatory phase:

- Permission to conduct the study was obtained from the hospital responsible authorities' after explanation the aim of the study.
- Development of the study tools were designed after reviewing the related literature was done.
- The content validity was being done by (5) expertise from critical care nursing staff & urological staff.
- Confidentiality and anonymity data was be under assured

A pilot study: was conducted on 10% of the sample in a selected setting to test the feasibility and applicability of the tools and the analysis of the pilot study revealed that minimal modifications are required, these necessary modifications were done and the pilot study subjects were excluded from the actual study.

Ethical consideration:

The ethical considerations in the study include the following:

- Research proposal was being approved from Ethical Committee in the Faculty of Nursing.
- There is no risk for study during application of the research.
- The study was following common ethical principles in clinical research.
- Written consent was being obtained from patients or guidance that are willing to participate in the study, after explaining the nature and purpose the study.
- Confidentiality and anonymity was being assured.
- Study subject it have the right to refuse to participate and ore withdraw from the study without any rational any time.
- Study subject privacy was being considered during collection of data.

Data collection;

Start from January 2019 to Dec 2019 on three phases preparatory phase, implementation phase, and evaluation phase condition and for three consequent days, every day and every shift then the data

Were recorded in the developed tools .data was collected on three phases.

Implementation phase:

Once permission was granted to proceed with the proposed study researcher initiated data collection head nurse of urology emergency unit who help the researcher to accomplish this work. Data was collected from urology emergency unit. Data was assured confidentiality and anonymity.

For both study and control group:

The researcher introduced herself to the patients and nursing staff and explained the purpose and nature of the study. She then recorded and assessed the patients' demographic data, such as patients' codes, age, and gender, as well as clinical data, such as diagnosis, cause and type of complication, grade of pain, past history of obstruction, hospital arrival methods, date of admission, date of discharge, and past medical history, to determine if the patients were eligible for the study using **tool one part I.**

When a patient is admitted to the emergency department, the vital signs and hemodynamic state are assessed, (respiratory rate and rhythm, temperature, heart rate, blood pressure and rhythm, and the mean arterial blood pressure taken from the bedside monitor, central venous pressure, tissue perfusion using capillary refill, and skin perfusion using **tool II.**

The researcher evaluates the patient's intake, output, and fluid type using crystalloid (normal saline, lactated ringers, colloids, and whole blood or blood products) and oxygenation and route of administration as simple mask, venture mask, and nasal cannula. Two-part tool I.

Laboratory findings (ABGs, hemoglobin, hematocrit, blood glucose level, prothrombine time & concentration, serum electrolytes, potassium K, renal sodium Na, and liver function testes) Radiological exam (X-ray, CT scan, or ultrasound) were evaluated by Tool two part II . The researcher measure percutaneous nephrostomy tube for any complication by **Tool three part I**

Regarding control group:

Patients who are receiving the routine hospital care were evaluated by the researcher..

Regarding study group: were assessed by the researcher then applying Nursing Guidelines care on acute percutaneous nephrostomy complications

The data was being collected from the first hour of admission (base line data), every shift till discharge or death then data was recorded in the developed tool.

Pre-operative phase:

Consideration is to assess of kidney function.

Patient preparation is required to maintain optimal renal function.

Fluids are encouraged before surgery to promote increased excretion of waste products, unless contraindicated due to preexisting renal or cardiac dysfunction. If kidney infection is present preoperatively, wide-spectrum antimicrobial agents may be prescribed to prevent bacteremia.

Because many antibiotics are toxic to the kidneys, they must be administered with extreme caution. If the patient has a history of bruising and bleeding, coagulation tests (prothrombin time, partial

thromboplastin time, platelet count) may be recommended.

The critical care nurse encourages the patient to recognize and express any anxiety he or she is experiencing. Establishing a trusting relationship and providing expert care help to boost confidence. When faced with the prospect of losing a kidney, patients may believe they will be dependent on dialysis for the rest of their lives. It is critical to teach the patient and family that a single healthy kidney can maintain normal function.

The perioperative concern is that renal surgery necessitates a variety of patient positions in order to adequately expose the surgical site. The common flank, lumbar, and thoracic abdominal surgical approaches are the three surgical approaches.

Plans for managing altered urinary drainage and drainage systems are made during surgery. Plans may include the placement of a nephrostomy or other drainage tube, as well as the use of ureteral stents.

