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Auditing Adherence To CAUTI Care Guidelines Among ICUS Nurses

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Abstract
Introduction- *Healthcare-associated infection is one of the major threats to patients' safety besides being among the principal causes of patient morbidity and mortality. Catheter-associated urinary tract infections are the most common healthcare associated infections (HAI) worldwide accounting for more than 150 million cases worldwide (CDC, 2021). The objective of the present study was to assess the adherence and awareness of nurses to CAUTI guidelines in selected ICUs.*
Method- *A descriptive observational audit of a tertiary care hospital was carried out, after obtaining formal approval and ethics clearance. Following the inclusion and exclusion criteria, prospectively, 80 nurses were observed, using a valid and reliable observation checklist (CVI 0.98-1; r 0.98-1) and socio-demographic sheet. Descriptive analysis, Chi-square and regression analysis were employed to analyse the data using SPSS version 25 at 0.05 level of significance.*
Results- *The present study shows that 93.75 percent of nurses showed poor adherence to CAUTI guidelines, even when they have good awareness (73.75%). CAUTI infection was seen to be 8.75 percent of patients. In factors influencing nurses non-adherence to CAUTI guidelines were lack of time for catheter care (97.50%) and lower qualification of nurses (97.50%); CAUTI prevention and Age(>40Yrs.) was the second major (93.75%) factor. E. Coli and Enterobacter Aerogenes bacteria were found to be 50 percent and 8 percent respectively in urine culture, Klebsiella pneumonia was found in 17 percent and Candidiasis was found in 25 percent of cases. Some of the patients were also on immunosuppressant drugs, 15 percent was on Tablet Tacrolimus, 13.75 percent was on Tablet Mycophenolate mofetil and 10 percent was on Tablet Prednisone. These group of drugs increases their susceptibility to CAUTI infection. In these patient's antimicrobial agent were being administered included broad-spectrum antibiotics like Inj. Meropenem, Cefixime, Tazact, Ceftriaxone, Fosfomycin and Dorepenem, narrow spectrum antibiotics like Inj. Teicoplanin, Colistin and Metronidazole and anti-fungal like Inj. Eraxis, Micafungin and Tablet Fluconazole drugs.*
Discussion- *Even adherence towards CAUTI guidelines was found to poor but awareness towards CAUTI guidelines was good.*
Keywords: *cauti, uti, adherence*

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I. Introduction

An intensive care unit is an organized system for the provision of care to critically ill patients that provides intensive and specialized medical and nursing care, an enhanced capacity for monitoring, and multiple modalities of physiologic organ support to sustain life during a period of acute organ system insufficiency. Although an ICU is based in a defined geographic area of a hospital, its activities often extend beyond (Marshall et al., 2017). The intensive care unit is recognized to have the greatest incidence of infections linked to healthcare (HAIs). Indwelling urine catheters, central line catheters, mechanical ventilators, and staff noncompliance with evidence-based infection prevention recommended care methods are among the many variables contributing to these high rates. Using invasive gadgets has become the standard of care for patients in ICUs, compromising the body's natural defensive systems and raising the risk of a healthcare-associated infection. More than 75% of all HAIs reported are device-acquired healthcare-associated infections, which include ventilator-associated event 18 percent, central line-associated blood stream infections was 21 percent, and catheter-associated urinary tract infections was 27 percent. However, like many other infections, Device Acquried-HAIs are believed to be preventable with the right infection control measures, such as the adoption of clinical practice standards and the adherence to evidence-based guidelines (Shamshiri 2016).

Urinary tract infections (UTIs) are infections that affect the kidney, ureters, bladder, or urethra. According to the National Healthcare Safety Network, urinary tract infections are the most frequent kind of illness linked to healthcare. About 75 percent of UTIs that are acquired in hospitals are linked to urinary catheters, which

are tubes that are put into the bladder through the urethra to drain urine. During their hospital stay, urinary catheters are used on 15–25 percent of patients. Prolonged usage of the urinary catheter is the primary risk factor for developing a catheter-associated UTI (CAUTI). Catheters should thus only be used when necessary and should be taken out as soon as they are no longer required (CDC, 2011).

