

Urosurgical Nurses' Adherence to Infection Prevention and Control Practices

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Abstract

Background: .The prevalence of urinary tract infections (UTIs), globally, is a major type and most common of HAIs and represent around 40% of HAIs and also, one of the top ranking microbial infections .Urinary tract infections(UTIs) associated with catheters threats patient's safety worldwide, it is infection called Catheter Associated Urinary Tract Infection(CAUTI). **Objective:** To assess urosurgical nurses' adherence to infection prevention and control practices **Settings:** The study was carried out in the inpatient Urosurgical Ward of the Main University Hospital at Alexandria, the inpatient Urosurgical Wards of Gamal Abd El Nasser Health Insurance Hospital at Alexandria, the inpatient General Surgical Ward of Shark El Madena Hospital at Alexandria and the inpatient Urosurgical Wards of the National Medical Institute, Damanshour, El Beheira Governorate. Egypt. **Subjects:** All nurses were worked at the above-mentioned settings who were available at the time of data collection: the Main University Hospital: around 14 nurses, Gamal Abd El Nasser Health Insurance Hospital: approximately 7 nurses, Shark El Madena Hospital: around 20 nurses, The National Medical Institute, Damanshour: 9 nurses. **Tools:** two tools were used. Tool one: "Urosurgical Nurses' Adherence with Infection Prevention and Control Practices: An Observation Checklist". Tool two: "Urosurgical Nurses' Adherence to Infection Prevention and Control Practices (IPCP):A Questionnaire of Knowledge". **Results:** The study showed that statistically significant differences, were detected among the four hospitals "safe injection practices" where ($p=0.027$). No statistical significant differences, were detected among the studied four hospitals, nurses regarding other nurses' practices, as well as the "overall nurses' practice", as determined different "P" values there was a statistical significant relationships were found between the nurses' overall knowledge and the nurses' gender and attendance of training courses on infection prevention and control practices ($p=0.002$, $p=0.042$) respectively. **Conclusion:** More than half of the studied nurses (56%) had "moderate" knowledge and only (2%) of them had "good knowledge" and the overall nurses' adherence to practice standards, was "poor" and (100%) had "poor" adherence. **Recommendations:** Continuing in-service training sessions are programs for nurses, about IPCPs, are required and monitoring and feedback of nurses' adherence should be periodically, reported.

Keywords: Nurses' Adherence, Infection Prevention and Control

Introduction

Healthcare-associated infection (HAIs) are the most significant global health problem, and acquired the process of care and are not present at the time of admission at the hospital (Yasmeen et al., 2022). HAIs are a significant cause of illness and mortality and lead to serious emotional,

financial, and medical effects. At any given time, approximately one in every 31 inpatients have an infection related to hospitalization. These infections lead to tens of thousands of deaths and cost the United States(US) health care system billions of dollars each year (Centers for Disease Control Prevention [CDC], 2021).

The prevalence of HCAI ranges from 25% to 40% high worldwide. In developed countries, in acute care hospitals, approximately 5%-10% admitted patients acquire HCAs at any given time however, this risk is 2-20 times higher in developing countries. In the United States hospitals, each year, such infections reason for approximately 99,000 deaths and in Europe, estimated 37,000 deaths (Yasmeen et al., 2022).

Urinary tract infections (UTIs) are amongst the most prevalent bacterial infections in the world and 40% of HAIs, have serious cost and morbidity effects as well as a high death rate. Approximately 75% of UTIs acquired are associated with a urinary catheter at hospital (Rashmi & Dhakal, 2021).

Urinary tract infection (UTI) cases are mostly due to the presence of urinary catheter, that is called Catheter-associated urinary tract infection(CAUTI). Nurses should have knowledge about the recommended indications for catheter placement and evidenced-based practice of catheter maintenance (Mukakamanzi, 2017). The most effective preventive measures of CAUTI is avoiding of unnecessary catheterization and catheters removal if possible (Tenke et al., 2017).