Because the kidney is a highly vascular organ, the main complications of renal surgery are hemorrhage and shock.

Fluid and blood component replacement is frequently required to treat intraoperative blood loss in the immediate postoperative period.

After a culture reveals the causative organism, antibiotics are prescribed. When evaluating the patient, the toxic effects of antibiotics on the kidneys (nephrotoxicity) must be considered. Low-dose heparin therapy can be started after any type of urologic surgery to prevent thromboembolism.

Evaluation phase:

Evaluation of clinical outcomes for patient of both groups were evaluated by using study tool (1, 2 and 3) during hospitalization period(first time as a base line data and 2^{nd} ,3^{rd} days .

Results

Table (1): Distribution of socio-demographic data among studied groups:

Socio-demographic data	Study Group		Control Group		F-test	P-value
	No. (n=30)	%	No. (n=30)	%		
Gender:						
Male	21	70.0	20	66.7	0.075	0.786
Female	9	30.0	10	33.3		
Age:						
18 to 35	9	30.0	6	20.0		
35 to 50	10	33.3	9	30.0	1.573	0.215
50 to 65	11	36.7	15	50.0		
Mean ± SD	**42.2 ± 15.2**		**46.9 ± 14.2**			
Range	**18 - 65**		**18 – 65**			
Marital status:						
Single	10	33.3	7	23.3	0.723	0.399
Married	20	66.7	23	76.7		
Residence:						
Rural	25	83.3	23	76.7	0.406	0.527
Urban	5	16.7	7	23.3		
Level of education						
Illiterate	17	56.6	18	60.0		
Read and write	8	26.7	9	30.0	0.283	0.597
High education	5	16.7	3	10.0		

Independent sample T-test ** Statistical significant differences (p < 0.05)*

Table (2): Present of past medical history among studied group:

Past medical history	Study Group		Control Group		F-test	P-value
	No. (n=30)	%	No. (n=30)	%		
ICU Stay					11.624	0.001**
One day	22	73.3	12	40.0		
Two days	8	26.7	11	36.7		
Three days	0	0.0	7	23.3		
Mean ± SD	**1.2 ± 0.4**		**1.8 ± 0.7**			
Range	1 - 2		1 - 3			
complications					0.233	0.631
Slipped	10	33.3	8	26.7		
Infection	8	26.7	7	23.3		
Bleeding	7	23.3	11	36.7		
Obstructing	5	16.7	4	13.3		
Grade of pain 1st day:					1.674	0.201
None	0	0.0	0	0.0		
Mild	0	0.0	0	0.0		
Moderate	16	53.3	11	36.7		
Sever	14	46.7	19	63.3		
Grade of pain 2nd day:					168.096	0.000***
None	25	83.3	0	0.0		
Mild	5	16.7	11	36.7		
Moderate	0	0.0	19	63.3		
Sever	0	0.0	0	0.0		
Grade of pain 3rd day:					50.091	0.000***
None	30	100.0	11	36.7		
Mild	0	0.0	19	63.3		
Moderate	0	0.0	0	0.0		
Sever	0	0.0	0	0.0		
DM					-	-
Yes	0	0.0	0	0.0		
No	30	100.0	30	100.0		
HTN					-	-
Yes	0	0.0	0	0.0		
No	30	100.0	30	100.0		
Other medical history:					-	-
Yes	0	0.0	0	0.0		
No	30	100.0	30	100.0		