Recent prevalence surveys show that urinary catheters are the most common indwelling device, with 17.5 percent of patients in 66 European hospitals and 23.6 percent of patients in 183 US hospitals having one. According to the NHSN 2011 surveillance report, indwelling catheters were present in 45–79 percent of patients on adult critical care units, 17 percent of patients on medical wards, 23 percent of patients on surgical wards, and 9 percent of patients on rehabilitation units. Consequently, the use of indwelling urethral catheters is very prevalent in healthcare settings. One of the main objectives of health-care infection prevention programs is the prevention of infections caused by these devices (Nicolle, 2014).

CA-UTI is the most common adverse event associated with indwelling urinary catheter use. Urinary tract infections were the third most prevalent sickness overall and 17.2 percent of all infections acquired in healthcare settings, accounting for 1.3 percent of all patient infections in the European Prevalence Survey (Tambyah & Maki,2000).

A recent US point prevalence research found that urinary tract infections accounted for 12.9 percent of healthcare infections, with 67.7 percent of these patients requiring a urinary catheter. The fourth most common type of illness is urinary tract infection. A symptomatic UTI was present in 0.3 percent of all urinary catheter days at one Veteran Affairs (VA) hospital. 10.6 percent–12.6 percent of catheterized patients developed CAUTI, according to a British study comparing different types of catheters, but only 3.2 percent–5.0 percent of infections received microbiologic confirmation (Pickard et al., 2012).

According to the National Healthcare Safety Network report (2015) from the Centers for Disease Control and Prevention, the rate of CAUTI in Malaysia was found to be 1.3 per 1,000 urinary catheter-days. The authors concluded that the rate in the United States' comparable intensive care units (ICUs) was lower than that of Malaysia. Furthermore, studies have demonstrated that CAUTI causes nosocomial bloodstream infections thereafter and prolonged hospital stays (Murphy et al., 2014; Rai et al., 2016). These outcomes have a significant financial impact on individuals and healthcare institutions, which worries policymakers and administrators in the sector.

Mong (2021) report a high correlation between CAUTI and patient morbidity and mortality. Gould et al. (2017) estimate that every year in the US, CAUTI-related deaths account for about 13,088 fatalities. The only available statistics on CAUTI are from patients in Malaysia's critical care unit (ICU). Rai (2016) conducted a study and revealed that among medical-surgical patients in four intensive care units, the risk of CAUTI was 5.0 per 1,000 urinary catheter days. Nonetheless, the patients' excess crude mortality rate from CAUTI was 32.2 percent, which means that two out of every five CAUTI patients would pass away.

Reducing the duration of catheterization, avoiding unnecessary urinary catheter insertions, and employing the proper catheter care and management strategies are some of the measures to prevent CAUTI. These steps are indeed recommended by evidence-based guidelines for the prevention of CAUTIs (CDC, 2015). Most notably, nurses play a critical role in the treatment of UC and the prevention of CAUTI because they are qualified to perform the insertion and maintenance of urinary catheters within the guidelines and standards of nursing practice (Sessa et al., 2011; Yoon et al., 2013). Therefore, it is believed that the safe delivery of UC treatment depends on nurses' attitudes and expertise regarding CAUTI prevention. Studies have shown that nurse-led treatments successfully lower the incidence of unnecessary indwelling catheter usage in hospitalized patients, while also significantly improving patient outcomes for CAUTIs (Durant, 2017; Tyson et al., 2020). In particular, it has been noted that the incidence of CAUTIs is decreased by nurses' involvement in patients' systematic monitoring, doctors' reminders about patients with an indwelling UC, routine bladder ultrasounds, catheter reminders, stop orders, and discontinuation protocols (Saint et al., 2000; Tyson et al., 2020). Additionally, the research has shown how nurses may be able to challenge the inappropriate use of catheters if they are familiar with the most recent recommendations (Crouzet et al. 2007). The aim of present study is to assess the adherence and Awareness to Catheter Associated Urinary Tract Infection guidelines among nurses and find the factors influencing the non-adherence of nurses to CAUTI guidelines.

II. Methods:

STROBE guidelines were used to report this study.

Research Design A quantitative research approach was used, descriptive design was carried out i.e. Observational Audit. **Setting** The two intensive care unit namely High Dependency Unit and Liver Coma ICU of the Institute of Liver and Biliary Sciences, New Delhi were Purposely allocated for the study.

