

Impact of Protocol of Care of Patients Undergoing Urinary Catheterization on Nurses' practice

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ABSTRACT

Background: Urinary catheterization is an invasive procedure carried out by nurses as part of the routine of their care practice. Hence, professional must have knowledge related to the management of urinary catheterization. **Aim of the study** was to evaluate the impact of protocol of care of patients undergoing urinary catheterization on nurses' practice. **Subject and Method:** A quasi- experimental research design was used to conduct this study. The study was carried out at Intensive Care Unit, Urology Department and Department of Internal Medicine at Al-Azhar University hospital in Damietta City to test the hypotheses that positive changes in nurses' practice after implementing the protocol of care for patients undergoing urinary catheterization. A convenient sample of 50 nurses was included. One tool was used for data collections, part (1) Structured Interview Questionnaire tool that includes demographic data part (2) Observational Checklist to evaluate nurses' practice in relation to care of patient patients undergoing urinary catheterization **Results** demonstrated that there were statistically significant improvements in the total score of nurses' practice regarding care of patients undergoing urinary catheterization throughout the protocol intervention. **Recommendations:** The study recommended that providing ongoing in-service education for nurses to update their practice related to care of patients undergoing urinary catheterization and catheter –associated problems.

INTRODUCTION

The indwelling urinary catheter (IUC) is a widely utilized device in modern hospital environments, yet they are not always used appropriately in hospital settings and can result in prolonged use and improper management, increasing risk of infections and length of stay. Nurses are the primary champions to promote preventative measures, provide patient education, and evaluate evidence-based practice (EBP) strategies to decrease catheter associated urinary tract infections (CAUTIs) (*Gordon, 2015*).

Nurses are able to perform the best possible IUC utilization assessment to patients, standardizing the health care quality. The culture of evidence-based practice can be promoted within the organization, motivating nurses and other clinical staff to pursue evidence-based practice in their scope of work and compete with the rapid clinical advances and information explosion. Furthermore, the new protocol may also strengthen the concept of patient safety and hospital acquired infection (HAI) prevention (*Pui, 2011*). Nurses are responsible for placing and maintaining the urinary catheter system; including cleaning and other tasks in addition nurses play a vital role in the diagnosis of catheter associated urinary tract infection (*Yoon et al., 2013*).

Among catheterized patients, nurses are often the first to notice a clinical change or technical problem. Routine care of the catheter is often delegated to non-licensed personnel. Inadequate placement and care from the beginning may contribute to increased infection rates. (*Yoon et al., 2013*). Despite being considered a common procedure, IUC it is associating with complications which require efforts from nurses to be controlled. Currently, there is an absence of standardization of the urinary catheterization technique in different health institutions so the Nursing professionals must have knowledge related to the management of an indwelling urinary catheter, complications caused by an indwelling urinary catheter and ways to prevent and manage these complications (*Altun and Karakoc, 2010 and Ercole et al., 2013*).

Focusing on nursing-driven interventions to improve the nursing care of IUCs was found to positively impact CAUTI rates. Reeducating on the importance of a

perceived “basic” skill and infusing best evidence into current practice were important to raise awareness of simple interventions that positively impacted patient outcomes. Standardizing the education, training, and orientation of new nursing staff on proper urinary catheter placement and care can have an impact on patient outcomes (*Oman et al., 2011*). Therefore; the aim of the current study is to evaluate the impact of protocol of care of patients undergoing urinary catheterization on nurses' performance

AIM OF STUDY:

The aim of this study was to; Evaluate the impact of protocol of care of patients undergoing urinary catheterization on nurses' practice.

Research Hypotheses:

To fulfill the aim of this study the following hypothesis was formulated:

- There will be positive changes in nurses' practice after implementing the protocol of care for patients undergoing urinary catheterization.

MATERIALS AND METHOD:

Research Design:

A quasi-experimental study design was used for the conduction of this study.

Setting:

This study was conducted at Intensive Care Unit, Urology Department and Department of Internal Medicine at Al-Azhar University hospital in Damietta city.