Independent sample T-test ** Statistical significant differences (p < 0.05)*

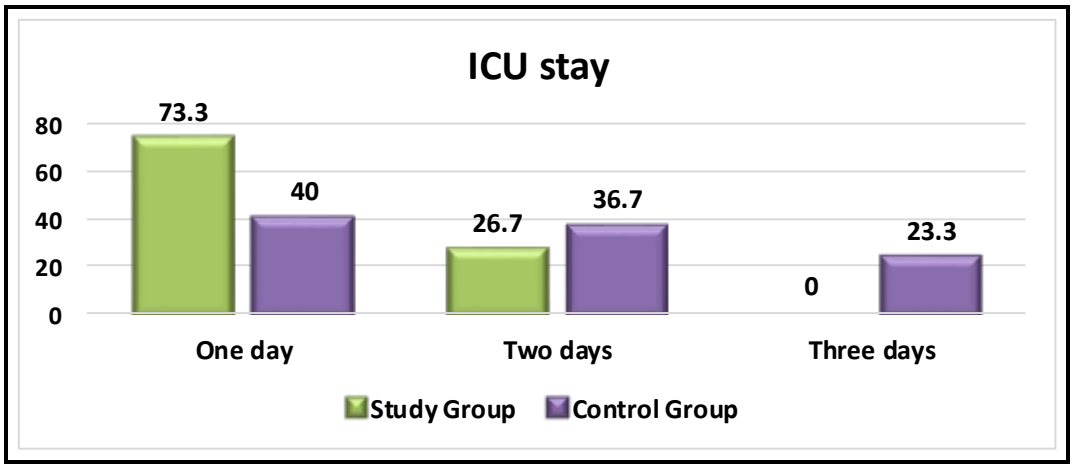

Figure (5): Percentage distribution of patients' ICU stay:

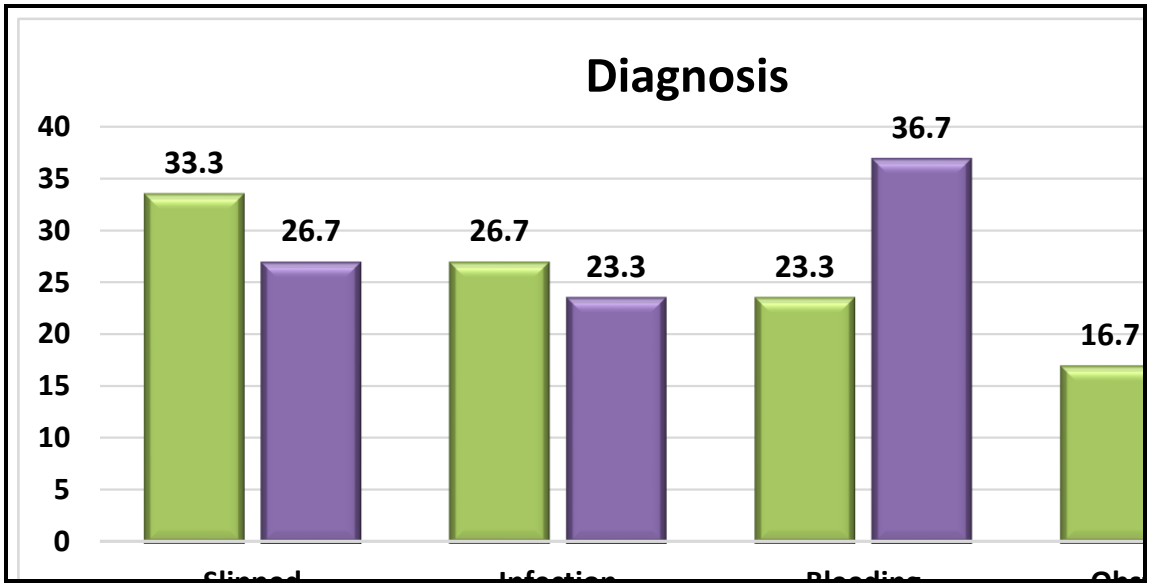

Figure (6): Percentage distribution of patients' complication at admission:

Table (3): Mean ± SD distribution of vital signs between study and control groups:

