

Effect of Aseptic Technique versus Routine Hospital Care on Prevention of Catheter Associated Urinary Tract Infection

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Abstract

Background: *The use of indwelling urinary catheters in hospitalized patients presents an increased risk of the development of complications, including catheter-associated urinary tract infection (CAUTI) which is considered the most common healthcare-associated infection (HAI). Using aseptic technique in the care of urinary catheter helps to minimize the risk of this complication. Objective:* *The aim of this study was to determine the effect of aseptic technique versus routine hospital care on prevention of catheter associated urinary tract infection. Setting:* *The study was carried out at the Urology departments of El-Zohor General Hospital, El-Mabra Health Insurance Hospital in Port Said City and urology and Nephrology Center in Mansoura University to test the hypothesis that catheter associated urinary tract infection will register low rate by using aseptic technique than using routine hospital care. Subjects:* *The study included 60 female adult patients in need for urethral catheterization for more than three days. They were equally divided into a study group for implementation of aseptic technique and a control group received the routine hospital care. Tools:* *Two tools were used for data collections. Tool one consisted of two parts part one included structured interview Sheet to assess patients' bio-socio demographic characteristics, information regarding catheter and drainage bag , knowledge regarding catheterization part two included observation checklist to assess implementation of aseptic technique during urinary catheter insertion and care. Tool two included urine culture schedule. Results:* *The results demonstrated that Positive urine culture was higher in the control group (50.0%) compared to (20.0%) in the study group (p=0.015). The study concluded*

that the incidence rate of UTI among patients with urinary catheter can be decreased through using of aseptic technique compared to using of routine hospital care.

Recommendations: *The study recommended the necessity of using aseptic technique practices for insertion and care of indwelling urinary catheter in the study setting and in other similar settings. Providing nurses with ongoing in-service education and training stressing the practices of aseptic technique and correct urinary catheter care.*

Keywords: Urinary Catheter, Aseptic Technique, Urinary Tract Infection

Introduction

Patients have a right to be protected from infection and healthcare staff has a duty to safeguard the wellbeing of their patients. Poor asepsis can lead to the risk of cross transmission of micro-organisms from the healthcare worker's hands (HCW) and/or the equipment to susceptible patient sites and from the environment which can result in serious life threatening infections⁽¹⁾.

Urinary catheter considered one of the most invasive medical devices used in the acute care setting. It involves introducing hollow tube through urethra and into the bladder. The catheter provides continuous flow of urine in patients unable to control micturition or those with obstruction⁽²⁾. Urinary catheters are a necessity for a substantial percentage of the population, including hospitalized patients, residents in long-term care institutions, and those with various urological or genitourinary disorders⁽³⁾.

Urinary tract infection (UTI) is the single most common hospital-acquired infection, and many cases of nosocomial UTI are associated with an indwelling urinary

catheter. Nearly 25% of hospitalized patients are catheterized yearly and 10% develop^(4,5,6). Urinary tract infections account for approximately 40% of all health care associated infections (HCAIs) annually. Fully 80% of these hospital-acquired urinary tract infections are attributable to indwelling urethral catheters. Over one million nosocomial UTIs occur per year^(7,8,9).

Individuals requiring an indwelling catheter are predisposed to the development of CAUTI due to the presence of an indwelling catheter device. The introduction of a catheter into the bladder circumvents the body's normal defense mechanisms and enables micro-organisms to track up the external catheter surface into the bladder^(10,11). Each day the urinary catheter remains in place the risk of infection associated urinary catheter increases 5% per day. Consequently, it can be estimated that 100% of the patients are colonized after 20 days of catheterization^(12,13).

Prevention of Urinary Tract Infection

Catheter associated urinary tract infection (CAUTIs) are painful for patients and costly for hospitals due to increased length of stay and use of additional resources. Each hospital-acquired (UTI) results in an increased length of stay of 5-6 days in hospital and has additional cost implications for treatments so, whenever possible, catheterization should be avoided and when it is deemed necessary it should be performed using careful strict aseptic technique (14, 15, 16).

Centers for Disease Control and Prevention Guidelines (CDC, 2008) reported that not all CAUTIs can be prevented, but it is believed that a large number can be avoided by the proper management of the indwelling urinary catheter by using infection control measures, an estimated 17% to 69% of (CAUTI) may be prevented. In places where infection control programs can be implemented reduction of morbidity and mortality had proven. (17).