Study population and Sample Size

The current research is a hospital based observational audit study carried out at the Intensive Care Unit of the hospital. The total number of nurses were 90. Out of which 64 were in Liver Coma ICU and 26 were in High Dependency Unit. The total number of adherences to CAUTI guidelines events observed were 80.

Sample size for the present study was estimated before starting of the study. Assuming that adherence rate of catheter associated urinary tract, infection is 95% with alpha 5% and permissible error taken as 5 %, it is be decided to enrol 80 observation.

Sample size (n)= Z^2pq/d^2
Where, p= 95%
q= 5%
z= 1.96
d= 5%
n= 1.96* 1.96* 95* 5
25
=1824.76/25 = 72.9904
Total number of nurses at Liver Coma ICU and High Dependency Unit: 64 + 26 = 90.

Inclusion Criteria:
Only nurses providing direct care to patients admitted in ICU are included in the study.

Exclusion Criteria:
Nurses not present during data collection and not willing to participate.

Ethical Consideration

The Institutional Review Board Clearance was obtained by two processes, Scientific Review Committee (SRC) and Ethic Committee of College of Nursing, ILBS, New Delhi. Firstly, research proposal was presented to the SRC and suggestions were incorporated. Then, it was presented to the Ethics Committee Clearance and ethical approval to conduct the study was obtained from Institutional Ethics Committee. **Ref No: MSc(N)/30008/ILBS/CON/2020/20854**

Try Out and Pilot Study

Try out of the structured Observational checklist was done on 10 nurses who care the urinary catheterized patient admitted between 2nd October 2023 to 7th October 2023 in ICU of ILBS, New Delhi to check the feasibility of the tool.

After obtaining formal administrative permission Pilot study was conducted on 10 percent participants (10 participants) in the month of October between 16th October 2023 to 21st October 2023. Conducted in Surgical ICU and Transplant ICU at ILBS.

Variables of the study

Study Variables	Adherence to Catheter Associated Urinary Tract Infection guidelines
Socio Demographic variables **(Nurses)**	Age, gender, nursing education, shift, nurse patient ratio, nursing experiences, experience in current ward, urinary catheter inserted in past month, received education or training related to Catheter Associated Urinary Tract Infection, aware of the existence of protocol or guidelines for urinary catheter care or Catheter Associated Urinary Tract Infection prevention.
Clinical variables **(Patient)**	Age, Gender, Diagnosis, catheter present, investigations, treatment

Content Validity and Reliability of the Tool

In order to measure the content validity of all tools, tools will be given to eleven experts two from the medical officer and nine from nursing and assessed by CVI (Content Validity Index)>=0.80 and Reliability will be established using Cronbach's alpha reliability.

S. No.	Tools	CVI	Reliability
1.	Socio demographic profile of nurses	0.98- 1.00	α is 0.968
2.	Patient clinico- demographic profile	0.98- 1.00	α is 0.968
3.	CAUTI Adherence checklist	0.98- 1.00	α is 0.968

