DOI: https://doi.org/10.53350/pjmhs2023172681

ORIGINAL ARTICLE

Practices Regarding Safe Urinary Catheterization among Healthcare Workers

AMINA AFTAB[1], SADIQ JAN[2], SABEEN KHAN[3], LALA RUKH[4]
[1]Assistant Professor, Obs/ Gynae, IIMC- T, Rawalpindi
[2]Associate Professor, Obs/ Gynae, IIMC- T. Rawalpindi
[3]Consultant Gynaecologist, MEDICSI, Islamabad
[4]Women Medical Officer, Social Security Hospital, Islamabad
Corresponding author: Amina Aftab, Email: Amina.aftab@riphah.edu.pk

ABSTRACT

Objective: To assess the knowledge and practices regarding safe urinary catheterization among health care workers
Study Design: It was a Cross sectional observational study.
Methodology: Ninety two health care workers were interviewed in two hospitals from April 2022 to July 2022. A questionnaire was designed about individual and departmental practices of urinary catheterization, including the practice of hand hygiene, wearing gloves, maintaining a sterile barrier and using a non-touch gentle insertion technique and post insertion catheter care.
Results: Fifty respondents were doctors, while 42 were paramedics. Hand washing and using sterile gloves were reported by 67.3% and 91.2% respectively. 71.7% cleaned the area with antiseptic but only 56.5% practiced appropriate method. 67.3% had a separate sterile catheterization tray. 68.5% respondents inserted the catheter without touching its tip. Other safety measures including arrangement of prefilled syringe for inflation of balloon (89.1%), clear visualization of urethral meatus (90%), gentle insertion (84.7%), confirmation of urine flow (86.9%), and holding the catheter in place while balloon inflation (82.6%) were variably practiced. 61.9% had mistakenly passed the catheter into vagina instead of urethra at some occasion in life. 83.6% thought it necessary to hang the urine bag on bed side for safe care, but more than 84% frequently found the urine bags on the floor in their wards.
Conclusion: Safe urinary catheterization practices need to be improved. Units must develop set protocols to reduce the incidence of catheter associated morbidity. This can be achieved by continuous training and audit within the department.
Keywords: urinary catheter, urinary tract infection, patient safety.

INTRODUCTION

Patient safety has become an increasingly important concern of organizations as well as patients during recent years. Health authorities are establishing guidelines for assurance of patient safety to minimize the risks associated with treatment and care in the hospitals. Prevention of hospital acquired and treatment related infections is one of the six international patient safety goals. Adverse events due to unsafe care have been reported as one of the ten leading causes of death and disability in the world[1]. In high-income countries, it is estimated that one in every 10 patients gets some harm while receiving hospital care [2]. The harm can be caused by a range of adverse events. And it is found that nearly 50% of these factors are preventable[3]. Hospital acquired infections occur in 7 and 10 percent of patients in high-income countries and low- and middle-income countries respectively[4]. Catheter associated urinary tract infection (CAUTI) is one of the most common hospital related infections. About one in four hospitalized patients may need to be catheterized for some indication5 (ghuri SK)The Centre for Disease Control and Prevention (CDC) defines CAUTI as "a UTI where an indwelling urinary catheter was in place for more than 2 calendar days on the date of the event"[6] CDC. The risk of acquiring bacteriuria has been estimated to be 1-3% With each catheterization[7]. This risk is likely universal by the end of three weeks with an indwelling catheter and over 50% with intermittent catheterization (IC)[7]. A local study in Pakistan has reported CAUTI to be about 80% among all hospital acquired infections[8]. This risk can be minimized by keeping the catheter system closed and further keeping the catheter in place for shortest time required.

This study was conducted to get an insight into individual practices and perception of health care workers about various safety measures regarding urinary catheterization. .

