



# Effect of Discharge Nursing Instructions on Selected Complications among Patients with Nephrostomy Tube

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## Abstract

Obstructive uropathy (OU) is a potentially life-threatening urologic emergency that requires urgent decompression. Percutaneous nephrostomy (PCN) is performed to establish urinary drainage. Percutaneous nephrostomy is a safe, minimally invasive, and effective procedure for upper urinary tract diversion with a low rate of morbidity. Despite success of nephrostomy tube placement up to 99%, complications occur in up to 6% of patients. The aim of study is to evaluate the effect of discharge nursing instructions on selected complications (skin related complications, tube related complications) among patients with nephrostomy tube. Consecutive non-equivalent pretest-posttest time series quasi-experimental control group design was utilized in the study. The study was conducted in Urology Department, King Fahd Unit affiliated to Cairo university hospitals, and National Institute of Urology and Nephrology affiliated to the General Authority for Teaching Hospitals and Institutes. A convenient sample of 60 patients scheduled for nephrostomy divided into two equal control and study groups constituted the study sample. Two tools were utilized to collect data; Personal Background Information Form (PBIF) and Nephrostomy Complications Follow up Form (NCF). The age of the study sample ranged from 18 to 60 years; near two thirds and three fourth of control and study group respectively were males. There was no significant difference between control and study groups' total complications mean score post 24 hrs. However, there were statistically significant difference between the two groups three days, two weeks and four weeks post nephrostomy insertion ( $t=2.7, p=0.01$ ;  $t=10.07, p=0.00$ ;  $t=21.41, p=0.00$ ) respectively. Nursing instructions presented to patients and their caregivers help in reducing nephrostomy complications. Nurses should provide patients, who had long-term nephrostomy and their care givers, self-management instructions to prevent and minimize the related complications.

**Keywords:** Nephrostomy, selected complications, nursing instructions

## Full-length article

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## 1. Introduction

The human body has two kidneys, each around the size of a fist. They are located at the back of the abdominal cavity just below the rib cage on each side of the spine. The kidneys play a dominant role in regulating the composition and volume of the extracellular fluid (Montero, 2019). The kidney allows a person to eat and drink according to their habits without changing the composition of their fluid compartments. Many different disorders can affect the functions of kidneys can lead to a variety of diseases (Bernstein, 2023). A range of diseases can affect the function of kidneys. Environmental or medical factors may lead to kidney disease, and they can cause functional and structural problems as glomerulonephritis, renal calculi, urinary obstruction and hydronephrosis (Azwadi, Norhayati & Abdullah, 2021).

Ureteral blockage leads to kidney degeneration and hydronephrosis that may clue to renal failure. Moreover, blockage frequently is complicated by infection, which reasons further injury to the body parts involved (Stoller, 2022). Percutaneous nephrostomy (PCN) is accomplished to create urinary drainage. The most common indication for

PCN placement in both adult and pediatric people is urinary blockage and it can serve as a linking procedure until absolute corrective surgery is done (Hwang et al., 2018).

The percutaneous nephrostomy tube distracts urine away from the ureter and bladder through a narrow-gauge pigtail drain imbedded into the renal pelvis for the resolution of urine drainage into an externalized drainage container (Martin & Baker, 2019). Percutaneous nephrostomy is a harmless procedure, but there are some hazards and complications that can get up like any invasive technique. These complications are allocated into major and minor complications (Efesoy, Saylam, Bozlu, Çayan, & Akbay, 2018). Patients should be taught self-care before discharge where possible and/or have instructions given to care givers for support, given adequate supplies for weekly dressing changes, given information on where to access future supplies, such as trusted home dispensary services or the local pharmacy, offered written information on how to manage their tube and details of future review/planned tube changes and given details of who to contact with questions or concerns (Watson, 2021).

The nurse has to teach the patient or their care givers on various nephrostomy management and care procedures. Some of the aspects include checking their leg bag, drainage bag or the night bag, managing the bags without unnecessary pulling to avoid the tubing's twisting; carrying out dressing and drainage changes weekly (Martin & Baker, 2019).

### 1.1. Significance of the study

Nephrostomy is the preferred procedure when transurethral access is unbearable or has already unsuccessful at releasing an obstructed urinary system from effect of extrinsic mass or intrinsic obstruction. Drainage of an occluded renal unit is the most common need for nephrostomy which accounts for 85 to 90% of all nephrostomy insertions (Young & Leslie, 2019). Based on the researchers' clinical observations in the urology departments and out-patients clinics and personal contact with health team members, the most common reasons for nephrostomy patients' readmission is tube dislodgements, decrease or disturbance in urine output and ostomy site infections which is manifested by changes in vital signs.