vital signs and hemodynamic status	Study Group				Control Group				P-value
	First hr.	Morning shift	Afternoon shift	Night shift	First hr.	Morning shift	Afternoon shift	Night shift	
	Mean± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
1st day									
Pulse	77.2±9.8	78.8±8.2	83.0±1.4	83.2±1.2	73.9±11.8	74.3±11.4	74.1±11.6	75.6±10.3	0.047*
Temp	37.6±0.9	37.5±0.9	37.4±0.8	37.1±0.2	37.5±0.9	37.6±0.8	37.6±0.9	37.4±0.9	0.061
Respiratory rate	20.3±2.9	20.5±3.1	18.2±1.3	18.2±1.2	20.1±2.9	19.8±3.1	20.4±2.3	18.1±1.1	0.362
Blood pressure	121.3±14.2 68.8±8.6	121.3±14.3 68.6±8.5	128.8±5.7 72.8±5.5	128.7±6.1 72.6±5.1	118.1±15.5 66.2±8.8	118.8±15.1 67.1±9.1	117.4±16.9 68.7±9.1	116.6±16.3 65.5±9.3	0.001**
Oxygen saturation	96.2±2.3	95.8±2.4	97.8±0.7	97.9±0.8	96.5±2.3	96.4±2.3	98.1±0.8	98.2±0.8	0.003**
2nd day									
Pulse	82.5±1.6	82.6±1.1	83.3±1.3	83.7±1.2	66.5±13.2	70.2±13.4	83.1±1.1	83.2±1.1	0.017*
Temp	37.1±0.2	36.8±0.1	36.7±0.2	36.8±0.2	37.7±0.9	37.9±0.8	37.9±0.9	37.6±0.9	0.020*
Respiratory rate	18.2±1.5	15.5±1.1	18.3±1.7	18.5±1.1	18.2±1.7	18.7±1.9	18.3±1.4	18.4±1.1	0.686
Blood pressure	130.1±6.9 74.5±4.2	125.2±3.8 73.3±4.7	125.2±3.8 73.3±4.7	126.5±3.4 73.5±4.7	128.8±7.1 70.7±5.8	128.7±6.9 71.1±5.4	126.1±3.2 72.5±3.2	125.1±3.3 72.5±4.6	0.116
Oxygen saturation	95.1±2.1	95.6±1.9	96.7±0.8	97.6±0.7	95.4±2.1	96.3±1.8	98.7±0.7	97.3±0.9	0.425
3rd day									
Pulse	82.5±1.6	82.6±1.1	83.3±1.3	83.7±1.2	82.7±1.2	83.7±1.2	82.5±0.9	83.8±1.4	-
Temp	37.1±0.2	36.8±0.1	36.7±0.2	36.8±0.2	36.8±0.1	36.7±0.2	38.8±0.1	36.8±0.1	-
Respiratory rate	18.2±1.5	15.5±1.1	18.3±1.7	18.5±1.1	18.2±1.3	19.2±1.1	17.5±1.9	18.5±0.7	-
Blood pressure	130.1±6.9 74.5±4.2	125.2±3.8 73.3±4.7	125.2±3.8 73.3±4.7	126.5±3.4 73.5±4.7	126.8±2.9 72.1±4.3	127.1±3.1 72.5±4.2	126.1±3.4 73.4±5.1	126.4±3.4 73.4±5.1	-
Oxygen saturation	95.1±2.1	95.6±1.9	96.7±0.8	97.6±0.7	94.4±1.9	97.4±1.9	98.4±0.8	97.4±0.8	-

One-Way ANOVA ** Statistical significant differences (p < 0.05)*

Table (4): Assessment of patients' Fluid & Electrolyte assessment (Intake and output):

Items	Study Group				Control Group				P-value
	On admission	Morning shift	Afternoon shift	Evening shift	On admission	Morning shift	Afternoon shift	Evening shift	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	
Intake									
1st day	586.6±73.1	743.3±97.1	613.3±62.8	598.3±51.6	206.6±97.1	253.3±34.5	303.3±34.5	208.3±43.7	0.000
2nd day	750.1±100.1	831.2±45.8	662.5±99.1	643.7±67.8	247.2±26.9	261.1±36.6	311.1±36.5	219.4±38.8	0.000
3rd day	-	-	-	-	250.1±28.8	251.3±40.8	300.1±40.7	25.2±41.7	-
Output									
1st day	448.3±64.9	565.1±77.8	488.3±52.1	468.3±64.9	140.1±40.2	193.3±38.8	231.6±33.4	150.1±29.3	0.000
2nd day	550.1±113.3	675.1±70.71	556.2±82.1	531.2±92.3	136.1±37.5	194.4±41.6	227.7±35.2	150.1±34.2	0.000
3rd day	-	-	-	-	150.1±28.8	128.5±39.3	200.1±50.1	150.1±28.8	-

One way ANOVA ** Statistical significant differences (p < 0.05)*

Table (5): Assessment of patients' oxygenation:

Patients' oxygenation	Study Group								Control Group								P-value
	Able to maintain oxygen saturation [90% on room air]		Needs oxygen supplement to maintain saturation [90%] (Simple mask, vent, other)		Oxygen saturation 90% even with oxygen supplement		Able to maintain oxygen saturation [90% on room air]		Able to maintain oxygen saturation [90% on room air]		Needs oxygen supplement to maintain saturation [90%] (Simple mask, vent, other)		Oxygen saturation 90% even with oxygen supplement		Able to maintain oxygen saturation [90% on room air]		
	No.	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
On admission	15	50.0	15	50.0	0	0.0	0	0.0	26	86.7	4	13.3	0	0.0	0	0.0	0.002*
Morning shift	20	66.7	10	33.3	0	0.0	0	0.0	26	86.7	4	13.3	0	0.0	0	0.0	0.049*
Afternoon shift	30	100.0	0	0.0	0	0.0	0	0.0	27	90.0	3	10.0	0	0.0	0	0.0	0.078
Evening shift	30	100.0	0	0.0	0	0.0	0	0.0	30	100.0	0	0.0	0	0.0	0	0.0	-