Subjects:

A convenient sample of 50 nurses working with patients undergoing urinary catheterization at Intensive Care Unit, Urology Department and Department of Internal Medicine, at Al-Azhar University hospital in Damietta city.

Exclusion criteria:

- Student nurses of any educational level.
- Nurses who refuse to participate in the study

Tools of data collection:

Tools used in this study were: *one tool was used in this study*

Part (I): Structured interview Questionnaire:

It was developed by the researcher to assess items related to socio- demographic characteristics and work related data of the studied nurses such as age, gender, marital status, working unit, level of education, years of experience and attending training program related to urinary catheter.

Part (II): " Observational Checklist":

It was developed by the researcher, after review of recent related literature to evaluate nurses' practice in relation to care of patient patients undergoing urinary catheterization. It consisted of 87steps

Scoring system:

As regard, studied nurse's practice each step checked answer was scored one for (done) and checked (not done) was scored zero. The total nurse's practice were summed up then converted to percent. Total nurses practices were calculated as the following: All values $\geq 75\%$ were considered satisfactory While values $<75\%$ were considered unsatisfactory

5. Assessment phase:

In this phase after finalization of the tools, the researcher assessed nurses' learning needs using Tool was designed to assess nurse's practice, as each nurse was observed by the researcher during her actual clinical practice. The nurse was evaluated by using observational checklist (Tool). Moreover, the researcher assessed available place, time, equipment, supplies, and instructional materials for conduction of the protocol of care.

6. The protocol of care development phase

The protocol of care was developed based on the identified needs and demands of nurses gathered in assessment phase and review of related literature. This phase included the following;

C. Setting objectives:

The aim of protocol was to improve nurses practice related to care of patients undergoing urinary catheterization though:

- Improve nurses' practice related to care of patients undergoing urinary catheterization

D. Preparation of the content:

Content covered all areas about caring of patients undergoing urinary catheterization was prepared which included the following: preparation during urinary catheter insertion, nursing care for urinary catheter management ,emptying of drainage bag and removing of urinary catheter.

In this phase, the researcher designed a plan for a protocol of care implementation

7. Implementation phase:

After official permission was taken from the concerned study setting. The researcher took the list of nurses who met the inclusion criteria. The participated nurses were divided into 10 groups, each consisted of five nurses. Each group was attended at conference room separately during morning and afternoon shift. The purpose and aim of the study was explained, then the researcher collect data about demographic characteristics using tool (I). This session is considered as introductory session.

At the beginning of each session, pretest related to the session content was provided to participants, followed by hands out. During the session, the researcher teach content in a clear, simple language using lectures , illustrative pictures and discussion giving feedback using positive verbal words.

At the end of each session the researcher, close the session by summary for the main points. Posttest was at the end of the 4th session using toll II.

8. Evaluation phase:

The protocol of care was evaluated three times using tool II. Tool II used to evaluate the studied nurses .Evaluation was done three times, first time: immediately after protocol implementation, second time after three Months, and third time: after six month.

Ethical Consideration:

Explain the aim of the study to the directors of Intensive Care Unit, Department of Urology and Internal Medicine to take their permission to start this study .Oral consent

was taken from the study subjects after explaining the aims and nature of the study to them, and they were assured that the information collected would be treated confidentially and used for the research purpose only, and they have the right to withdraw from the study at any time.

Statistical Design:

The collected data organized, tabulated and statistically analyzed using statistical package for social science (SPSS) version 16 for windows, running on IBM compatible computer. Qualitative data (categorical data) were expressed as relative frequency (number) and percent distribution, and for comparison between groups, the Chi square (X^2) or Mann-Whitney test (Z) was calculated. Quantitative data were expressed as mean \pm SD, and for comparison between two means, the student (t) test was calculated. For interpretation of results, the p value ≤ 0.05 was considered significant.

RESULTS:

Table (1): shows the demographic and work related data of studied nurses. It revealed that (96%) of the studied nurses were females and (90%) their age from 21 to 36 years. There were 46% of studied nurses had technical nursing institute diploma , while only (16%) had nursing bachelor; and (48%) had less than five years of experience and (50.0%) working in intensive care unit (ICU) and (30%) work in urology unit. All studied nurses (100%) have not any previous training course about urinary catheterization.