It was apparent from the prior experience of the researchers and thorough contacts with patients with nephrostomy that nephrostomy tube care is particularly frightening experience at first and takes a lot of concern from patients and those who care for them as both have little information about dealing with and caring for nephrostomy at home. The nurse should provide the patient and the caregiver all pertinent instructions related to nephrostomy and its care, all alert signs that patient may face and all interventions that may help in preventing or minimizing the complaints and complications. Indeed, patient instruction is one of the most important roles carried out by nurses; however, patients need to take a proactive role in their own health care. A few recent studies done in Egypt discussing the complications of nephrostomies and few nursing instructions were provided for those patients and their caregivers or even nursing staff. The current study might provide evidence-based guidance for nurses and nursing students while dealing with patients having nephrostomies. The researchers hope that the study findings to be helpful for patients having nephrostomy, or the newly patients who will have nephrostomy in the upcoming time as these instructions will help them in minimizing or preventing complications.

### 1.2. The aim of the study

The aim of the current study was to evaluate the effect of discharge nursing instructions on selected complications (skin related complications, tube related complications and other complications) among patients with nephrostomy tube at one of the university hospitals, Cairo-Egypt.

### 1.3. Research Hypothesis

To fulfill the aim of this study, the following research hypothesis was postulated to be tested.

**H1:** Nephrostomy follow-up complications scores of patients with nephrostomy who received nursing instructions, were different than nephrostomy follow-up complications scores of the control group postoperatively.

## 2. Methods

### 2.1. Research Design

Consecutive non-equivalent pretest-posttest time series quasi-experimental control group design was utilized in the proposed study. The pretest helps to obtain baseline data from patients prior to intervention. The posttest allows the researcher to determine the effects of the treatment/intervention on the outcome variable(s). In addition, immediate post-test and delayed posttests are often included to examine the effects of the treatment/intervention over the longer term. Moreover, the inclusion of the control group enables the researcher to determine the difference between the control and study group as the effect of treatment or intervention. As both study and the control groups take the tests at the same time; time-related confounds are minimized (Rogers & Revesz, 2019).

### 2.2. Setting

The current study was conducted in three settings: The first setting was Urology department and urology outpatient clinics at one of the University Hospitals in Cairo; the second setting was King Fahd Unit. The Patients with different urological problems were admitted in this unit especially who necessitate surgical interventions; while the third setting was the National Institute of Urology and Nephrology (Radiology department, Nephrology department and outpatient clinics).

### 2.3. Sample

A convenient sample of 60 patients scheduled for nephrostomy who fulfilled the inclusion criteria and attended the selected settings was recruited as study sample during a period of about one year. The study sample was divided into two groups of 30 patients for each; the first group constituted the control group who received the routine hospital care, and the second group constituted the study group who received the nursing instructions in addition to routine hospital care. The following criteria was established for inclusion: Adult patients up to 60 years old, who have permanent nephrostomy, free from physical or mental disorders which can affect the communication with the researcher. Patients who have nephrostomy for acute conditions, patients with uncontrolled diabetes mellitus and patients who developed major complications during surgery as (prolonged hematuria, renal hematomas, pneumothorax, hydrothorax, hemothorax, pneumonia, atelectasis and bowel transgression) were excluded from the study.

### 2.4. Data Collection Tools

Data of this study was collected using the following three tools.

#### 2.4.1. First tool

Personal Background Information Form (PBIF); it was developed by the researchers. This tool consisted of two parts: The first part includes socio-demographic data that covers variables such as age, gender, level of education, residence, occupation, marital status ...etc., the second part was medical data which includes variables such as current medical diagnosis, date of surgery, date of admission, date of discharge, co-morbid diseases, past history etc.

#### 2.4.2. Second tool

Nephrostomy Complications Follow up Form (NCFF); was designed by the researchers based on reviewing related literature and related tools. It contains assessment of selected complications (14 items) which was divided into three parts; firstly, skin complications which covered items as discharge, stomal necrosis, soreness, hyperplasia, itching, tenderness, bleeding, and redness; the second was tube related complications as obstruction, dislodgement, tear and kinking, while the third part covered other complications as leakage of urine and transient hematuria.