Collection of Data

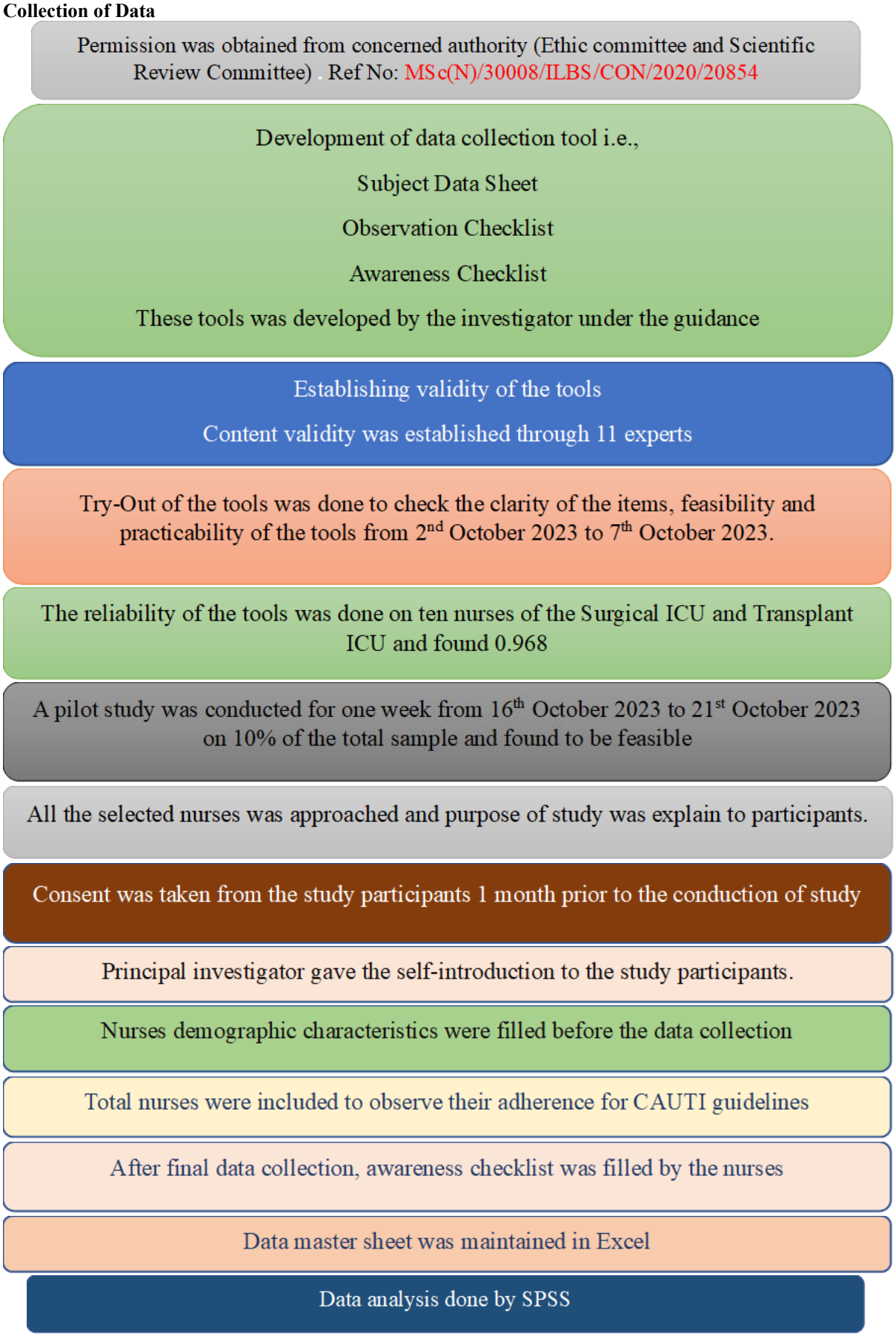

Figure 1. Flow diagram showing the method of Data collection

Statistical Methods Used In The Study

The descriptive and inferential statistics such as frequency, percentage, mean, standard deviation, mean percentage, rank and regression analysis were done respectively. The association between nurses' adherence to CAUTI guidelines with selected socio- demographic variables was computed using Chi- Square test.

III. Results

This study comprised of 80 nurses working to the Liver Coma ICU and High Dependency Unit of the hospital. Audit was done to assess the adherence of nurses to CAUTI guidelines in ICU patients who have urinary catheter. Among 80 nurse's 93.75 percent nurses were having poor adherence, 6.25 percent nurses were having fair adherence and 0 percent nurses were having good adherence to CAUTI guidelines whereas 73.75 percent nurses were having good awareness, 26.25 percent nurses having fair awareness and 0 percent nurses were having poor awareness to indwelling catheter care (Figure 2).

In term of CAUTI 81.3 percent patient investigated for urine culture in which 15 percent patient having infection and 8.75 percent patient culture report having bacterial growth more than 20000 CFU. In term of type of organism found in 8.75 percent patient 50 percent of urine culture showed E. Coli, 25 percent was Candidiasis, 17 percent was Klebsiella pneumonia and 8 percent was Enterobacter aerogenes (Figure 3).