Table (2): Shows that Percentage distribution of studied nurses' satisfactory practice related to urinary catheterization procedure throughout the protocol intervention and revealed that before intervention (94%) have satisfactory practice score, immediate after (100%), 3 month after (100%) and 6 month after intervention (100%) have total satisfactory practice score Moreover, there were statistically significant differences ($X^2 = 9.13$, $p = 0.028$) about urinary catheterization procedures while, there were no statistically significant differences regarding applying sterile drape ($X^2 = 2.02$, $p = 0.56$).

Table (3): Shows Percentage distribution of studied nurses' satisfactory practice related to urinary catheter management throughout the protocol intervention (No=50) and revealed that before intervention (14%) have satisfactory practice score, immediate after

(32%), 3 month after (28%) and 6 month after intervention (28%) have total satisfactory practice score but there were no statistically significant differences ($X^2 = 4.80$, $p=0.18$) about urinary catheter management. Moreover, there were statistically significant differences as regard hand washing before handling catheter ($X^2 = 34.09$, $p<0.001$), wear clean disposable gloves ($X^2 = 81.8$, $p<0.001$) and prevent kinking of catheter ($X^2 = 35.29$, $p<0.001$),

Table (4): shows that there were statically significant differences in the total score of nurses' practice regarding care of patient undergoing urinary catheterization throughout the protocol intervention between immediately posttest, pre protocol first follow up and pre protocol, second follow up, and pre protocol ($P<0.001$). There were no statistically significant differences between immediately posttest and first follow up ($P= 0.076$). In addition, there was no statistical significant difference between first and second follow-up ($P= 0.68$).

Table (5): Shows that there were no statistical significance differences between studied nurse's knowledge or practice and their age groups throughout the protocol intervention.

Table (21): Shows regarding knowledge there no statistically significant differences between studied nurses' knowledge and their experience throughout the protocol intervention except before the protocol ($F=3.48$, $p= 0.039$). Regarding practice there no statistically significant differences between studied nurses' practice and their experience throughout the protocol intervention except before the protocol ($F=3.50$, $p= 0.038$).

Table (1): Distribution of the studied nurses according to their demographic characteristics and work related data (No=50)

Items		N	%
-Age	Less than 21years	5	10.0
	21 to 36 years	45	90.0
-Gender	Male	2	4.0
	Female	48	96.0
-Marital state	single	9	18.0
	Married	40	80.0
	Divorced	1	2.0
	Widow	0	0.0
-Education level	Secondary school diploma	19	38.0
	Technical nursing institute diploma	23	46.0
	Bch degree of nursing	8	16.0
-Years of experience	Less than 5 years	24	48.0
	5 to 10 years	20	40.0
	More than 10 years	6	12.0
-Work Department	Urology	15	30.0
	ICU	25	50.0
	Internal medicine	10	20.0
-Training course	yes	0	0.0
	No	50	100.0

Table (2): Percentage distribution of studied nurses' satisfactory practice related to urinary catheterization procedure throughout the protocol intervention (No=50)

ITEMS	Before intervention		Immediately After		3 Months After		6 Months After		X ²	P-value	
	N.	%	N.	%	N.	%	N.	%			
Picking up catheter with..	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Lubricating the tip of....	47	94.0%	50	100.0%	50	100.0%	50	100.0%	9.13	0.028*	
Inserting catheter to...	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Advance catheter until...	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Advance the catheter another	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Don't force the catheter	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Asking patient to breathe during insertion	29	58.0%	49	98.0%	47	94.0%	46	92.0%	41.42	<0.001**	
Inflate balloon	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Testing the balloon	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Securing the catheter	5	10.0%	33	66.0%	34	68.0%	34	68.0%	9.53	<0.001**	
Attach drainage bag to	Bed frame	30	60.0%	33	66.0%	29	58.0%	28	56.0%	1.16	0.76(NS)
	Stand	0	0.0%	0	0.0%	0	0.0%	2	4.0%	6.06	0.11(NS)
Left bag free on the floor	20	40.0%	17	34.0%	21	42.0%	20	40.0%	0.75	0.86(NS)	
Discard contaminated equip.	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Remove gloves	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Hand washing	50	100.0%	50	100.0%	48	96.0%	48	96.0%	4.08	0.25(NS)	
Recording and reporting	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a		
Total	47	94.0%	50	100.0%	50	100.0%	50	100.0%	9.13	0.028*	