MATERIAL AND METHODS

Ninety two health care workers were interviewed. **S**ample size was calculated by software Raosoft after calculating total number of doctors/ paramedics predominantly responsible for urinary catheterization of female patients in one public and one private sector hospital in Rawalpindi and Islamabad. They included post graduate trainees, house officers, medical officers, nurses and midwives. Most of them were working in obstetrics/ Gynaecology department and Emergency wards, so were frequently involved in catheterization of female patients as well as post-operative catheter care. They were interviewed on a predesigned performa. The performa included assessment of their knowledge and practices regarding correct method and safety techniques including hand washing, use of sterile gloves, proper method of cleaning the area before catheterization, non-touch technique of catheter insertion, as well as care of the catheterized patients in their departments.

RESULTS

Fifty respondents (54.3%) were doctors, while 42 (45.6%) were paramedics. Sixty two (67.3%) respondents had to catheterize the patients less than 10 per week, and thirty (32.6%) used to pass catheter more than ten times a week. Hand washing and using sterile gloves were reported by 67.3% and 91.2% respectively. 43 (46.7%) always cleaned the vulva with antiseptic solution before passing the catheter, 23 (25%) usually practiced it and 26(28.2%) reported that they never cleaned the area. Only 52 (56.5%) practiced appropriate method of cleaning the area with only one swab per wipe and cleaning the vulva from top to bottom and with three swabs. 67.39% had a separate sterile catheterization tray in their wards. Sixty three (68.5%) respondents inserted the catheter without touching its tip. Other safety measures including arrangement of prefilled syringe for inflation of balloon (89.1%), clear visualization of urethral meatus (90.2%), antiseptic use (78.3%), gentle insertion (84.7%), confirmation of urine flow before inflating the balloon (86.9%), and holding the catheter in place while balloon inflation (82.6%) were variably practiced. Fifty seven respondents (61.9%) had mistakenly passed the catheter into vagina instead of urethra at some occasion in life.

When we asked question about post catheterization care especially care of the perineal hygiene and care of urinary drainage bag, the answers were quite disappointing, as although 83.6% thought it necessary to hang the urine bag on bed side for safe care, but more than 84% frequently found the urine bags on the floor in their wards.

Table 1:

Survey	Yes	No	Always	Often/ usually	Seldom	Never
Hand washing	62 (67.3%)	30 (32.6%)	37 (40.2%)	25(27.1%)		30 (32.6%)
Use of sterile gloves	84 (91.2%)	8 (8.6%)	70 (76%)	14 (15.2%)		8 (8.6%)
Clean area			43 (46.7%)	23 (25%)		26 (28.2%)
Prefilled syringe	82 (89.1%)	10 (10.9%)				
Antiseptic application on catheter tip	72 (78.3%)	20 (21.73%)				
Non touch catheter tip insertion	63 (68.5%)	29 (31.5%)				
Slow/ gentle insertion	78 (84.7%)					
Clear visualization of urethral meatus	67 (90%)	8 (10%)				
Confirm urine flow	80 (86.9%)	12 (13.6%)				
Holding catheter tip in place	76 (82.6%)	16 (17.3%)				
Mistaken insertion into vagina	57 (61.9%)	35 (38.04%)				
Do you think it necessary to hang the urine bag	77 (83.6%)	15 (16.30%)				
How often you see urine bag lying on the floor on bedside			19 (20.6%)	59 (64.1%)	14 (15.2%)	

Table 2: Doctors vs. paramedics, non-touch insertion, urine bag on floor. Healthcare workers

HCW	No. (%)	HCW	No. (%)
Doctors	50 (54.3%)	House Offices	16 (17.39%)
		Postgraduate Trainees	34 (36.9%)
Paramedic Staff	42 (45.6%)	Nurses	23 (25%)
		Midwives	19 (20.6%)