The patient responded to these items by yes or no, the value of yes is different according to each item's critical consequences. Items such as purulent discharge, stomal necrosis, soreness, hyperplasia, obstruction, dislodgement, tear and leakage; was valued by three if answered by yes and zero if no. Items such as skin inflammation, tenderness, minimal bleeding, redness, kinking and transient hematuria; valued by one if answered by yes and zero if the answer is no. The total score for this tool was 30, however; if the score is from zero to ten, it indicates mild complications' incidence; while 11-20 indicates moderate complications' incidence, and 21-30 indicates severe complications' incidence.

#### 2.5. Ethical consideration

Permission to conduct the study was obtained from Research Ethics Committee of Faculty of Nursing, Cairo University and the concerned authoritative personnel in the study setting. Also, each eligible patient who met the inclusion criteria was informed about the purpose of the study and its importance. The researchers emphasized that participation in the study was entirely voluntary; anonymity and confidentiality were assured through coding the data. Informed consent was taken from patients who accept to be included in the study. The participants were assured that their data were not reused in another research without their acceptance.

#### 2.6. Validity and reliability

Content validity of the developed tools was established to identify the degree to which the developed tools measures what was supposed to be measured. It was tested by subjecting the tools to five experts in the field of Medical Surgical Nursing- Faculty of Nursing and Urology specialty- Faculty of Medicine, Cairo University. The Experts were asked to examine the tools to ensure that they were suitable to achieve the aim of the current study. Reliability of the study tools was tested using test re-test form.

#### 2.6. Procedure

Once official permissions from Ethical Research Committee (number of the final approval) and authoritative personnel were granted to proceed with the proposed study, the eligible study subjects were interviewed individually to explain the nature and purpose of the current study preoperatively. Measures were taken to protect the patients' ethical rights as mentioned before. Patients who were willing to participate in the study were asked to sign an informed written consent form, and the data collection was filled out by the researchers through structured interview. The study was

conducted throughout four phases: assessment, planning, implementation, and evaluation phase.

#### 2.7. Assessment or initial phase

It involved collecting data through literature reviewing of scientific data bases, further ensuring the availability of subjects, the environment as well as facilities which were needed to accomplish the current study. Then, assessing patients with nephrostomies was done to determine their needs and preparation of nursing instructions accordingly. Also, the researchers designed the appropriate tools to collect relevant data for the study.

##### 2.7.1. Planning phase

Based on the outcome of the previous phase, final decision about time, frequency of patients' instructional sessions and its content were determined. Final format of the study tools after ensuring its validity, in addition to the Arabic booklet that contains the designed nursing instructions were established.

##### 2.7.2. Implementation phase

It was started by contacting the head nurses of the different urology departments to identify the newly admitted patients scheduled for nephrostomy, then; the researchers conducted an initial meeting with each eligible patient preoperatively for ten minutes. During this meeting, the researchers explained the nature and purpose of the study and obtained the written approval agreement from the patient about participation in the study and obtained data related to first tool (Personal and Background Information Form). Firstly, the researchers collected the data from the patients of the control group after 24 hours, three days, two weeks and four weeks postoperatively using second and third tools. After finishing data from control group, the researchers started to select and assess patients of the study group using the first tool, and then the researchers implemented the designed nursing instructions and collected related data postoperatively using the developed study tools (second and third tools).

After assessing and selecting patients of study group, patients were involved in the nursing instructional sessions which were started during the time of hospitalization. Each session lasted for 45-60 minutes. The first session was started in the second day postoperatively; it covered nephrostomy definition, normal urine excretion, nephrostomy indications, urine drainage from nephrostomy and post nephrostomy complications. While, the second session was performed in the third day postoperatively which covered measures of complication prevention, caring for nephrostomy, performing daily activities and when to seek medical help. The researchers were available for any clarifications and answering any questions related to the nursing instructions. Patients were given a copy of the instructions to be followed (Arabic booklet) after the end of sessions.

##### 2.7.3. Evaluation Phase

Pre intervention assessment (baseline assessment) was carried out after 24 hours postoperatively for a purpose of having baseline data. The first post assessment was carried out 48 hours after baseline assessment and before discharge. The second post assessment was carried out after two weeks

and the third post-assessment was carried out after four weeks postoperatively using the study tools (second and third tools). The collected data of baseline assessment and post-assessments were analyzed and compared statistically to evaluate the effect of the nursing instructions on selected patient's complications among patients with nephrostomy. The baseline assessment and first post assessment were conducted during hospitalization, while the second and third post assessments were carried out during follow up visits either at out-patient clinics or at home.