Table (3): Percentage distribution of studied nurses' satisfactory practice related to urinary catheter management throughout the protocol intervention (No=50)

ITEMS	Before intervention		Immediately After		3 months After		6 Months After		X ²	P-value
	N.	%	N.	%	N.	%	N.	%		
Hand washing before UC handling	10	20.0%	37	74.0%	32	64.0%	30	60.0%	34.09	<0.001**
Hand washing after handling	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a	
Wear clean disposable gloves	26	52.0%	50	100.0%	50	100.0%	50	100.0%	81.8	<0.001**
Antiseptic before emptying	0	.0%	1	2.0%	0	.0%	0	.0%	3.01	0.38(NS)
Antiseptic after emptying	0	.0%	1	2.0%	0	.0%	0	.0%	3.01	0.38(NS)
Urine received in sterile container	0	.0%	1	2.0%	0	.0%	1	2.0%	2.02	0.56(NS)
Assess urethral meatus	34	68.0%	36	72.0%	35	70.0%	34	68.0%	0.25	0.96(NS)
Clean perineum	34	68.0%	36	72.0%	36	72.0%	36	72.0%	0.29	0.96(NS)
Prevent kinking of tube	16	32.0%	40	80.0%	40	80.0%	36	72.0%	35.29	<0.001**
Position uribag appropriately	29	58.0%	36	72.0%	35	70.0%	35	70.0%	2.80	0.42(NS)
Avoid catheter clamping	8	16.0%	47	94.0%	50	100.0%	50	100.0%	145.3	<0.001**
Empty bag every 8 hours	0	.0%	0	0.0%	0	.0%	0	0.0%	a	
Empty bag every 12 hours	0	.0%	0	0.0%	0	.0%	0	0.0%	a	
Empty bag when needed	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a	
Check character of urine	42	84.0%	50	100%	50	100.0%	50	100.0%	16.45	0.001**
Encourage fluid intake	46	92.0%	50	100.0%	50	100.0%	50	100.0%	12.24	0.007*
Record intake and output	50	100.0%	50	100.0%	50	100.0%	50	100.0%	a	
Check securing of uribag system	7	14.0%	34	68.0%	22	44.0%	22	44.0%	30.01	<0.001**
Keep uribag from touching floor	17	34.0%	34	68.0%	31	62.0%	31	62.0%	14.22	0.003*
Give patient health teaching	12	24.0%	32	64.0%	32	64.0%	32	64.0%	24.15	<0.001**
Total	7	14.0%	16	32.0%	14	28.0%	14	28.0%	4.80	0.18(NS)

Table (4): Percentage distribution of the total score of nurse's practice regarding care of patients undergoing urinary catheterization throughout the protocol intervention (No=50)

	Before intervention		Immediately After		3 Months After		6 Months After		X ²	P-V
	N.	%	N.	%	N.	%	N.	%		
Satisfied ($\geq 75\%$)	8	16.0%	40	80.0%	32	64.0%	30	60.0%	45.49	<0.001**
Unsatisfactory (< 75%)	42	84.0%	10	20.0%	18	36.0%	20	40.0%		
Mean \pm SD	64.95 \pm 7.38		80.38 \pm 5.65		78.32 \pm 6.18		77.47 \pm 6.57		F=28.25	<0.001**
Immediately Posttest- pre protocol	Z = 6.37 , p < 0.001*									
F3-pre protocol	Z = 4.87, p < 0.001*									
F6-Pre protocol	Z = 4.51, p < 0.001*									
F3- Immediately Posttest	Z = 1.77 , p = 0.076(NS)									
F6- Immediately Posttest	Z = 2.17 , p = 0.03*									
F6-F3	Z = 0.41 , p = 0.68(NS)									