Aseptic technique represents patients' last line of defense from microorganisms during invasive clinical procedures. In terms of preventable healthcare-associated infections (HCAIs), aseptic technique can be seen as the most common and critical infection prevention practice in healthcare setting (18). Effective aseptic technique is dependent on healthcare organizations taking a systematic approach to asepsis management in general. The effective education and training of healthcare workers is paramount (19).

Nurses have the unique opportunity to directly reduce health care associated infections through recognizing and applying evidence based procedures to prevent HAIs among patients and protecting the health of the staff. Clinical care nurses directly prevent infections by performing, monitoring, and assuring compliance with aseptic work practices; providing knowledgeable collaborative oversight on environmental decontamination to prevent transmission of microorganisms from patient to patient (20).

Urinary catheterization is usually carried out by nurses, who have a professional responsibility to be aware of the risks of infection related to the procedure. Failure to maintain professional knowledge and competence or failure to identify and minimize risk to patients in relation to aseptic technique could be viewed as a failure to meet the standards set out in Nursing (21, 22). So, the main concern of the study was to determine the effect of aseptic technique versus routine hospital care on prevention of catheter associated urinary tract infection

Aim of Study

The aim of this study was to determine the effect of aseptic technique versus routine hospital care on prevention of catheter associated urinary tract infection.

Research hypothesis:

Catheter associated urinary tract infection will register low rate by using aseptic technique than using routine hospital care.

Materials and Method

Materials

Design: A quasi-experimental research design was used in this study.

Setting: The study was conducted at the urology departments of El-Zohor General Hospital and El-Mabra Health Insurance Hospital in Port Said City and Urology and Nephrology Center in Mansoura University.

Subjects: The subjects of the study included 60 patients in need of indwelling urinary catheter. Patients were selected according to the following criteria female patients who need urethral catheterization for more than three days, on closed urinary drainage system and free from urinary tract infection as proved by first urine culture test.

The sample size was calculated to estimate prevalence rate of catheter associated urinary tract infection of 1.57 %⁽²³⁾. With 3% absolute precision and a 95% level of confidence, using the single proportion equation for dichotomous variables⁽²⁴⁾. After correction for a dropout rate of about 10%, the required sample size was 30 patients; patients were divided into studied and control group. 30 patients in each

group .The total sample size were 60 patients.

Tools: Two tools were used in this study Tool I and II were developed by the researcher based on the Identified standards of care needed for care of patients with indwelling urethral catheters and through reviewing the relevant literature.

Tool (I): Structured Interview Schedule:

It includes two parts:

Part (I): included:

a- Bio-Socio-demographic Characteristics of Patients, e.g. age, sex, marital status, level of education, occupation , past and present medical history, present diagnosis, concomitant disease ,current drug intake, previous history of urinary tract infection, hospitalization and catheterization.

b- Information regarding catheterization: reason of catheterization, type of catheter, size, material of catheter, catheter needed to be changed and uribag needed to be changed E-knowledge regarding catheterization

Part (II): It includes observation checklists to assess the implementation of aseptic technique during urinary catheter insertion and care and it includes:

a- Item related to preparation of equipments for urinary catheter insertion. It included observation of the following:

Prevention of Urinary Tract Infection

hand washing before preparing equipments, preparing of sterile equipment and other equipments needed in urinary catheter insertion

b- Items related to preparation of patient for urinary catheterization and catheter insertion technique. It included observation of the following: position of the patient, technique of perineal care, hand washing before procedures, using sterile gloves, attaching the end of catheter to the drainage collector catheter , applying sterile drape, cleansing the urethral meatus using sterile technique, lubricating and inserting catheter slowly , securing the catheter ,attaching drainage bag and recording procedures .

c- Items concerned with catheter care for maintaining the integrity of the sterile closed drainage system and preventing the complications associated with urinary catheter. It included observation for essential aspects of nursing care as checking catheter patency, fixation of catheter position of catheter and uribag, inspecting skin surrounding catheter, daily meatal care, mobilization of patient, time of draining bag evacuation, measuring fluid intake and output. In addition to the items related to health teaching given to the patients about care of catheter

d- Items represented the steps of collecting urine specimen for bacterial culture.

e- Assessment of problems that may arise while catheter in situ as leakage, blockage and

disconnection of the tube. It also included signs and symptoms of urinary tract infection.