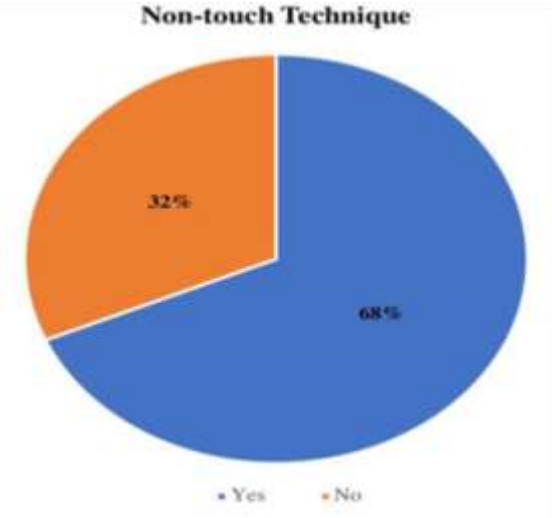

Figure 1:

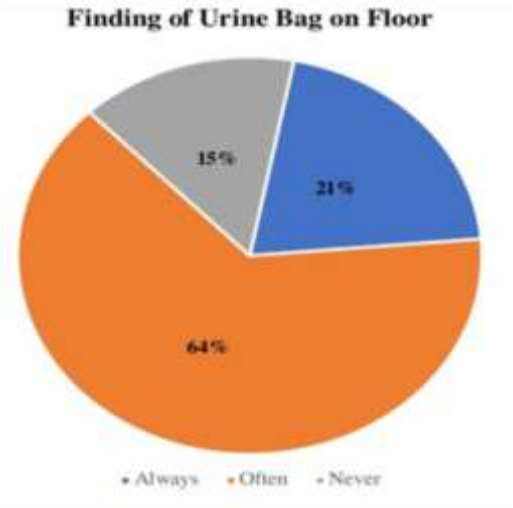

Figure 2:

DISCUSSION

Indwelling urinary catheters, first introduced in 1920 by Foley[7], are used in the care of more than five million patients per year[9] . The prevalence ranges from 4-25% in home and acute care respectively[9]. In the initial years the catheters were drained into open buckets by the attached tubes. It was called open drainage system. In 1950s for the first time, closed drainage system was introduced because of high incidence of catheter associated bacteriuria which usually developed within 4 days with open drainage system[7].Closed system has now become the standard for patients requiring indwelling urethral catheters.

Common indications for use of indwelling catheters in hospitalized patients include Surgery, urine output measurement, urinary retention and urinary incontinence. Bacteria can get entry into the catheter and the urinary bladder during insertion of catheter, through gap between the urethral mucosa and catheter, or during opening of the closed drainage system while emptying of the urine bag[10]. The incidence of bacteriuria is 1-3% per catheterization[11]. CAUTIs account for approximately 40% of hospital acquired infections and are associated with severe morbidity[12]. It has been emphasized in literature that technical and sociodaptive factors are responsible for this phenomenon[13]. Technical factors include care for appropriate indication of catheter use, taking care of aseptic measures while catheter insertion and assuring closed drainage of urine[13]. Socio-adaptive factors refer to attitudes and behaviors of individuals as well as hospital units to minimize catheter associated UTI[13]. In short-term catheterization, common bacteriuric species such as Escherichia coli are isolated. Other common organisms are Pseudomonas aeruginosa, Klebsiella pneumoniae, Proteus mirabilis, Staphylococcus epidermidis, enterococci, and Candida species. Most bacteriuria in short-term catheterization is of single organisms[14]. These patients are usually asymptomatic, however, 5% of them may develop bacterimia/systemic infections.

Clear guidelines from CDC recommend the use of foleys catheter to be done only for real indication and for shortest possible time duration[15]. The duration of catheterization is the most important risk factor for the development of catheter-associated bacteriuria. Once a catheter is put in place, the risk of CAUTI can be minimized by keeping the catheter system closed and remove the catheter as soon as possible[7].

Keeping in view the above mentioned complications of short term and long term catheterization, various measures have been recommended and experienced at different times. These include intermittent catheterization, anti-microbial agents application at the interface between urethral mucosa and catheter surface and introduction of anti-microbial agents into collecting tubes[16].Moreover, catheter and bladder have been irrigated with antiseptic solution in addition to use of condoms attached with drainage tubes (in males)[16] . None of the above has been found to significantly reduce the risk of CAUTI. Hand hygiene is the single most important practice for prevention of the transmission of infection[17].