All patients who were admitted in ICU already received antimicrobial. Antimicrobials are classified as broad-spectrum, narrow-spectrum and antifungal drugs. In broad-spectrum antibiotics like 37.5 percent patient received inj. Meropenem and inj. Cefixime, 25 percent received inj. Tazact and inj. Ceftriaxone, 12.5 percent received inj. Fosfomycin and 6.25 percent received inj. Dorepenem. While in the narrow-spectrum antibiotics which is most effective against the Klebsiella pneumonia, 35 percent patient received inj. Teicoplanin, 20 percent received inj. Collistin and 18.75 percent patient received inj. Metronidazole and in antifungal drugs which was given for Candidiasis, 20 percent patient received inj. Eraxis, 10 percent received inj. Micafungin and 7.5 percent patient receiving tablet Fluconazole (Figure 4).

Some factors are found during study that influencing the non-adherence of nurses to CAUTI guidelines. factors influencing the non- adherence of nurses to CAUTI guidelines. Table shows 26.25 percent nurses having lack of awareness to indwelling catheter care, 93.75 percent nurses having poor adherence, 97.5 percent nurses lack of time for catheter care, 82.5 percent nurses having lack of need for catheter verified daily, 62.5 percent nurses having lack of motivation for catheter care, 85 percent nurses having lack of other options to catherization , 30 percent nurses does not think CAUTI is a priority , 31.3 percent nurses having heavy workload, 93.75 percent nurses was aged less than and equal to 40 years, 97.5 percent nurses was graduate and 77.5 percent nurses having experience less than or equal to 5 years (Figure 5).

Table 1

Frequency and Percentage Distribution of Nurses by Demographic Characteristics

n=80

Variable	***Frequency (f)***	***Percentage (%)***
Age in years		
21- 30	16	20
31- 40	59	73.8
>41	5	6.3
Gender		
Male	31	38.8
Female	49	61.3
Qualification		
GNM	2	2.5
Post Basic Nursing/ B. Sc. (H) Nursing	59	73.8
M. Sc. Nursing	19	23.8
Shift		
Morning	21	26.3
Evening	48	60.0
Night	11	13.8
Nurse- Patient Ratio		
1:1	2	2.5
1:2	53	66.3
1:3	25	31.3
Total Experience (in years)		
≤ 5	30	37.5
6- 10	43	53.8
>10	7	8.8

Department		
Liver Coma ICU	54	67.5
High Dependency Unit	26	32.5
Experience in Current ICU (in years)		
≤ 5	62	77.5
6- 10	17	21.3
>10	1	1.3
Total number of Catheter insertion done		
0-1	24	30.0
2-3	44	55.0
≥ 4	12	15.0
Received any training on CAUTI guidelines		
Yes	79	98.8
No	1	1.3
Aware of the existence of guidelines		
Yes	80	100.0
No	0	0.0

Table 2

Frequency and Percentage Distribution of Patient by Demographic Characteristics

		n=80
Variables	***Frequency (f)***	***Percentage (%)***
Age (in years)		
11-20	5	6.3
21-30	11	13.8
31-40	14	17.5
41-50	23	28.7
>51	27	33.8
Gender		
Male	58	72.5
Female	22	27.5
Diagnosis		
CLD	59	73.8
HCC	9	11.3
OTHERS	12	15.0
Hospitalization		
>2 week	30	37.5
<2 week	50	62.5
Previous history of hospitalization		
Yes	62	77.5
No	18	22.5
Previous history of surgery to renal disease		
Yes	1	1.3
No	79	99.8
Investigation		
• **Urine Routine and Microscopic**		
Yes	76	95.0
No	4	5.0
• **Hemoglobin**		
<8.0 g/dl	27	33.8
>8.0 g/dl	53	66.3
• **Creatinine**		
<1.6 mg/dl	50	62.5
>1.6 mg/dl	30	37.5
Cirrhosis		
Yes	60	75.0
No	20	25.0
Co- morbidity (DM)	31	38.8