Tool II: consisted of urine culture sheet.

Method

Preparatory Phase

It included reviewing of literatures related to the problem and theoretical knowledge of various aspects of the problem using books, articles, periodicals and magazines to develop tools for data collection

Content validity

The validity of the study tools was done through experts' opinions. Eleven experienced professionals in the medical surgical nursing discipline, as well as in medicine reviewed the materials for comprehensiveness and relatedness. After rigorous revision by the experts, the tools were finalized based on their recommendations.

Pilot Study

Pilot study was conducted on 10% of subjects. It was done to test the clarity and practicality of the tools, the results of the data obtained from the pilot study helped in modification of the tools; items were corrected or added as needed. Accordingly, modifications were done and the final form was developed .The subjects of the pilot

study were not included in the main statistical sample

Field Work

Field study was conducted during the period from the beginning of May (2012) to the end of October (2012). The researcher visited the hospitals to collect the data by using previous tools. Convenient patients attending the study setting and fulfilling the eligibility criteria were asked to participate in the study. Those who gave their consent were subjected to interviewing using the study tool. They were then randomly assigned to either the study or the control groups. In the patients assigned to the study group, catheter insertion was done under aseptic technique by the researcher in El-Zohor General Hospital and El-Mbra Health Insurance Hospital in Port Said City while in Urology & Nephrology Center in Mansura University it was inserted by urologist according to hospital policy. (In the patients assigned to the control group, catheter insertion was done according to hospital routine care by both urologist and nurses. A urine sample was taken and analyzed immediately after catheter insertion to ensure they are free from urinary tract infection then; a urine sample was collected from each patient in both groups and sent to the laboratory for culture. Catheter insertion and subsequent care for control group were observed using

observational checklist (**appendix I**). The nurses were observed during their clinical practice. For study group, insertion of catheter and continuing care was done by the researcher following aseptic technique and procedures checklist (**appendix I**). After three days, a second urine sample was collected from patients of both groups sent to the laboratory for culture test.

ADMINISTRATIVE DESIGN

An official permission for data collection was obtained from directors of El-Zohor General Hospital and El-Mbra Health Insurance Hospital in Port Said City, Urology & Nephrology center in Mansura University and head of urology departments. A formal letter from the Dean of the Faculty of nursing Port Said University was submitted. The aim of the study and procedures were explained to them to attain their cooperation

Ethical Considerations:

The agreement for participation of the subjects was taken after aims of the study had been explained to them. A verbal informed consent was obtained from the patients to ensure willingness to engage in the study after explaining its purpose. They were informed about their rights to refuse or withdraw at any time with no consequences on their care. The study interventions could not have any

harmful effect on participants and they were assured that the information collected would be treated confidentially and used for the research purpose only

Statistical Analysis

At the end of the fieldwork, data sets obtained in different body postures were coded and transformed into coding sheets.

The following statistical measures were used:

- Number and percent distribution of the studied data for each patient were calculated.
- The collected data were organized, tabulated and statistically analyzed using statistical package for social sciences (SPSS) version 16 (SPSS, Chicago, USA).
- All data were in categorical manner, and frequency and percent distribution were calculated.
- For comparison between groups the chi square (X^2) or Fisher exact test were used.

For interpretation of results, the p value ≤ 0.05 was considered significant. Significant results were signed by asterisk (*) while NS was used for non significant differences

Results

Table (1) shows comparison of the socio-demographic characteristics of patients in the study and control groups. It

revealed that the most common age group in both study and control groups was from 41 to 60 years (56.7% and 70.0% respectively) with total (63.3%) of patients. As regards marital state in both study and control groups, the highest percentages of patients were married (83.3% and 90.0% respectively). Regarding educational level the highest percentage of patients (40.0%) in study group were secondary educated while in control group 46.7% of patients were illiterate with statistically significant difference ($p=0.003$). Finally more than half the patients in study and control groups were housewives (66.6%, 80% respectively).