Table (5): Relation between mean score of studied nurses' total satisfactory knowledge and practice regarding care of patients undergoing UC throughout the protocol intervention according to according to their age (No=50)

Protocol intervention		Age group		t- test	P-value
		≤ 21 years	> 21		
		Mean \pm SD	Mean \pm SD		
Total satisfactory Practice score	Before protocol	64.02 \pm 2.53	65.05 \pm 7.74	0.29	0.76(NS)
	Immediately after protocol	83.22 \pm 8.57	80.07 \pm 5.28	1.18	0.24(NS)
	3 months after protocol	80.57 \pm 8.45	78.07 \pm 5.96	0.85	0.39(NS)
	6 months after protocol	80.41 \pm 8.59	77.15 \pm 6.34	1.05	0.29(NS)

Table (6): Relation between mean score of studied nurses' total satisfactory knowledge and practice regarding care of patients undergoing UC throughout the protocol intervention according to their experience (No=50)

		Years of experience			F	P-value
		Fewer Than 5 Years	From 5 To 10 Years	More Than 10 Years		
		Mean±S D	Mean±S D	Mean±S D		
Total satisfactory Practice score	Before protocol	62.29±2.77	66.92±9.78	66.02±8.06	3.50	0.038*
	Immediately after protocol	80.56±6.31	80.04±5.12	80.85±5.45	0.06	0.93(NS)
	3 months after protocol	77.93±5.68	77.89±6.82	81.30±6.12	0.78	0.46(NS)
	6 months after protocol	77.71±5.77	76.70±7.54	79.10±6.91	0.32	0.72(NS)

DISCUSSION :

Catheter-associated urinary tract infections (CAUTIs) account 40% of all nosocomial infections in the United States, affecting nearly 900,000 patients per year. (The indwelling urinary catheter (IUC) is a widely utilized device in modern hospital environments, yet they are not always used appropriately in hospital settings and can result in prolonged use and improper management, increasing risk of infections and length of stay. Nurses are the primary champions to promote preventative measures, provide patient education, and evaluate evidence-based practice (EBP) strategies to decrease CAUTIs (*Gordon, 2015*). Moreover *Meddings et al. (2014)* stated that changing practice is not easy and can be costly, but it will cost healthcare organizations more financially without adequately educating nurses about best practices. In addition, lack of prevention strategies knowledge regarding patient safety and the quality of care.

Concerning nurses' satisfactory practice total score related to urinary catheterization procedure throughout the protocol intervention. The current study results indicated improvement in the nurses' satisfactory practice total score regarding urinary catheterization procedure throughout the protocol intervention. This finding supported by *Damani, (2011)* who mentioned that Healthcare personnel performing urinary catheterization should receive training on correct procedures for insertion and maintenance of urinary catheters based on local written protocols. Also *Fink et al., (2012)* reported that it is critical that staff be made aware of policy revisions and be provided with annual training and education reviews related to catheter insertion and maintenance techniques

Nurses' satisfactory practice total score related to **urinary catheter care** throughout the protocol intervention. The results revealed improvement in the nurses' satisfactory practice total score regarding urinary catheter care throughout the protocol intervention. This finding supported by *Gordon,(2015)* who said that Nurses are required to have the ability to improve patient care, increase positive quality outcomes and decrease negative outcomes with patients.

As regard total score of nurses' practice regarding **urinary catheter management** throughout the protocol intervention. It revealed that there were statically significant difference in the total score of nurses' practice regarding urinary catheter management throughout the protocol intervention between immediately posttest, pre protocol first follow up and pre protocol, second follow up, and pre protocol. This finding supported by *Sobeih and Nasr, (2015)* who revealed that, there were highly statistically significant differences between level of acquired nurses' practices pre/post and one month later after the interactive workshop related to urinary catheter insertion, care and removal.