### 2.8. Data analysis

Obtained data was tabulated, computed and analyzed using SPSS program version 20 (Rahman & Muktadir, 2021). Descriptive statistics including frequency distribution means and standard deviation, inferential statistics as ANOVA, T. test etc. was utilized; level of significance was established at ( $p \leq 0.05$ ).

### 3. Results

The findings of the current study are presented in two main sections as follows; First section deals with findings of demographic and medical data. Second section concerned with statistical findings and correlations related to post nephrostomy complications throughout the four assessments.

#### 3.1. Section I: Demographic and Medical data

Table (1) illustrated that, the age of the study sample ranged between 50 to 60 years among 66.7% of control group with mean age  $58.70 \pm 13.05$  years and 76.7% of study group with mean age  $58.63 \pm 14.39$  years. 60% of control group and 70% of study group were males. More than half of control and study groups were not employed 60% and 53.4% respectively. 56.7% of control group' subjects lived in urban areas; while 60% of study group' subjects lived in rural areas. The percentage of subjects who were married among control and study groups constituted 80% and 63.3% respectively. In relation to education, 50% of the subjects of control group can't read or write, while the percentage in the study group was 73.3%. It was noted that, there were no significant statistical differences between control and study groups' subjects in relation to personal data indicating homogeneity between the two groups.

In relation to medical data, as shown in table (2), it was observed that, the most common medical diagnoses among control group were renal pelvic stone, bladder mass followed by ureteric stenosis 33.3%, 26.7% and 23.3% respectively; while, the most recurrent medical diagnoses among study group were renal pelvic stone, bladder mass followed by ureteric stones 36.7%, 23.3% and 20 % respectively. In regard to the period of hospital stay, 36.7% of the subjects in control and 46.7% of subjects in study group stayed three days in hospital with mean stay days  $3.50 \pm 1.65$

and  $3.70 \pm 1.05$  respectively. 63.4% and 70 % of control and study groups respectively had no comorbid diseases.

The 70% of control group and 96.7% of study group had no history of bladder dysfunction; 56.7% of control group and 50% of study group had history of indwelling urinary catheter; 56.7% of control group and 86.7% of study group had no history of bacteriuria. 60% of subjects in both control and study groups had no history of renal calculi; 60% of control group and 76.6% of study group had no history of urinary tract obstruction. It was observed that, there were no significant statistical differences between control and study groups' subjects in relation to medical data and different risk factors for patients to develop urinary tract obstructions indicating homogeneity between the two groups.

#### 3.2. Section II: Post-nephrostomy complications throughout the four assessments between control and Study Groups.

As shown in table (3), the total complications' score indicates mild level of complications in both groups after 24 hours postoperatively; 96.7% of control group and all study group subjects had mild level of complications three days after nephrostomy insertion; 76.7% of control group had moderate level of complications and 96.7% of study group still had mild level of complications two weeks postoperatively. Furthermore, 90% of control group had severe level of complications and no severe levels was founded among study group followed by 73.3% of them still had mild level of complications four weeks postoperatively.

Table (4) clarified that, the total mean score of post nephrostomy complications among control and study groups were  $3.03 \pm 1.09$  and  $2.93 \pm 0.25$  respectively after 24 hours with no statistical significant difference between the two groups ( $t = 0.486$ ,  $p = 0.629$ ). Three days post nephrostomy, the total mean of complications' score among control and study groups were  $3.03 \pm 2.67$  and  $1.66 \pm 0.71$  respectively with statistically significant difference between the two groups ( $t = 2.7$ ,  $p = 0.01$ ).

Two weeks post nephrostomy insertion, the total mean complications' score among control group was  $14.56 \pm 4.19$  and among study group was  $5.63 \pm 2.45$  with a highly statistically significant difference between the two groups ( $t = 10.07$ ,  $p = 0.00$ ). After four weeks post nephrostomy insertion, the total mean complications' score among control group was  $22.73 \pm 2.37$  and among study group was  $9.1 \pm 2.55$  with highly statistically significant difference between the two groups ( $t = 21.41$ ,  $p = 0.00$ ).