Infection prevention strategies must help in preventing HAIs that associated morbidity and mortality .Adherence to standard precautions : isolation precautions (contact, droplet, and airborne precautions), safety injection, antibiotic stewardship, vaccinations, comprehensive safety program and surveillance are the basic interventions of infection prevention and control (IPC). Infection prevention is one of the most vital challenges in the health care settings (Desta et al., 2018)

In urological departments, urological nurses should develop procedural manuals and the guidelines about urinary catheters and its care for patients undergoing urological surgeries as well as about caring

for patients pre and post-operatively (Mohamed, 2016).

Aims of the Study

This study aims to assess urosurgical nurses' adherence to infection prevention and control practices.

Research Questions

- What is the urosurgical nurses' adherence level to infection prevention and control practices at the selected study settings?

Materials and Method

Materials

Design: A descriptive design will be used in the current study to collect data.

Settings: The current study was conducted at the following 4 settings: The Inpatient Urosurgical Ward of the Main University Hospital at Alexandria. The Inpatient Urosurgical Wards of Gamal Abd El Nasser Health Insurance Hospital at Alexandria. The Inpatient General Surgical Ward of Shark El Madena Hospital at Alexandria. The Inpatient Urosurgical Wards of the National Medical Institute, Damanshour, El Beheira Governorate. This hospital is the main academic/teaching hospital in Damanshour.

Subjects: Subjects of the study consisted of all nurses working at the above-mentioned settings (nurses) who were available at the time of data collection: (The Main University Hospital: 14 nurses, Gamal Abd El Nasser Health Insurance Hospital: 7 nurse, Shark El Madena Hospital: 20 nurses and The National Medical Institute, Damanshour: 9 nurses.

Tools: Two tools was utilized for data collection.

Tool I: Urosurgical Nurses' Adherence with Infection Prevention and Control Practices: An Observation Checklist:

This tool was developed, adapted and translated to Arabic based on related literature. It was used to record the nurses' observed adherence to IPC practices as they carry out nursing procedures. The tool has

the following practice domains: hand hygiene, donning personal protective devices, linen management, safe injection practices, surgical wound dressing aseptic technique, urinary catheter and drain care as well as waste disposal. Each subcompetency of the above-mentioned domains, was scored on a 3-point likert scale as follows: “Done adequately”:2, “Done inadequately”:1 “Done wrong/not done”: 0 and “Not applicable. Serial code identifier of the observational checklist was recorded (Alhraiwil et al., 2020; Anderson et al., 2018; Crisp et al., 2020; El-soudany, 2018; Koros et al., 2018; Memon & Afghan, 2020; Ministry of Health and Family Welfare, 2020; Orth, 2018; Osman et al., 2021; Perry et al., 2019; Phan et al., 2018; Prathibha et al., 2015; Quallich & Lajiness, 2020; Renton et al., 2021; Wahab et al., 2019).

Scoring system The total mean score of every domain was calculated by summing up subcompetency scores, divided by its numbers. Each domain & all domain total scores, were converted into percent scores, as follows:75% or more score was considered “good adherence” and from 60% to less than 75%score was considered “moderate adherence” and Less than 60% score was considered “poor adherence”.

Tool II: Urosurgical Nurses’ Adherence to Infection Prevention and Control Practices (IPCP): A Questionnaire of Knowledge:

This tool was developed, adapted and translated to Arabic by the researcher after extensive review of related literature. This tool’s aim was to assess the nurses’ knowledge related to adherence to IPC practices while carrying out nursing procedures. It was comprised two parts as follows:

Part I: Nurses' Socio-demographic Data:

This part consists of questions that elicit information on nurses’ characteristics including :(Personal related data such as age,

gender, education level. Work related data such as ranking employment, hepatitis B vaccination status, years of work experience, history of sharps injury, attendance of courses relevant to IPC practices as well as a serial code identifier of the questionnaire.)

Part II: Nurses’ knowledge related to Adherence to IPCP:

This part contains several domains, its related subcompetencies & statements relating to the assessment of nurses’ knowledge and frequency of adherence to IPC practices. Adherence practices domains included: Hand hygiene, donning personal protective devices, linen management, safe injection practices, surgical dressing aseptic technique, urinary catheter care, drain care as well as waste disposal.Each subcompetency of the above mentioned domains, was scored on a 3-point likert scale as follows: “Always”: 2 “Sometimes”:1 and “Never” :0 (Awekeya, 2019; Bedoya et al., 2017;; Cruz et al., 2016; Justineo, 2022; Kim & Oh, 2015; Koros et al., 2018; Osman et al., 2021; Prathibha et al., 2015; Storr et al., 2017; Valim et al., 2015).