One way ANOVA ** Statistical significant differences (p < 0.05)*

Table (6): Assessment of patients' laboratory investigation & Arterial blood gases:

Items	Study Group	Control Group	F-test	P-value
	Mean ± SD	Mean ± SD		
CBC Picture				
RBC	5.2±0.5	5.3±0.5	0.494	0.485
WBC	9.3±2.7	8.6±2.8	0.849	0.361
HG	13.7±3.1	13.2±3.5	0.443	0.508
Plat	401.6±93.2	433.3±113.2	1.398	0.242
HCT	45.2±3.9	44.5±4.1	0.456	0.502
Coagulation profile				
PT	12.3±1.1	12.2±0.8	0.267	0.608
PC	98.6±20.1	101.0±20.0	0.194	0.661
INR	2.1±2.7	1.9±0.8	4.566	0.137
Renal function test				
Urea	37.9±11.25	34.7±7.7	1.683	0.200
Creatinine	0.8±0.2	0.7±0.2	3.299	0.074
Eiectrolyte				
Na+	139.7±4.5	140.4±4.4	0.399	0.530
K+	4.3±0.5	4.4±0.5	0.037	0.848
Ca	9.5±0.5	9.3±0.4	2.723	0.104
Mg	1.6±0.2	1.6±0.2	0.111	0.740
PH	7.3±0.1	7.2±0.2	0.188	0.666
Arterial blood gases				
PaCo2	40.5±2.1	40.9±1.7	0.883	0.351
SaO_2	93.7±3.2	93.9±2.8	0.088	0.768
BE	1.5±0.2	1.5±0.2	0.002	0.961
PaO_2	75.4±10.5	79.2±11.1	1.796	0.185

One-Way ANOVA ** Statistical significant differences (p < 0.05)*

Table (7): Distribution of sample related outcomes data of patients:

Items	Study Group		Control Group		F-test	P-value
	No. (n=30)	%	No. (n=30)	%		
Hospital stay:					30.923	0.000***
1 day	10	33.3	8	26.6		
2 days	11	36.7	0	0.0		
3 days	9	30.0	0	0.0		
4 days	0	0.0	2	6.7		
5 days	0	0.0	10	33.3		
6 days	0	0.0	8	26.7		
7 days	0	0.0	2	6.7		
Systemic complication:					3.341	0.073
Present	2	6.7	7	23.3		
Not present	28	93.3	23	76.7		
Local complication:					3.341	0.073
Hotness, redness skin	2	6.7	7	2		
Intact	28	93.3	23	28		
Mortality					-	-
Yes	0	0.0	0	0.0		
No	30	100.0	30	100.0		