So, the study hypothesis was supported as nephrostomy follow-up complications scores of patients with nephrostomy who received nursing instructions, were different than nephrostomy follow-up complications scores of the control group postoperatively.

**Table 1:** Frequency and Percentage Distribution of Personal Data among Control and Study Groups (N = 60)

Variable	Control group		Study group		X <sup>2</sup>	p-value
	n	%	n	%		
<b>Age</b>						
Less than 20	0	0.0	1	3.3	4.13	0.24
30-40	3	10.0	4	13.3		
41-50	7	23.3	2	6.7		
50 ≤ 60	20	66.7	23	76.7		
Mean ±SD	58.70 ± 13.05	58.63 ± 14.39	t=0.02	0.98		
<b>Gender</b>						
Male	18	60.0	21	70.0	0.65	0.42
Female	12	40.0	9	30.0		
<b>Occupation</b>						
Not employed	18	60.0	16	53.4	0.82	0.84
Manual Work	6	20.0	9	30		
Retired	5	16.7	4	13.3		
Employee	1	3.3	1	3.3		
<b>Place of residence</b>						
Urban	17	56.7	12	40	1.66	0.19
Rural	13	43.3	18	60		
<b>Marital Status</b>						
Single	1	3.3	1	3.3	2.72	0.43
Married	24	80	19	63.3		
Divorced	0	0.00	1	3.3		
Widow	5	16.7	9	30		
<b>Level of Education</b>						
Not read or write	15	50.0	22	73.3	3.97	0.26
Primary	1	3.3	0	00.0		
Intermediate	12	40.0	7	23.3		
Secondary	2	6.7	1	3.3		

**Table 2:** Frequency and Percentage Distribution of Medical Background Data among Control and Study Groups (N = 60)

Variables	Control Group	Study Group	X <sup>2</sup>		p-value
	n (%)	n (%)			
<b>Medical diagnoses</b>					
Bladder Mass	8 (26.7)	7 (23.3)	3.13		0.53
Ureteric stenosis	7 (23.3)	4 (13.3)			
Pelviureteric junction Stenosis	3 (10)	2 (6.7)			
Ureteric stone	2 (6.7)	6 (20)			
Renal pelvic stone	10 (33.3)	11 (36.7)			
<b>Hospital stay</b>					
One day	3 (10)	1 (3.3)	13.93		0.32
Two days	5 (16.7)	0 (0.0)			
Three days	11 ( 36.7)	14 (46.7)			
Four days	3 ( 10)	9 (30)			
Five days	1 ( 3.3)	4 (13.3)			
More than Five days	7 ( 23.3)	2 (6.7)			
Mean of hospital stay/day	3.50± 1.65	3.70± 1.05			
<b>Comorbid diseases</b>					
HTN	1 (3.3)	3 (10)	1.36		0.24
DM	7 (23.3)	4 (13.3)			
Both	3 (10)	2 (6.7)			
None	19 ( 63.4)	21 (70)			
<b>History of bladder dysfunction</b>					
Yes	9 (30)	1 (3.3)			
No	21 (70)	29 (96.7)			
<b>History of Indwelling Urinary catheter</b>					
Yes	17 (56.7)	15 (50)	0.26		0.61
No	13 (43.3)	15 (50)			
<b>Bacteriuria</b>					
Yes	13 (43.3)	4 (13.3)	6.6		0.24
No	17 (56.7)	26 (86.7)			
<b>Renal calculi</b>					
Yes	12 (40)	12 (40)			
No	18 (60)	18 (60)			
<b>Urinary tract obstruction</b>					
Yes	12 (40)	7 (23.3)	1.92		0.16
No	18 (60)	23 (76.7)			

**Table 3:** Frequency and Percentage Distribution of Total Complications’ Score among Control and Study Groups along the Study Period (N = 60).

Time  Complications’ Score	24 hours postoperatively		Three days postoperatively		Two weeks postoperatively		Four weeks postoperatively	
	Control Group	Study Group	Control Group	Study Group	Control Group	Study Group	Control Group	Study Group
	n	%	n	%	n	%	n	%
<b>Mild (zero to Ten)</b>	30 (100)	30 (100)	29 (96.7)	30 (100)	5 (16.7)	29 (96.7)	0 (00)	22 (73.3)
<b>Moderate (11 to 20)</b>	0 (00)	0 (00)	1 (3.3)	0 (00)	23 (76.7)	1 (3.3)	3 (10)	8 (26.7)
<b>Severe (21 to 30)</b>	0 (00)	0 (00)	0 (00)	0 (00)	2 (6.7)	0 (00)	27 (90)	0 (00)

**Table 4:** Comparison of the Means and Standard Deviation Related to Post-Nephrostomy Complications’ Scores among Control and Study Groups (N=60).