Scoring system Part II

The total mean score of each domain was calculated by summing up subcompetency scores, divided by its numbers. Each domain & all domains total scores were converted into percent scores, as follows: More than 75% score was considered “good adherence” and from 60%-75% score was considered “moderate adherence” and Less than 60% score was considered “poor adherence”.

Method

Approval of the Research Ethics Committee, Faculty of Nursing, Alexandria University was obtained before conducting the study. Written approval was obtained from The Faculty of Nursing Alexandria University, administrative offices and directed to the responsible authorities of the previously mentioned settings to take their permissions to conduct the study, after explaining the aim

of the study. An Official permission to conduct the study was obtained from the previously mentioned settings urosurgical wards responsible authorities after explaining aim and nature of the study. Study tools I and II, were developed, adapted and translated to Arabic by the researcher. Study tools were tested for its content and construct validity by five experts in the Medical Surgical Nursing, faculty of Nursing, Alexandria University. Accordingly, all necessary modifications were introduced.

A pilot study was carried out on 10% (5 nurses) of the study nurses, at the previously mentioned settings, to test clarity and feasibility of the tools and necessary modifications were introduced. Those nurses were excluded from the total study sample. Reliability of the study tools I and II was ascertained using the using the Cronbach's Alpha test to measure its internal consistency to evaluate how well the tools reliably measure what they were designed to measure. The correlation coefficient was ($\alpha=0.982, 0.962$) respectively. Tool I was completed, using concealed observations. Every nurse was watched, as feasible twice throughout morning and afternoon shifts, for around two to three hours, each shift. Nurses' questionnaire (tool II) was completed by nurses individually, as convenient, throughout morning shifts and as feasible at the study settings. Data were collected, throughout a period of 6 months, from the 18 of September till the 18 of March.

Ethical Considerations

Witness informed written consent to carry out the study was obtained from the administrative authorities and head nurse of the identified study settings. Written informed consents of all nurses, were obtained from nurse participants in the study, after providing appropriate explanation about the purpose of the study. Confidentiality of data of urosurgical nurses was maintained throughout phases of the study. Privacy and anonymity of urosurgical

nurses were assured. Subjects were assured that their participation is on a voluntary base and they have the right to withdraw from the study at any time.

Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp) Qualitative data were described using number and percent. The **Kolmogorov-Smirnov** test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean, standard deviation. Significance of the obtained results was judged at the 5% level. **The used tests were 1 - Chi-square test:**For categorical variables, to compare between different groups **2 - Monte Carlo correction** Correction for chi-square when more than 20% of the cells have expected count less than 5 **3 -Spearman coefficient** To correlate between two distributed abnormal quantitative variables

Results

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

First, less than half of the studied nurses (40%), were from Shark El madeina Hospital. The majority (90%) of nurses, were females. As regards age, around more than one third of nurses (34% and 34%) were aged between 40 to 50 years old and 30 to 40 years respectively. The majority (78%), were married. For the level of education, almost the majority of the studied nurses (78%) were secondary school nursing holders. As regard years of experience, more than half of nurses (60%) had more than 15 years of experience. Almost of the studied nurses (94%) had permanent payment, the majority of them (86%) had been vaccinated, against hepatitis B. About the infection prevention and control courses, the majority of studied subject (96%) attended previous training courses related to Infection

prevention and control practices. For sharps-related injuries, the majority of the sample (94%) reported that were not exposed to sharps-related injuries.

Table (2): shows the frequency distribution of the studied nurses according to their knowledge related to adherence to infection prevention and control practices. More than half of the studied nurses (56%) had “moderate” knowledge and only (2%) of them had good knowledge.