Table (2) shows the comparison of the results of urine culture among patients in the study and control groups. It revealed that second urine culture results in study group one fifth of patients (20.0%) had positive urine culture samples. In control group half of patients (50.0%) had positive urine culture with a total of (35.0 %). Regarding type of microorganism, E-coli was high in both studied and control group (13.3%, 36.7% respectively) with a total of (25.0%), and there were statistically significant differences between study and control groups regarding second sample

results, and type of microorganism ($p=0.015, 0.041$ respectively).

Table (3) shows the results of urine culture according to concomitant diseases among patients in study and control groups. It revealed that there was statistically significant difference between concomitant diseases and results of urine culture, patients without concomitant disease ($p=0.008$) and patients with diabetes ($p=0.040$) in the two groups.

Table (4) shows the results of urine culture according to patients' preparation for urinary catheterization in study and control groups. It revealed that there were statistically significant difference between patient preparation for urinary catheterization and results of urine culture test in the two groups regarding washing perineal area with soap and water or saline removing and disposing gloves, wearing sterile gloves, cleansing the ureteral meatus using aseptic technique ($p=0.004$) for each and attaching the end of catheter to the drainage collector ($p=0.001$).

Table (5) shows the results of urine culture according to urinary catheter care and health teaching for patient about care of urinary catheter in study and control groups. It revealed that, there were statistically significant differences between urinary catheter care and results of urine culture regarding, hand washing before handling catheter, wearing disposable

gloves, urine received in clean container, assessing urethral meatus, cleansing perineum with soap and water, maintaining patency of catheter, checking character of urine, encourage fluid intake and maximum mobility, checking securing of urinary drainage system, keeping drainage bag from touching the floor and health teaching for patient about care of urinary catheter ($p=0.001$)

Discussion

Most nurses are aware of the importance of aseptic technique but some may be unsure about applying the technique during urinary catheterization. So, the main concern of the present study was to determine the effect of aseptic technique versus routine hospital care on prevention of catheter associated urinary tract infection.

As regards socio-demographic characteristics of patients in relation to age the finding of present study showed that, there was no statistically significant difference between the patients' age and results of urine culture. This finding is supported by Inyama et al. (2011)⁽²⁵⁾ who reported that, the relationship between the patients' age and growth of microorganism in their urine was not statistically significant. This finding

Prevention of Urinary Tract Infection

disagrees with Talaat et al. (2010)⁽²³⁾ who mentioned that patients above 40 years of age had a significantly higher risk of acquiring CAUTIs.

Furthermore, in the present study there was no statistically significant difference between marital status and result of urine culture. This finding is in accordance with Lafi (2010)⁽²⁶⁾ who demonstrated there is no association between marital status and occurrence of UTI. This finding disagrees with Chedi et al. (2009)⁽²⁷⁾ who said that married women are more likely to get UTI than their single or widowed counterparts.

As regards patient preparation for urinary catheterization regarding hand washing before urinary catheterization procedures there were statistically significant differences between study and control groups and there were statistically significant difference between hand washing and results urine culture in the two groups. This finding was in accordance with Royal College of Nursing (2012)⁽²⁸⁾ which concluded that many health care professionals, including nursing staff, do not perform hand hygiene as often as is required. Health care workers have the greatest potential to spread micro-organisms that may result in infection.

Additionally as regards washing perineal area with soap & water, removing and disposing gloves, there were statistically significant differences between

study and control groups. These findings were supported by Tsuchida et al. (2008)⁽²⁹⁾ who reported that nurses had been taught the principles of infection control; however, they may not be able to interpret and implement these principles into practice.

In this respect, there were statistically significant differences between patient preparation for urinary catheterization and results of urine culture in the two groups regarding washing perineal area with soap & water, removing and disposing gloves. These findings are supported by Talaat et al. (2011)⁽²³⁾ who mentioned that many risk factors associated with acquiring CAUTIs in Alexandria University Hospitals reflected lack of use of infection control measures, e.g., hand washing and use of aseptic techniques during catheter insertion.