Independent sample T-test ** Statistical significant differences (p < 0.05)*

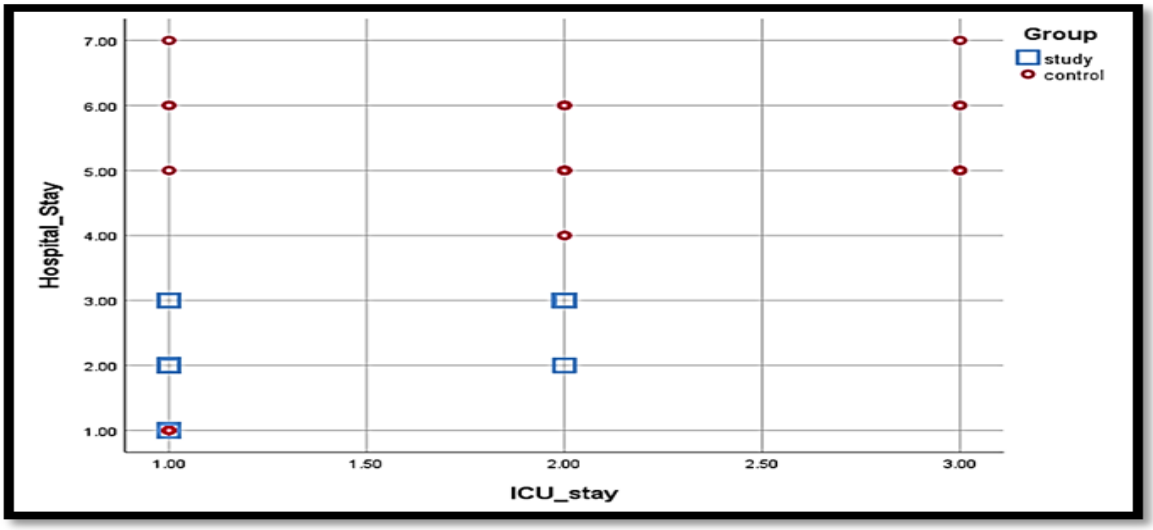

Figure (7): Relation between patients' ICU & hospital stay days:

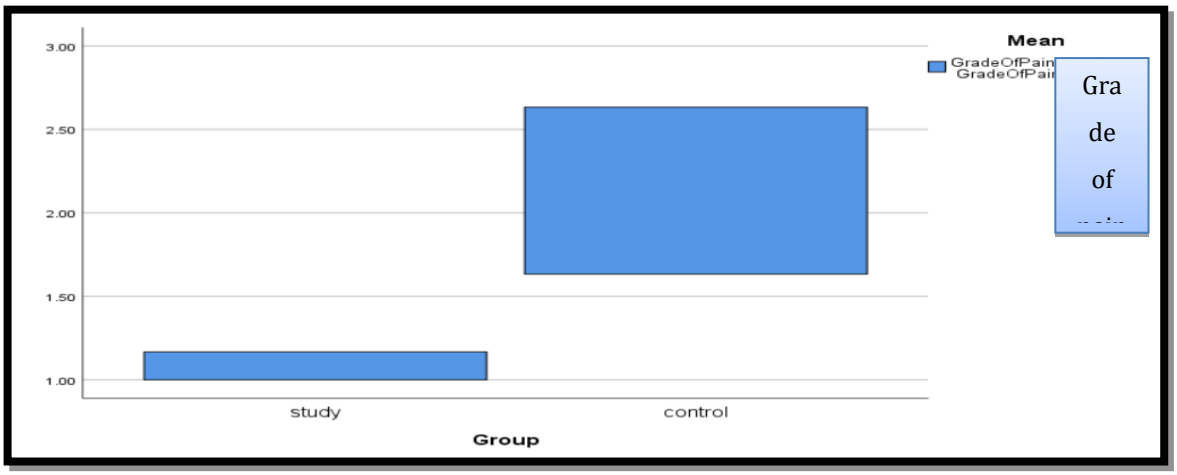

Figure (8): Relation between study and control groups related to grade of pain

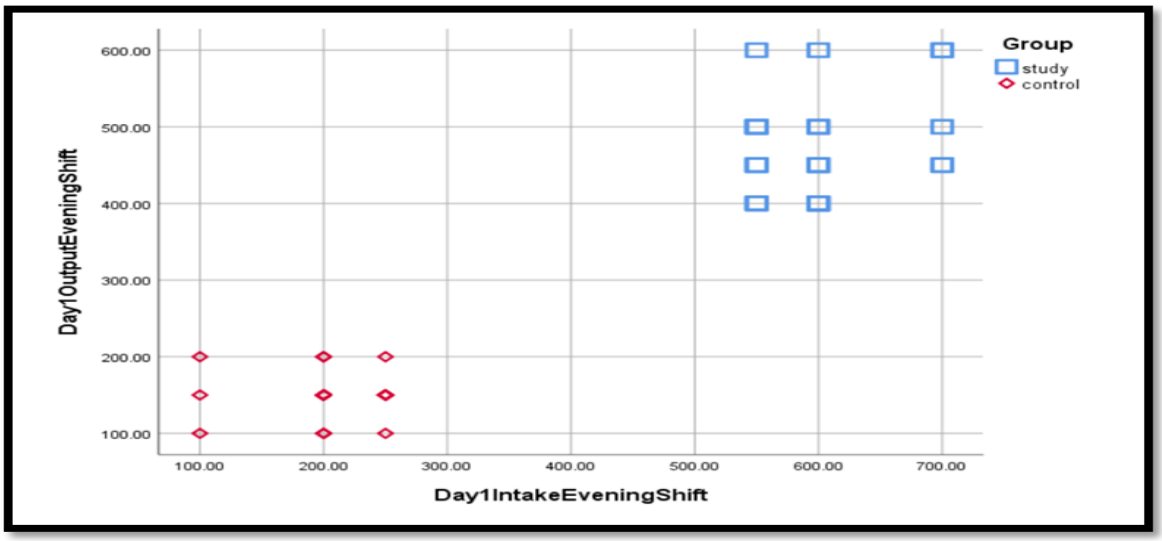

Figure (9): Relation between study and control groups related to Fluid & Electrolyte:

Table (1): This table shows that: Most groups were male with percentage (70.0% and 66.7% respectively). Greater than half of groups were married with percentage (66.7% and 76.7% respectively). Most of them were rural with percentage (83.3% and 76.7% respectively). Most groups were illiterate with percentage (56.6% and 60.0% respectively). There is no statistical difference between groups' socio-demographic data between study and control groups.

Table (2): This table shows that: There is highly statistical difference between study and control groups regarding (ICU Stay) with p-value (0.001). There is very highly statistical difference between study and control groups regarding (Grade of pain 2nd day & Grade of pain 3rd day) with p-value (0.0001). All groups hadn't any issue concerning DM, HTN or other medical history.

Table (3): This table illustrates that: There is statistical difference between study and control groups regarding (Pulse 1st day & Pulse 2nd day & Temp 2nd day) with p-value (0.047 & 0.017 & 0.020 respectively). There is highly statistical difference between study and control groups regarding (Blood pressure 1st day & Oxygen saturation 1st day) with p-value (0.001 & 0.003 respectively).

Table (4): This table illustrates that: There is very highly statistical difference between study and control groups regarding (Fluid & Electrolyte assessment (Intake and output)) with p-value (0.000) during all three days.

Table (5): This table shows that: There is statistical difference between study and control groups regarding (Assessment of patient oxygenation) at on admission & morning shift with p-value (0.002 & 0.049 respectively) during all three days.

Table (6): This table illustrates that: There is no statistical difference between study and control groups regarding laboratory investigation & ABG at 1st day.

Table (7): These table illustrations that: There is very highly statistical difference between study and control groups regarding (Hospital stay) with p-value (0.000).

Figure (7): This figure shows that: The study group hospital stays days less the control group related to the effect of implementing nursing guidelines.

Figure (8): This figure displays that: The study group grade of pain had less than the control group related to the effect of implementing nursing guidelines.

Figure (9): This figure confirmations that: The study groups Fluid & Electrolyte are more than the control group related to the effect of implementing nursing guidelines.

Data Analysis

The data was reviewed, prepared for computer entry, coded, analyzed, and tabulated using a computer programme (SPSS/Version 24).

- Descriptive statistics like frequencies and percentages, mean and standard deviation, etc.
- The independent sample T-test, Chi-square, and one-way ANOVA tests were used to examine the relationship between the study and control groups.
- The tests' critical value When P was less than 0.05, it was considered statistically significant.
- Cronbach's alpha was used to assess the tools' dependability.

Discussion

The Critical care nurse have a vital role before , during and after the procedure and require specific attention to the skin around the nephrostomy tube insertion site should be kept clean and to prevent infection, place a sterile dressing around the site where the tube leaves the skin **(Tuck, & Krenzischek, 2020).**

The current study found that there was no statistical difference between study and control groups regarding their demographic data. The result of the current study agree with **Chamberlain et al., (2019)** who reported that there was no statistically significant difference between the groups was found in gender, between study and control groups.

In addition, agreed with (**Park & Gil, (2018)** who reported that there was a significant difference between the groups related to the sex.

In the current study most groups were illiterate and from rural areas. The researcher opinion, that this because the large areas of Assiut governorate are rural areas.

This in according with **(El-Shaer et al., (2019)** who reported that no statistically significant difference between study and control groups regarding educational level among patients with percutaneous nephrostomy of the most of patients in both study and control groups.

There is very highly statistical difference between study and control groups regarding (Grade of pain 2nd day & Grade of pain 3rd day) with p-value (0.0001). In this respect, **Guitynavard, et al., (2019)** found that suprapubic pain; urethral pain and lower urinary tract symptoms were significant in the percutaneous nephrostomy group. Also the current study found that the main diagnosis for Percutaneous nephrostomy is bleeding. The researcher opinion that the main indication for percutaneous nephrostomy placement is to relieve an obstructed and infected collecting system (i.e., pyonephrosis) due to the risk of rapidly developing sepsis

Regarding (Fluid & Electrolyte assessment (Intake and output)), the present study revealed that there is very highly statistical difference between study and control groups with p-value (< 0.001) during all three days.