Table (3): shows distribution of the studied nurses' practices according to adherence. The table shows that all of the studied nurses' practices “hand hygiene”, “personal protective equipment” as well as drain care were “poor”. “Surgical wound dressing” was to be applicable by nurses only in the National Medical Institute (18%) who all demonstrated “poor” adherence to aseptic technique. “Urinary catheterization” wasn't applicable in the four studied hospitals as they were carried out by the urosurgical staff. For urinary catheter care, the majority of the studied nurses (i.e 92%) were demonstrating “poor” adherence. Also, the majority (88%) demonstrated “poor” adherence to safe injection practices. Moreover, almost all of the nurses (i.e 94%) demonstrated “poor” adherence of handling soiled linen and waste management. Thus, the overall nurses' adherence to practice standards, was “poor” (100%) had “poor” adherence.

Table (4): presents comparisons among the studied hospitals according to nurses' practice. Statistically significant differences, were detected among the four hospitals “safe injection practices” where ($p=0.027$). No statistically significant differences, were detected among the studied four hospitals, nurses regarding other nurses' practices, as well as the “overall nurses' practice”, as determined different “P” values.

Table (5): Shows the relations between nurses' overall knowledge and nurses' socio-demographic characteristics.

Statistically significant relationships were found between the nurses' overall knowledge and the nurses' gender and attendance of training courses on infection prevention and control practices ($p=0.002$, $p=0.042$) respectively. No statistical significant relationships, could be identified between the nurses' overall knowledge and the studied nurses' name of hospital, age, marital status, educational level, years of experiences, terms of employment vaccination against hepatitis B virus and sharps-related injury ($p=0.133$, $p=0.747$, $p=0.070$, $p=0.082$, $p=0.102$, $p=0.601$, $p=0.328$, $p=0.296$) respectively.

Discussion

Infection prevention and control practice (IPCP) is basic to quality of care and to protect nurses, patients and communities from huge risks. According to WHO, Education and training is a core component for effective Infection prevention and control (IPC) programs. Lack of knowledge of IPC leads to obtain worse outcomes of the healthcare delivery (Alhumaid et al., 2021; Sahiledengle et al., 2018). Urological Nurse should play an important role in urinary catheter insertion, maintenance, and removal (Sobeih & Nasr, 2015). Nurses should be up to-dating knowledge and nursing skills to play important roles in infection control (Ayed, 2015). Statistical significant differences, were detected among the current study four hospitals “safe injection practices”, where ($p=0.027$). No statistical significant differences, were detected among the studied four hospitals, nurses regarding other nurses' practices, as well as the “overall nurses' practice”, as determined by different “P” values. **In relation to the current study nurses' overall knowledge and nurses' sociodemographic characteristics**, statistically significant relationships were found between the **nurses' overall knowledge and the nurses' gender and previous attendance of training courses** on IPCPs. These findings coincide with a study carried out by Marey et al. (2020) who reported that statistical

significant differences were found between **nurses' knowledge and their gender**. Also, these findings coincide with a study carried out by Mong et al. (2022) who reported that the female nurses had achieved significantly higher knowledge levels Rashmi and Dhakal (2021), also had similar findings. This results weren't supported by Ayed (2015) who reported that no significant statistical differences were found between **mean knowledge scores towards training course**. This might be reflecting the need for training for enhancing knowledge about IPCPs and adherence to IPCPs. These findings are not in line with a study carried out by **Algarni et al. (2019)** who reported **no** statistical significant relations **between mean knowledge & gender and their knowledge score & training courses**. **In the current study**, **no** statistically significant relationships, could be identified between the studied nurses' overall knowledge and their age, marital status, educational level, years of experiences, terms of employment as well as, vaccination against hepatitis B virus and sharp-related injuries. These findings are similar to those cited by Ayed (2015) **who** reported no statistical significant relations between mean knowledge scores and the studied nurses' age and years of experience. **Algarni et al. (2019)**, **also** reported no statistically significant relations between mean knowledge scores and the studied subjects' years of experience years of experiences. These former findings are not line with a study carried out by Mong et al. (2022) who reported that the studied subjects' knowledge scores were found to differ significantly by nurses' demographic characteristics. Work-related variables did not present any influence on nurses' knowledge level in that study. Nurses aged 25 and below had significantly lower knowledge scores, higher level of education subjects displayed significantly higher knowledge, levels and five or fewer years of experience in nursing also had lower knowledge scores than nurses who had six to 10 years of experience. The last findings agree with those obtained by a study carried

out by **Algarni et al. (2019)** who reported significant relations between subjects' knowledge and age.