In our study, health care workers were interviewed about their knowledge and practices of safety measures in urinary catheterization. Most of them were aware of and claimed to practise hand washing, using sterile gloves, pre-insertion cleaning of the area, proper visualization of the urethral meatus, and gentle insertion of the catheter by non touch technique. But as a practical aspect, very few of them were found to be aware of the proper cleaning technique using single wipe of the perineal area with single swab in a direction from before backwards. These practical aspects have also been reported in different local and international studies[8, 18].

In a large study conducted about indication as well as safe practices in urinary catheterization among health care workers, it has been observed that CAUTI prevention is perceived as a low-priority problem by hospital providers[18]. Our observations were similar to this finding as although most of our respondents knew about safe practices, but a significantly lower proportion was actually observing them in true spirit. Observation about post catheterization care was quite disappointing, as in the wards immediate care providers to the patients ---including both the hospital staff as well as attendants of the patients --- are usually not sensitize about the care of the catheter and urine bag. The result is frequently observed as finding the urine bag on the floor on patient bed side. Communication, education and evaluation in this regard need to be imoroved[18].

In a large study among emergency nurses in united states, about the personal and environmental factors involved in decision making regarding need for catheterization as well as further care, it was observed that appropriate education and evaluation did not appear to be a priority[19]. Participants reported the competency evaluation of a catheter insertion as a yearly check-off, with no real-time witnessed evaluation of a catheter being inserted into a patient. The emergency nurses reported that neither proper technique nor appropriateness of patient was being evaluated with any regularity in their facilities. Only a few of the participants appeared to be aware of their facility CAUTI rate[19]. Lack of space to keep the sterile necessary conditions, lack of staff and inadequate training have been reported as important barriers for safe urinary catheterization. Again we had similar findings in our study as only 67% respondents had a separate sterile catheterization tray in their wards and only 68% knew the importance of catheter insertion without touching its tip.

Departmental protocols must be established for proper training of health care workers initially and then a continuous check on the safe practices on regular basis. Each ward must have minimum available material (in the form of sterile tray with availability of all the required articles). When we asked about this, only% workers gave a positive response. In most of the cases, the articles were arranged on emergency basis at the time of need, thus compromising the minimal safety measures required to prevent associated infections.

CONCLUSION

Incidence of catheter associated morbidity can be reduced effectively by appropriate training and sensitization of the staff about safe practices. There is dire need for improvement in appropriate training and designing strict and standard protocols of the departments and a continuous check on these practices in order to reduce these hospital acquired infections.

Recommendations: Departments must develop set protocols to reduce the incidence of catheter associated morbidity. This can be achieved by continuous training and audit within the department.