Table 3

Frequency and Percentage Distribution of catheter related details in patient

n=80

Variables	***Frequency (f)***	***Percentage (%)***

Previous history of catheter insertion	35	43.8
Past history of UTI	20	25.0
Urinary Catheter (current)	80	100.0
Indication of Catheterization		
Bed ridden and terminally ill patients	80	100.0
Other indication for catheterization	0	0.0
Duration of Urinary Catheter		
<14 days	69	86.3
>14 days	11	13.8
Urine Culture	65	81.3
CAUTI	12	15.0
Culture Report		
No growth	68	85.0
<10000 CFU/mL	2	2.5
10000- 100000 CFU/mL	3	3.75
>100000 CFU/mL	7	8.75
Types of Organisms (n=12)		
Candidiasis	3	25.0
E. Coli	6	50.0
Klebsiella Pneumonia	2	16.67
Enterobacter Aerogenes	1	8.33
Antimicrobial present	80	100.0
Types of Antimicrobial		
• **Broad- Spectrum**		
Inj. Piperacillin and Tazobactam (n= 20/80)	20	25.0
Inj. Meropenem (n= 30/80)	30	37.5
Inj. Dorepenem (n=5/80)	5	6.25
Inj. Fosfomycin (n= 10/80)	10	12.5
Inj. Ceftriaxone (Monocef) (n=20/80)	20	25.0
Inj. Cefixime (n= 30/80)	30	37.5
• **Narrow- Spectrum**		
Inj. Metronidazole (Gram -ve) (n=15/80)	15	18.75
Inj. Teicoplanin (Gram +ve) (n=28/80)	28	35.0
Inj. Collistimethate (Gram +ve) (n=16/80)	16	20.0
• **Antifungal Drugs**		
Injection Eraxis (n=16/80)	16	20.0
Injection Micafungin (n=8/80)	8	10.0
Tablet Fluconazole (n=6/80)	6	7.5
Immunosuppressants		
Tablet Prednisone (n= 8/80)	8	10.0
Tablet Tacrolimus (n= 12/80)	12	15.0
Tablet Mycophenolate mofetil (n= 11/80)	11	13.75
Days of Antimicrobial		
1-5	28	35.0
6-10	32	40.0
11-15	20	25.0

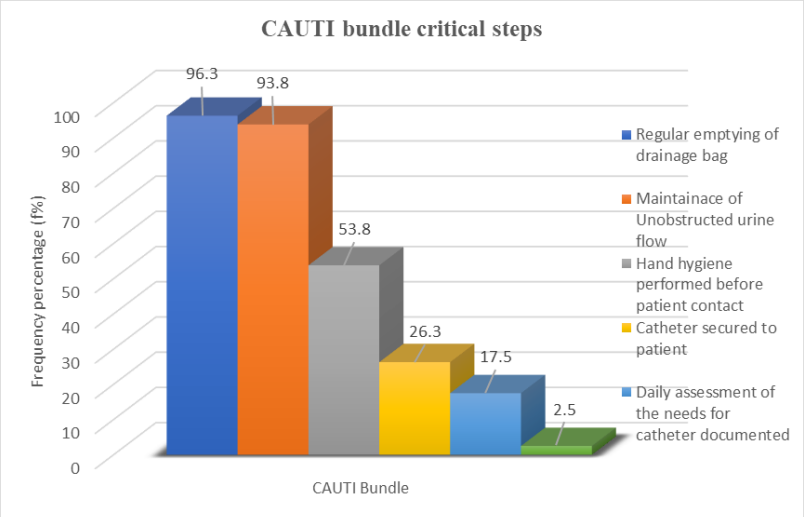

Figure 1.3-D cluster bar Diagram showing Frequency distribution of nurses Adherence to CAUTI care bundle