Total complications’ Score  Time	Post nephrostomy complications		
	Control group	Study group	
	Mean ±SD	Mean ±SD	t-test (p-value)
<b>Post 24 hours</b>	3.03 ± 1.09	2.93 ± 0.25	.486 (.629)
<b>Post three days</b>	3.03 ± 2.67	1.66 ± 0.71	2.7 (0.01**)
<b>Post two weeks</b>	14.56 ± 4.19	5.63 ± 2.45	10.07 (0.00**)
<b>Post four weeks</b>	22.73 ± 2.37	9.1 ± 2.55	21.41 (0.00**)

(\* ) Statistically significant at  $p < 0.05$ , (\*\*) highly statistically significant at  $p < 0.00$

#### 4. Discussion

The findings of the current study will be discussed in two main sections; the first section discusses the findings of the current study in relation to demographic and medical data, while the second section is devoted to findings related to post nephrostomy complications throughout the four assessments between control and Study Groups.

##### 4.1. Section I: Personal and Medical data

Personal data of the current study revealed that, more than half of the control and the study groups were aged between 50 to 60 years with mean age  $58.70 \pm 13.05$  years and  $58.63 \pm 14.39$  years respectively, this is matched with the study done by Azer, A.-El Mohsen and Sayed (2018) titled "The effect of nursing guidelines on minimizing incidence of complications for patients with percutaneous nephrostomy" who founded that 33.3% of the study subjects aged between  $50 < 65$  years, and Meira et al., (2019) who conducting a study about "Retrospective analysis of computed tomography guided percutaneous nephrostomies in cancer patients" among 201 patients with mean age of 63.8 years.

More than half of control group and more than two thirds of study group were males. This is matched with Singh et al., (2022) study entitled "Percutaneous nephrostomy in ureteropelvic junction obstruction with poorly functioning kidney" who reported that males were the predominant population (65.3%), also this result is consistent with Fernández-Cacho and Ayesa-Arriola (2019) study which assessed the "Quality of life, pain and anxiety in patients with nephrostomy tubes" as they denoted that 68% of subjects were men. Furthermore, the study done by Mansoor et al., (2022) entitled "The role of percutaneous nephrostomy for ureteric obstruction due to advanced ab-domino-pelvic malignancy: A Retrospective analysis" reported that 60.4% were males, while 39.6% were females. On the other hand, the current findings were inconsistent with a study done by Gebreselassie et al., (2022) entitled "Emergency decompression of obstructive uropathy using percutaneous nephrostomy: Disease pattern and treatment outcome at two urology centers in Ethiopia" who claimed that females accounted for 70% of cases.

In relation to education, half of the subjects of the control group and about three-quarters of the study group can't read or write. These findings might be logic as approximately half of the study subjects come from rural areas. Similarly, this finding is consistent with the findings reported from a study done by Buttisha, Tolba, Desoky, and Ahmed (2020) entitled "Self-care practices among adult patients with percutaneous nephrostomy tube" who reported that 41.6% of study subjects were illiterate. The finding is contradictory to Fernández-Cacho and Ayesa-Arriola (2019) research' finding which documented that 37.1% attended high school.

More than half of control and study groups were not employed; this might be due to that more than half of the study sample can't read or write. More than half of the control group' subjects and less than two thirds of the study group' subjects lived in rural areas. In relation to marital status, more than three quarters of the control group and less than two thirds of the study group were married; this is similar with Buttisha et al., (2020) who concluded that 71.7% of the study subjects were married and 58.3% of them lived in rural areas. Also, Azer et al., (2018) reported that 86.7% of subjects were

married. Moreover, these results are compatible with Fernández-Cacho and Ayesa-Arriola (2019) study which showed that 67.5% of study sample was married.