Regarding wearing sterile gloves, applying sterile drape, cleansing the urethral meatus using sterile technique, there were statistically significant differences between studied and control groups. This finding could result from lack of nurses' awareness of the importance of preparing sterile equipment and following medical and surgical asepsis to prevent urinary tract infection associated with catheter. This result is in line with Yousef (2009)⁽³⁰⁾ who

Prevention of Urinary Tract Infection

reported that regarding nurse's practice there was unsatisfactory level of practice regarding the use of appropriate sterile instruments in the procedures. This finding disagrees with Fink et al. (2012)⁽³¹⁾ who reported that most hospitals routinely used sterile technique during indwelling urinary catheter placement insertion.

Moreover, there were statistically significant differences between patient preparation for urinary catheterization and results of urine culture in the two groups regarding wearing sterile gloves, cleansing the urethral meatus using aseptic technique. This finding is supported by Conway & Larson (2012)⁽³²⁾ who reported that all authors advised using aseptic technique and sterile equipment for inserting catheters in acute-care settings for prevention of CAUTI.

These findings disagreed with Dutta et al. (2012)⁽³³⁾ who stated that techniques (sterile and clean) were found to be equally effective in preventing bacteriuria. Similarly Carapeti et al. (1996)⁽³⁴⁾ reported that There was no statistically significant difference between , sterile or clean/ technique with respect to the incidence of catheter associated bacteriuria, but the sterile method was more than twice as expensive

As regards results of urine culture the present study revealed that in the study group, one fifth of patients had positive urine culture while in control group half of

patients had positive urine culture and there was statistically significant difference between studied and control groups regarding second results of urine culture. This finding is supported by Vieira (2009)⁽³⁵⁾ who observed that the risk of infection is reduced after standardization of aseptic techniques for bladder catheter insertion and maintenance.

As regards type of microorganism the present study revealed that E-coli was high in both the study and control groups. This finding is supported by Inyama et al. (2011)⁽²⁵⁾ who said that E. coli is the most prevalent microorganism isolated and was prevalent among the female patients. This could be due to the close proximity of the urethral catheter to the anal passage. This finding disagreed with Wagenlehner (2006)⁽³⁶⁾ who reported that, the most frequently isolated microorganism was Candida followed by E. coli

As regards urinary catheter care and health teaching for patient about care of urinary catheter the study results revealed that, there were statistically significant differences between hand washing before handling catheter, wearing disposable gloves and results of urine culture. This result is in line with Bond and Harris (2005)⁽³⁷⁾ and Pratt et al, (2007)⁽¹⁾ who reported

Prevention of Urinary Tract Infection

that, hand hygiene and appropriate use of personal protective equipment, such as gloves had a vital importance in preventing the risk of UTI.

Concerning cleansing perineum with soap and water, there was statically significant difference between cleansing perineum with soap and water and results of urine culture. This finding is congruent with (SARI) National Committee (2011)⁽³⁸⁾ which clarified that, the meatus washing with soap and water, during daily routine bathing or showering, is all that is required in prevention of CAUTI. This finding is contradicted by Healthcare Infection Control Practices Advisory Committee (2009)⁽³⁹⁾ and Willson, et al. (2009)⁽⁴⁰⁾ who reported that there was no difference in the risk of bacteriuria in patients receiving periurethral care regimens compared to those not receiving them and more study is needed to determine if perineal cleansing has a statistically significant effect on CAUTI rates.

In addition, the results of the current study presented that, there were statically significant differences between maintaining patency of catheter, keeping drainage bag from touching the floor and results of urine culture. These findings are in line with Society of Urologic Nurses and Associates (2010)⁽⁴¹⁾ which reported in clinical practice guidelines for prevention of CAUTI that unobstructed urine flow should be maintained and never disconnect

the tubing. The drainage bag must never touch the floor.

Also, the present study results revealed that there was statistically significant difference between checking securing of urinary drainage system and results of urine culture. This finding is supported by Turner and Dickens (2011)⁽⁴²⁾ who found that it is vital to fix the drainage device securely to prevent, discomfort and infection. This finding disagreed with Hooton et al. (2010)⁽⁴³⁾ who found that indwelling catheters are usually anchored to minimize movement and urethral trauma, but it is not clear whether anchoring helps to reduce CA-bacteriuria.