REFERENCES

1. Jha AK. Presentation at the “Patient Safety – A Grand Challenge for Healthcare Professionals and Policymakers Alike” a Roundtable at the Grand Challenges Meeting of the Bill & Melinda Gates Foundation, 18 October 2018 (https://globalhealth.harvard.edu/qualitypowerpoint, accessed 23 July 2019).
2. Slawomirski L, Auraaen A, Klazinga N. The economics of patient safety: strengthening a value-based approach to reducing patient harm at national level. Paris: OECD; 2017 (http://www.oecd.org/els/health-systems/Theeconomics-of-patient-safety-March-2017.pdf, accessed 26 July 2019).
3. De Vries EN, Ramrattan MA, Smorenburg SM, Gouma DJ, Boermeester MA. The incidence and nature of inhospital adverse events: a systematic review. Qual Saf Health Care. 2008;17(3):216–23. http://doi.org/10.1136/qshc.2007.023622, https://pubmed.ncbi.nlm.nih.gov/18519629/
4. World Health Organization. Report on the burden of endemic health care-associated infection worldwide. Geneva; 2011. Retrieved from (http://apps.who.int/iris/bitstream/handle/10665/80135/9789241501507_eng.pdf?sequence=1, accessed 26 July 2019).
5. Ghauri SK, Javaeed A, Abbasi T, Khan AS, Mustafa KJ. Knowledge and attitude of health workers regarding catheter-associated urinary tract infection in tertiary care hospitals, Pakistan. JPMA 69: 2019; 1843.) DOI:10.5455/JPMA.8096
6 Center for Disease Control. Urinary tract infection (catheter-associated urinary tract infection [CAUTI] and non-catheter-associated urinary tract infection [UTI]) and other urinary system infection [USI]) events. 2019 Jan. Retrieved from https://www.cdc.gov/nhsn/pdfs/pscmanual
7 J.W. Warren. International Journal of Antimicrobial Agents. 17: 2001; 299-303.
8 Anwar G, Naaz G, Afzal M, Majeed I, Waqas A. Assessment of Perceptions and Practices of the Nurses to Prevent Indwelling Catheter Associated Infection; Jinnah Hospital Lahore, Pakistan (2017) Int. J. Appl. Sci. Biotechnol. Vol 5(2): 150-158
9. Smith JM. Indwelling catheter management: from habit-based to evidence-based practice. Ostomy Wound Manage. 2003 Dec;49(12):34-45. PMID: 14712009
10. Daifuku R, Stamm W. Association of rectal and urethral colonization with urinary tract infection in patients with indwelling catheters. J Am Med Assoc1984;252:2028–30.
11. King RB, Carlson CE, Mervine J, et al. Clean and sterile intermittent catheterization methods in hospitalized patients with spinal cord injury. Arch Phys Med Rehabil 1992;73:798– 802.
12. Rebmann T, Greene LR. Preventing catheter-associated urinary tract infections: an executive summary of the Association for Professionals in Infection Control and Epidemiology, Inc. Elimination Guide. Am J Infect Control. 2010;38(8):644-646.
13. Saint S, Greene MT, Krein SL, Rogers MA, Ratz D, Fowler KE, Edson BS, Watson SR, Meyer-Lucas B, Masuga M, Faulkner K, Gould CV, Battles J, Fakih MG. A Program to Prevent Catheter-Associated Urinary Tract Infection in Acute Care. N Engl J Med. 2016 Jun 2;374(22):2111-9.
14. Warren JW, Platt R, Thomas RJ, et al. Antibiotic irrigation and catheter associated urinary-tract infections. N Engl J Med 1978;299:570. and Policymakers Alike” a Roundtable at the Grand Challenges Meeting of the Bill & Melinda Gates Foundation, 18 October 2018 (https://globalhealth.harvard.edu/qualitypowerpoint, accessed 23 July 2019).
15. Gould CV, Umscheid CA, Rajender K. Agarwal K, Kuntz G, Pegues DA; Healthcare Infection Control Practices Advisory Committee (HICPAC) CAUTI: Guideline for Prevention of Catheter-Associated Urinary Tract Infections (2009). Last update June 6, 2019. P12 Retrieved from https://www.cdc.gov/infectioncontrol/pdf/guidelines/cauti-guidelines-H.pdf
16. Hoopes J, Muncie H, Warren J, et al. Once-daily irrigation of long-term urethral catheters with normal saline. Lack of benefit. Arch Intern Med 1989;149:441– 3.
17. Fumincelli L, Mazzo A, Martins JCA, Henriques FMD. Quality of Life of Intermittent Urinary Catheterization Users and Their Caregivers: A Scoping Review. Worldviews Evid Based Nurs. 2017;14(4):324–334. doi: 10.1111/ wvn.12231. Retrieved from https://pubmed.ncbi.nlm.nih.gov/28742287/
18. Saint S, Kowalski CP, Forman J, et al. A multicenter qualitative study on preventing hospital-acquired urinary tract infection in US hospitals. Infect Control Hosp Epidemiol. 2008;29(4):333-341.
19. Elizabeth Mizerek. Foley or not to foley: Emergency nurses perception of clinical decision making in the use of urinary catheters in the emergency department. Journal of emergency nursing. 2015; 41(4): 334