In relation to medical data, the current study showed that, one-third of the control group had renal pelvic stone followed by bladder mass then ureteric stenosis; while, more than one third of the study group had renal pelvic stone followed by bladder mass then ureteric stones, these results are consistent with a study by Alham, Hindawy and El-Eweedeey (2019) entitled "Ultrasound guided percutaneous nephrostomy, feasibility in lateral position" which documented that nephrostomy was inserted due to ureteric stones in 30% of patients 30% followed by stricture ureter and urinary bladder mass 14%. Furthermore, Turo et al., (2018) study entitled "Complications of percutaneous nephrostomy in a district general hospital" reported that the main indications for nephrostomy tube insertion were obstructive uropathy due to malignant disease among 46% of patients and 43% diagnosed by renal stones.

In regard to the period of hospital stay, more than one third of the control and about half of the study group subjects stayed three days in hospital with mean stay days  $3.50 \pm 1.65$  and  $3.70 \pm 1.05$  respectively. This is in the same line with Azer et al., (2018) who displayed that the mean hospital stay among study group was  $2.03 \pm 0.41$  and among control group was  $2.2 \pm 0.41$ . Furthermore, Singh et al., (2022) reported that the length of hospital stay among 72 patients was  $2.4 \pm 0.7$  days. Regarding comorbid diseases, about two thirds of the study subjects had no comorbid diseases; this is in the same direction with Naik, Lal, Gupta and Verma (2018) study entitled "Dual technique percutaneous nephrostomy: Experience from a tertiary care center" which claimed that systemic hypertension was present in 17.2% of patients and diabetes mellitus with controlled sugar in 13.7% patients; however, this percentage was increased in Gebreselassie et al., (2022) study who reported that associated comorbidities such as hypertension and diabetes were diagnosed in 45.5% of patients.

##### 4.2. Section II: Post-nephrostomy complications throughout the four assessments between control and study groups

The current study showed that the total complications score indicates mild level of complications among subjects in both groups 24 hours postoperatively. Almost all of the control group subject and all study group subjects had mild level of complications three days after nephrostomy insertion. However, more than three quarters of the control group had moderate level of complications and almost all of the study group subjects still had mild level of complications two weeks postoperatively. Although, the majority of control group had severe level of complications and no severe levels was founded among study group and about three quarters of them still had mild level of complications four weeks postoperatively.

The current study demonstrated that, the total mean score of post nephrostomy complications among control group was  $3.03 \pm 1.09$  and among study group was  $2.93 \pm 0.25$  with no statistical significant difference ( $t = 0.486$ ,  $p = 0.629$ ) between control and study groups after 24 hours. This finding indicates that the subjects are comparable in both groups. Three days post nephrostomy and after conducting the instructional session, total mean of complications' score

among control group was  $3.03 \pm 2.67$  and among study group was  $1.66 \pm 0.71$  with statistical significant difference between the two groups ( $t= 2.7, p= 0.01$ ). Two weeks and four weeks post nephrostomy insertion, the comparison of the total mean complications' score among control group and among study group shows a highly statistical significant difference between the two groups ( $t= 10.07, p= 0.00$ ) and ( $t= 21.41, p= 0.00$ ) respectively. These findings might be related to several factors, the effect of designed and individuality nursing instructions rendered to the subjects of the study group, the handed of illustrated Arabic booklet containing adequate, simple and clear information, in addition to the watchful confidential follow up of the researchers to the subjects and answering any question or query regarding the nephrostomy tube might help in decreasing the incidence of and severity of complications among study group. The finding is supported by Ali, Mohamed and Ahmed (2023) who concluded that designated nursing guidelines had a positive effect on the outcomes of patients as regarding self-care practices, knowledge and incidence of complications and duration of hospital stay. Also, Azer et al., (2018) documented that application of the nursing guidelines had its positive impact on the outcomes of patients who underwent percutaneous nephrostomy tube placement.

## 5. Conclusions

The findings of the current study revealed that patients with nephrostomy complained of multiple minor complications which needs some attention from health care team specially nurses. The result of the current study succeeded in supporting the research hypothesis, as nephrostomy follow-up complications scores of patients with nephrostomy who received nursing instructions, were different than nephrostomy follow-up complications scores of the control group postoperatively.

## 6. Recommendations

Based on the study findings, the researchers recommend the following:

- Replication of the study on a larger probability sample selected from different geographical areas in Egypt to obtain more generalizable findings.
- Adequate necessary information about nephrostomy caring and performing daily life activities in the form of simple clear illustrated instructional booklet for all patients who scheduled for nephrostomy insertion.

## Conflict of interest

All authors declare that they have no conflicts of interest.

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