Moreover the present study results revealed that, there was statistically significant difference between health teaching for patient about care of urinary catheter and results of urine culture. This finding is in agreement with Sauter (2011)⁽⁴⁴⁾ who found that CAUTI prevention began with educating the patient and family about the patient's current condition and explaining why the patient required a urinary catheter.

Conclusion

From findings of this study, it can be concluded that:

The incidence rate of urinary tract infection among patients with urinary catheter can be decreased through using of aseptic technique for management of urinary catheter compared to using of routine hospital care. This is demonstrated through symptoms and signs and laboratory results.

The risk factors associated with acquiring catheter associated urinary tract infection in the present study are: diabetes mellitus, lack of use of infection control measures, e.g., hand washing ,using sterile equipments, cleansing perineum area using aseptic technique, securing catheter to patient body, wearing gloves, attaching the end of catheter to the drainage collector before catheter insertion, keeping drainage bag from touching the floor, checking securing of urinary drainage system cleansing perineum with soap and water after bowel movement, maintaining patency of catheter, checking character of urine, encouraging fluid intake and maximum mobility and health teaching for the patient about care of catheter.

Recommendations

In the light of the findings of this study, the following is recommended:

- Providing ongoing in service education for nurses to update their

knowledge related to care of patients with indwelling urethral catheter and catheter – associated problems.

- Using of aseptic technique practice for insertion and care of indwelling urinary catheter
- Nurses who take care of catheter should be given periodic in-service training stressing the practices of aseptic technique and correct urinary catheter care.
- Teaching of catheterized patients and their caregivers the necessary instructions to manage their catheter and urine drainage bag and also provide them with booklets containing information related to catheter care.

Table (1): Comparison of the socio-demographic characteristics of patients in the study and control groups

	Study Group (N=30)		Control group (N=30)		Total		Statistics	
	Total		Total		N	%	X ²	p-value
	N	%	N	%				
Age group (years)	10	33.3%	6	20.0%	16	26.7%	1.42	0.49
From 20 – 40	17	56.7%	21	70.0%	38	63.3%		
From 41 – 60	3	10.0%	3	10.0%	6	10.0%		
More than 60								
Marital state							1.22	0.45
Married	25	83.3%	27	90.0%	52	86.7%		
Single	1	3.3%	0	0.0%	1	1.7%		
Window	4	13.3%	3	10.0%	7	11.7%		
Educational level	11	36.7%	14	46.7%	25	41.7%	10.48	0.003*
Illiterate	1	3.3%	8	26.7%	9	15.0%		
Primary	2	6.7%	2	6.7%	4	6.7%		
Preparatory	12	40.0%	5	16.7%	17	28.3%		
Secondary	4	13.3%	1	3.3%	5	8.3%		
University or more								
Occupation							1.36	0.24
Housewife	20	66.7%	24	80.0%	44	73.3%		
Working	10	33.3%	6	20.0%	16	26.7%		

*significant at P≤0.05

Table (2): Comparison of the results of urine culture among patients in the study and control groups

	Study group (n=30)		Control group (n=30)		Total		Statistics	
	Total A		Total R		N	%	X ²	P-value
	N	%	N	%				
First sample							0.001	1.0
Negative	30	100.0%	30	100.0%	60	100.0%		
Positive	0	0.0%	0	0.0%	0	0.0%		
Second sample							5.93	0.015*
Negative	24	80.0%	15	50%	39	65%		
Positive	6	20.0%	15	50%	21	35%		
Type of micro-organism	4	13.3%	11	36.7%	15	25%	4.60	0.041*
E coli	2	6.7%	4	13.3%	6	10%		
Klebsiella								

Table (3): Results of urine culture according to concomitant diseases among patients in the study and control group