In this regard**, Kwong et al., (2020)** recommended that in & output patients with nephrostomy is observed. **Axelsson, et al., (2020)** added that the nurse should measure urine output hourly for 4 hours, then 4 hourly for 24 hours then progress to 8 hourly until stable. However, **Roberson et al., (2020)** reported that subsequent reprieve of obstruction; a post obstructive diuresis may develop (and should be anticipated). It is our preparation to flush the tube with 5 cc of normal saline every 8 hours to maintain tube patency. Also, **MacDonald et al., (2021)** recommended displaying urine for color and attendance of sediment.

Regarding the postoperative complications; the present study found that there is no statistical difference at patients' tube complication between study and control groups. There was no skin complication present and regarding tube complication was slipping among study group but bleeding among control group.

The researcher opinion that there was that the main disadvantage is that a larger access needle is required, increasing the risk of bleeding complications.

This match with **Zhao et al., (2018)** who found that a minor complications are not uncommon including microscopic hematuria (which usually clears within 48 hours), pain, fever, perirenal hematoma, self-limited.

Zhai et al., (2020) concluded that the total rate of minor complications in our series was 6.1% which is comparable with other studies and below the established RCR standard of 15%. **Ertreo, & Momah, (2022)** added that all minor complications were catheter-related problems most frequently catheter dislodgment.

Multivariate logistic regression analysis showed prolonged hospitalization, neutropenia, and use of Percutaneous nephrostomy and carbapenems as the independent risk factors for this patients. In the univariate analysis, use of Percutaneous nephrostomy and port any urinary catheter were significantly associated with mortality **(Armas-Phan, et al., 2020). Yoo et al., (2021)** reported that catheter dislodgement rates range from 1% to 30%,depending on the length of time the percutaneous nephrostomy is necessary. While, **Hu et al., (2021)** found that blockage may occur in 1% of patient. So, **Assmus et al., (2021)** recommended that flushing the tube regularly and high fluid intake may help prevent this complication.

In this respect, **Wollin, & Preminger, (2018)** recommended minimizing the number of tract manipulations, which reduces the risk of losing renal access or forming perinephric urinomas.

Singh et al., (2020) advocate this in patients with dilated collecting systems due to the risk of rapid decompression or dissection of the renal pelvis during serial tract dilatations.

In the other hand, **Soares et al., (2018)** found that major percutaneous nephrostomy-related complications, including sepsis, occurred in 6% of patients. Hematuria requiring transfusion was noted in 2.4% of patients. While, **Shah et al., (2018)** found the minor complications included catheter displacement or malposition (4.8%), pelvic perforation (4.3%), paralytic ileus (2.4%) but no deaths or significant morbidity resulted from any complication.

Emergency percutaneous nephrostomy under fluoroscopic guidance is a simple, safe, and effective procedure and should be offered in all suitably equipped radiology departments **(Sowerby et al., 2019).**

Jiang, (2019) documented that the overall, 10% of patients will develop a minor or major complication after percutaneous nephrostomy. The reported mortality rate of percutaneous nephrostomy is approximately 0.2%.

In this side, **Koo, & Ryu, (2020)** reported that hemorrhage requiring transfusion is reported in 1% to 2.4% of cases, generally due to renal artery pseudoaneurysms[5] or arteriovenous fistulas. **Mostafa et al., (2020)** added that most hemorrhages are self-limited and need no intervention. In the other side, **Nerli et al., (2018)** revealed that some patients will require transfusion of blood or blood products (fresh frozen plasma [FFP], platelets) to help stop the bleeding. In uremic patients, desmopressin may be used to improve platelet function. If gross blood drains through the nephrostomy or large clots are seen in the nephrostogram, the percutaneous nephrostomy should be flushed with cold saline.

Conclusion

The results of the contemporary study, it concluded that implimentation of the nursing guidelines impact positively on the patients' outcomes who underwent percutaneous nephrostomy tube placement.

Recommendations:

Replication of the current study on a larger probability sample for results generalisation.

- Patients with percutaneous nephrostomy tubes will be given a printed copy of the nursing guidelines.
- A workshop for nurses working in the urology emergency unit and intensive care unit will be organized to update nurses on the most recent percutaneous nephrostomy tube guidelines.

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