Conclusion

The majority of the urosurgical nurses' in the four study settings had a lot of experience that enables them to be decision makers, despite their comparatively low level of education. More than half of the studied nurses (56%) had "moderate" knowledge and only (2%) of them had "good knowledge". The overall nurses' adherence to practice standards, was "poor" and (100%) had "poor" adherence. Statistically significant relationships were found between the nurses' overall knowledge and the nurses' gender and attendance of training courses on infection prevention and control practices. No statistically significant relationship could be identified between the studied nurses' socio-demographic characteristics, and their total practice scores. The majority of the urosurgical nurses' in the study settings demonstrated non-adherence to their practice to infection prevention and control practices (IPCPs).

Recommendation

In line with the study findings, it is recommended that:

For nurses: A system of monitoring nurses for adherence to IPCPs, has to be available from head nurse to instruct them. Recent, written policies and procedures guidelines need to be available in Arabic. Monitoring and feedback of nurses' adherence should be periodically, reported.

For organization: Visual reminders on IPCPs at points of care, have to available. Arabic visual posters about standard precautions, must be available, at all surgical units.

For future studies: Replication of the present study in other clinical settings, is highly advocated.

Table (1): Frequency distribution of the studied nurses according to their socio-demographic characteristics (n = 50)

Nurses' Socio-demographic Characteristics	No.	%
Name of Hospital		
The Main University Hospital	14	28.0
Gamal Abd El Nasser Health Insurance Hospital	7	14.0
Shark El Madena Hospital	20	40.0
The National Medical Institute, Damanhour	9	18.0
Gender		
Male	5	10.0
Female	45	90.0
Age in years		
20>30	16	32.0
30>40	17	34.0
40>50	17	34.0
Marital status		
Single	8	16.0
Married	39	78.0
Widow	1	2.0
Divorced	2	4.0
Educational level		
Secondary school nursing	39	78.0
Technician nursing diploma	10	20.0
Bachelor	1	2.0
Years of experiences		
<5	9	18.0
5<10	7	14.0
10<15	4	8.0
≥15	30	60.0
Terms of employment		
Contract	3	6.0
Permanent	47	94.0
Vaccination against hepatitis B virus		
Yes	43	86.0
No	7	14.0
Attendance of training courses on infection prevention and control practices		
Yes	48	96.0
No	2	4.0
History of sharps-related injuries		
Yes	3	6.0
No	47	94.0

Table (2): The frequency distribution of the studied nurses according to knowledge related to adherence to infection prevention and control practices (n = 50)

Nurses' knowledge related to Adherence to Infection Prevention and Control Practices	No.	%
Poor Knowledge	21	42.0
Moderate Knowledge	28	56.0
Good knowledge	1	2.0

Table (3): Distribution of the studied nurses' practices according to adherence level (n = 50)

Nurses' practice	Poor Adherence		Moderate Adherence		Good Adherence	
	No.	%	No.	%	No.	%
Hand Hygiene	50	100.0	0	0.0	0	0.0
Personal protective equipment (PPE)	50	100.0	0	0.0	0	0.0
Safe injection practices	44	88.0	6	12.0	0	0.0
Surgical wound dressing under aseptic technique (n = 9)	9	100.0	0	0.0	0	0.0
Urinary catheterization (n = 0)	0	N.A	0	N.A	0	N.A
Handling soiled linen	47	94.0	3	6.0	0	0.0
Waste management	47	94.0	3	6.0	0	0.0
Drain care	50	100.0	0	0.0	0	0.0
Urinary catheter care	46	92.0	4	8.0	0	0.0
Overall Nurses' practice	50	100.0	0	0.0	0	0.0

Table (4): Comparisons among the studied hospitals according to nurses' practice (n = 50)