Variables	Negative (39)						Positive (21)						Total		Statistics	
	Study group N=24		Control group N=15		Total		Study control N=6		Control group N=15		Total		N	%	X ²	P-value
	N	%	N	%	N	%	N	%	N	%	N	%				
None	10	41.7	4	26.7	14	35.9	1	16.7	0	0.0	1	4.8	15	25.0	7.05	0.008*
Diabetes	11	46	8	53.3	19	48.7	5	83.3	11	73.3	16	76.2	35	58.3	4.23	0.040*
Hypertension	10	41.7	8	53.3	18	46.2	5	83.3	11	73.3	16	76.2	34	56.7	2.30	0.12
Hepatitis	1	4.2	0	0.0	1	2.6	2	33.3	1	6.7	3	14.3	4	6.7	3.01	0.08
Ischemic heart disease	1	4.2	1	6.7	2	5.1	1	16.7	1	6.7	2	9.5	4	6.7	0.42	0.51
Hyperthyroidism	0	0.0	1	6.7	1	2.6	0	0.0	0	0.0	0	0.0	1	1.7	0.54	0.44
Anemia	0	0.0	1	6.7	1	2.6	0	0.0	0	0.0	0	0.0	1	1.7	0.54	0.44

Table (4): Results of urine culture according to patients' preparation for urinary catheterization in study and control groups

Variables	Negative (39)						Positive (21)						Total		Statistics	
	Study group N =24		Control group N=15		Total		Study group N =6		Control group N=15		Total					
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	X ²	P-value
Explaining procedure to the patient	24	100	15	100	39	100	6	100	15	100	21	100	60	100	0.001	1.0
Maintain patient privacy	24	100	15	100	39	100	6	100	15	100	21	100	60	100	0.001	1.0
Positioning the patient appropriately	24	100	15	100	39	100	6	100	15	100	21	100	60	100	0.001	1.0
Draping patient with blankets	24	100	15	100	39	100	6	100	15	100	21	100	60	100	0.001	1.0
Washing hands	24	100	13	86.6	37	94.9	6	100	8	53.3	14	66.7	51	85.0	8.51	0.004*
Wearing disposable gloves	24	100	15	100	39	100	6	100	15	100	21	100	60	100	0.001	1.0
Washing perineal area with soap & water	24	100	13	86.6	37	94.7	6	100	8	53.3	14	66.7	51	85.0	8.51	0.004*
Removing and dispose gloves	24	100	13	86.6	37	94.9	6	100	8	53.3	14	66.7	51	85.0	8.51	0.004*
Wearing new sterile gloves	24	100	13	86.6	37	94.9	6	100	8	53.3	14	66.7	51	85.0	8.51	0.004*
Attaching the end of catheter to the drainage collector	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.1	40	66.7	11.86	0.001*
Applying sterile drape	24	100	13	86.6	37	94.9	6	100	8	53.3	14	66.7	51	85.0	8.51	0.004*
Cleansing the urethral meatus using aseptic technique	24	100	13	86.6	37	94.9	6	100	8	53.3	14	66.7	51	85.0	8.51	0.004*

Table (5): Results of urine culture according to urinary catheter care and health teaching for patient about care of urinary catheter in the study and control groups

Variables	Negative (39)						positive(21)						Total		Statistics	
	Study group N=24		Control group N=15		Total		Study group N=6		Control group N=15		Total					
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	X ²	P-value
1-Hand washing Before handling catheter	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.1	40	66.7	11.86	0.001*
2-Hand washing after a handling catheter	24	100	15	100	39	100	6	100	15	100.0	21	100	60	100.0	0.001	1.0
3-Wearing disposable gloves	24	100	8	53.3	32	82.2	6	100	2	13.3	8	38.1	40	66.7	11.86	0.001*
4- Antiseptic solution was applied to the tape	2	8.2	0	00.0	2	51.1	3	50	0	100	3	14.3	5	8.3	1.49	0.22
5-Urine received in clean container	10	41.7	8	53.3	18	46.1	0	0.0	2	13.3	2	9.5	20	33.3	11.86	0.001*
6-Assessing urethral meatus	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.3	40	66.7	11.86	0.001*
7- cleansing perineum with soap and water	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.3	40	66.7	11.86	0.001*
8- Maintaining patency of cath. By	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.3	40	66.7	11.86	0.001*
9-Encourage fluid intake	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.3	40	66.7	11.86	0.001*
10-Checking securing of urinary drainage system and character of urine	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.3	40	66.7	11.86	0.001*
11- Encouraging maximum mobility	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.3	40	66.7	11.86	0.001*
12-Keeping drainage bag from touching the floor	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.3	40	66.7	11.86	0.001*
13-Health teaching for the patient	24	100	8	53.3	32	82.1	6	100	2	13.3	8	38.3	40	66.7	11.86	0.001*

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