Regarding **age of studied nurses** the result, of the current study revealed that there were no statistical significance differences between nurse's knowledge or practice and their age groups throughout the protocol intervention. This Finding of this study was consistent with a study conducted by *Prasanna and Radhika, (2015)* on knowledge regarding catheter care among staff nurses who reported that there is no significant association between the level of knowledge of staff nurses regarding catheter care with their selected socio demographic variables like age, gender and professional experience. The results contradicted with *Shahen, (2012)* who detected a positive statistically significant relation between post program knowledge score and age of participants

As regard **level of studied nurses' experience** the results revealed that; there no statically significant differences between studied nurses knowledge and their experience throughout the protocol intervention except before the protocol. In this respect *Madeo and Roodhouse, (2009)* clarified that nurses who are qualified for at least 4 years, would be expected to have at least a basic understanding of best practice for the management of an indwelling urinary catheter.

CONCLUSION:

Based on study findings, it can be concluded that: There were statistically significant difference in the total score of nurses' knowledge as well as practice regarding urinary catheter care throughout the protocol intervention between posttest, pre protocol first follow up and pre, second follow up, and pre protocol. A high statistical significant improvement in nurse's knowledge were found between the immediate posttest and the pre protocol level, between pre protocol and 3month after and between pre-second follow up.

RECOMMENDATIONS:

Providing ongoing in service education for nurses to update their practice related to care of patients undergoing urinary catheterization .Provide equal opportunities for nurses to attend national and international congresses and in-service training programs related to urinary catheter care and urological departments and other units where catheters are used must be supplied with comprehensive manuals containing basic procedural steps of how to handle and to avoid catheter associated problems.

Developing nursing standards of care for patients with urinary indwelling catheter and encouraging nurses to attend national and international congresses, seminars, symposiums and workshop about urinary catheterization, care of the patient with urinary catheter.

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تأثير بروتوكول لرعاية المرضى الخاضعين للقسطرة البولية على ممارسات الممرضين

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الخلاصة

تعتبر القسطرة البولية واحدة من اهم وأكثر الاجراءات العلاجية المستخدمة في المستشفيات وتشتمل على ادخال انبوب مجوف من خلال مجرى البول الى المثانة وذلك لتيسير عملية خروج البول من المثانة. تمثل القسطرة البولية ضرورة لنسبة كبيرة من المرضى في المستشفيات وخاصة الذين يعانون من اضطرابات في الجهاز البولي والمرضى ذوى الحالات الحرجة ويحتاجون لقياس دقيق لكمية السوائل الداخلة والخارجة من الجسم ومع وجود اهمية لاستخدام القسطرة البولية يوجد ايضا العديد من المضاعفات ومن اهمها عدوى مجرى البول وتؤدي الإصابة بعدوى مجرى البول المصاحبة للقسطرة البولية. وقد أجريت دراسة شبه تجريبية مع تقييم قبلي وبعدي لتقييم تأثير بروتوكول لرعاية المرضى الخاضعين للقسطرة البولية على مهارات الممرضين الذين يعملون بوحدة الرعاية المركزة وقسم المسالك البولية وقسم الباطنة الداخلي بمستشفى جامعة الازهر بدمياط. وقد شملت عينة الدراسة على جميع الممرضات والممرضين الذين يعملون بالأماكن السابق ذكرها. وقد تم استخدام استمارة استبيان للبيانات الشخصية واستمارة تقييم الاداء فيما يتعلق برعاية المرضى الخاضعين لت تركيب القسطرة البولية. وقد أسفرت نتائج الدراسة عن حدوث تغيير إيجابي لمهارات الممرضين بعد تنفيذ بروتوكول حول رعاية المرضى الذين يخضعون للقسطرة البولية وقد أوصت الدراسة بتزويد الممرضات بالتدريب المستمر لتحديث مهاراتهم عن القسطرة البولية ومعرفة المشاكل المصاحبة لها وقد اوصت ايضا بأهمية تصميم برامج وبروتوكولات تعليمية لتحقيق جودة عالية من الرعاية التمريضية للقسطرة البولية.

الكلمات المرشدة: بروتوكول الرعاية ، القسطرة البولية ،ممارسات الممرضين .