Nurses' practice	Main University Hospital (n = 14)		Gamal Abd El Nasser (n = 7)		Shark El Madena (n = 20)		National Medical Institute (n = 9)		χ^2	MC p
	No.	%	No.	%	No.	%	No.	%		
Hand Hygiene										
Poor Adherence	14	100.0	7	100.0	20	100.0	9	100.0	-	-
Personal protective equipment (PPE)										
Poor Adherence	14	100.0	7	100.0	20	100.0	9	100.0	-	-
Safe injection practices										
Poor Adherence	14	100.0	7	100.0	14	70.0	9	100.0	7.397*	0.027*
Moderate Adherence	0	0.0	0	0.0	6	30.0	0	0.0		
Surgical wound dressing under aseptic technique										
Poor Adherence (n = 9)	0	0.0	0	0.0	0	0.0	9	100.0	-	-
Urinary catheterization practice (NA)	-	-	-	-	-	-	-	-	-	-
Handling soiled linen										
Poor Adherence	14	100.0	7	100.0	17	85.0	9	100.0	2.935	0.325
Moderate Adherence	0	0.0	0	0.0	3	15.0	0	0.0		
Waste management										
Poor Adherence	14	100.0	7	100.0	17	85.0	9	100.0	2.935	0.325
Moderate Adherence	0	0.0	0	0.0	3	15.0	0	0.0		
Drain care										
Poor Adherence	14	100.0	7	100.0	20	100.0	9	100.0	-	-
Urinary catheter care										
Poor Adherence	14	100.0	7	100.0	16	80.0	9	100.0	4.171	0.158
Moderate Adherence	0	0.0	0	0.0	4	20.0	0	0.0		
Overall Nurses' practice										
Poor Adherence	14	100.0	7	100.0	20	100.0	9	100.0	-	-
Moderate Adherence	0	0.0	0	0.0	0	0.0	0	0.0	-	-

χ^2 : Chi square test MC: Monte Carlo
 *: Statistically significant at $p \leq 0.05$

Table (5): Relations between nurses' overall knowledge and nurses' socio-demographic characteristics (n = 50)

Nurses' Socio-demographic Characteristics	Nurses' overall knowledge						χ^2	MCp
	Poor (n = 21)		Moderate (n = 28)		Good (n = 1)			
	No.	%	No.	%	No.	%		
Name of Hospital								
The Main University Hospital	5	23.8	8	28.6	1	100.0	8.728	0.133
Gamal Abd El Nasser Health Insurance Hospital	3	14.3	4	14.3	0	0.0		
Shark El Madena Hospital	6	28.6	14	50.0	0	0.0		
The National Medical Institute	7	33.3	2	7.1	0	0.0		
Gender								
Male	4	19.0	0	0.0	1	100.0	10.414*	0.002*
Female	17	81.0	28	100.0	0	0.0		
Age in years								
20>30	7	33.3	8	28.6	1	100.0	2.600	0.747
30>40	6	28.6	11	39.3	0	0.0		
40>50	8	38.1	9	32.1	0	0.0		
Marital status								
Single	5	23.8	2	7.1	1	100.0	12.275	0.070
Married	15	71.4	24	85.7	0	0.0		
Widow	1	4.8	0	0.0	0	0.0		
Divorced	0	0.0	2	7.1	0	0.0		
Educational level								
Secondary nursing	18	85.7	21	75.0	0	0.0	8.190	0.082
Diploma	2	9.5	7	25.0	1	100.0		
Bachelor	1	4.8	0	0.0	0	0.0		
Years of experiences								
<5	6	28.6	3	10.7	0	0.0	9.877	0.102
5<10	2	9.5	5	17.9	0	0.0		
10<15	2	9.5	1	3.6	1	100.0		
≥15	11	52.4	19	67.9	0	0.0		
Terms of employment								
Contract	2	9.5	1	3.6	0	0.0	2.018	0.601
Permanent	19	90.5	27	96.4	1	100.0		
Vaccination against hepatitis B virus								
Yes	20	95.2	22	78.6	1	100.0	3.165	0.328
No	1	4.8	6	21.4	0	0.0		
Attendance of training courses on infection prevention and control practices								
Yes	21	100.0	27	96.4	0	0.0	7.936*	0.042*
No	0	0.0	1	3.6	1	100.0		
History of sharps-related injuries								
Yes	0	0.0	3	10.7	0	0.0	3.188	0.296
No	21	100.0	25	89.3	1	100.0		

χ^2 : Chi square test MC: Monte Carlo *: Statistically significant at $p \leq 0.05$

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