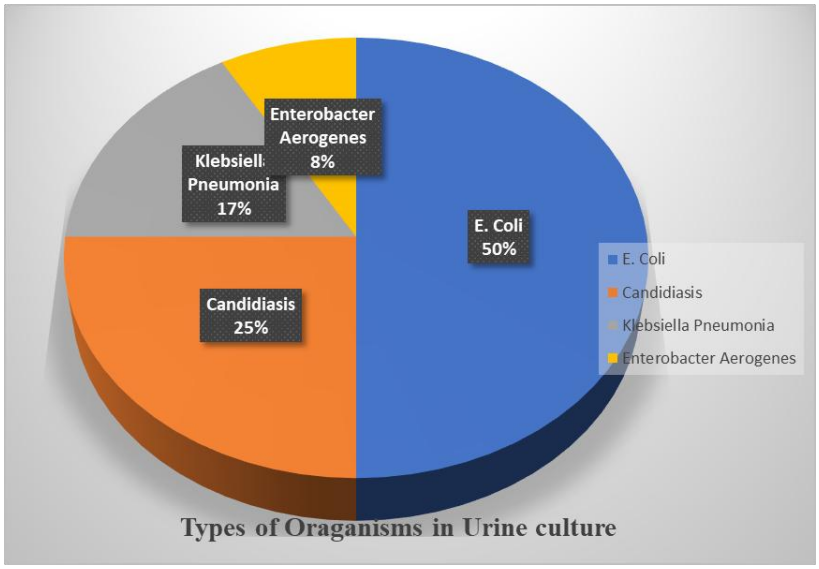

Figure 2. Bar Diagram showing distribution of Nurses on Adherence and Awareness to CAUTI Guidelines

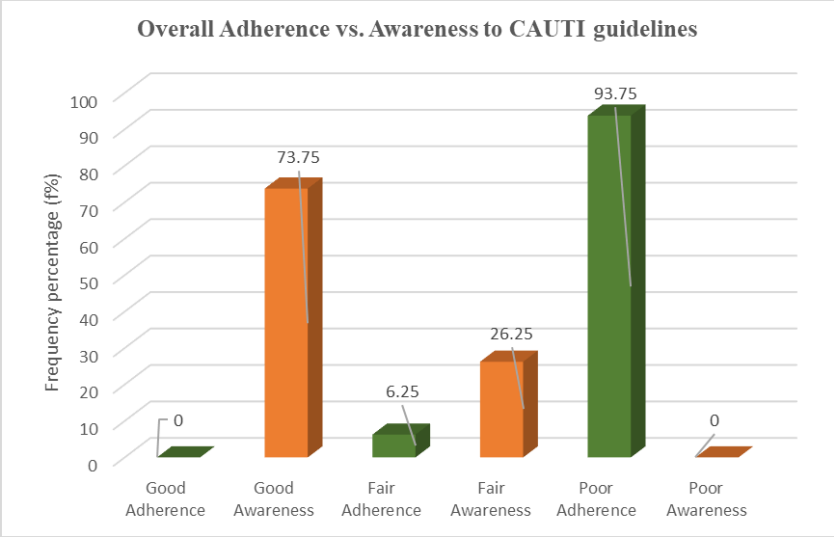

Figure 3. Pie chart showing types of organisms in urine culture

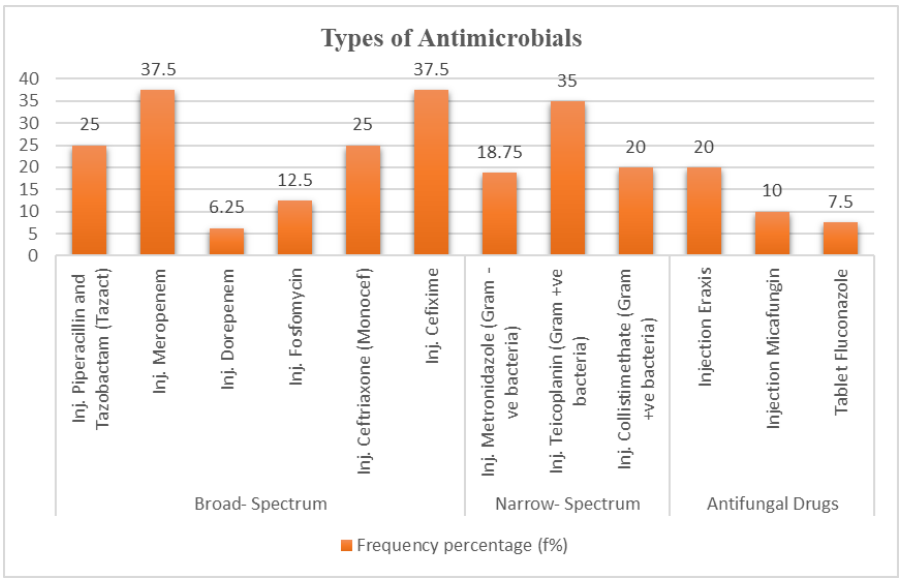

Figure 4. Bar Diagram showing types of antimicrobials

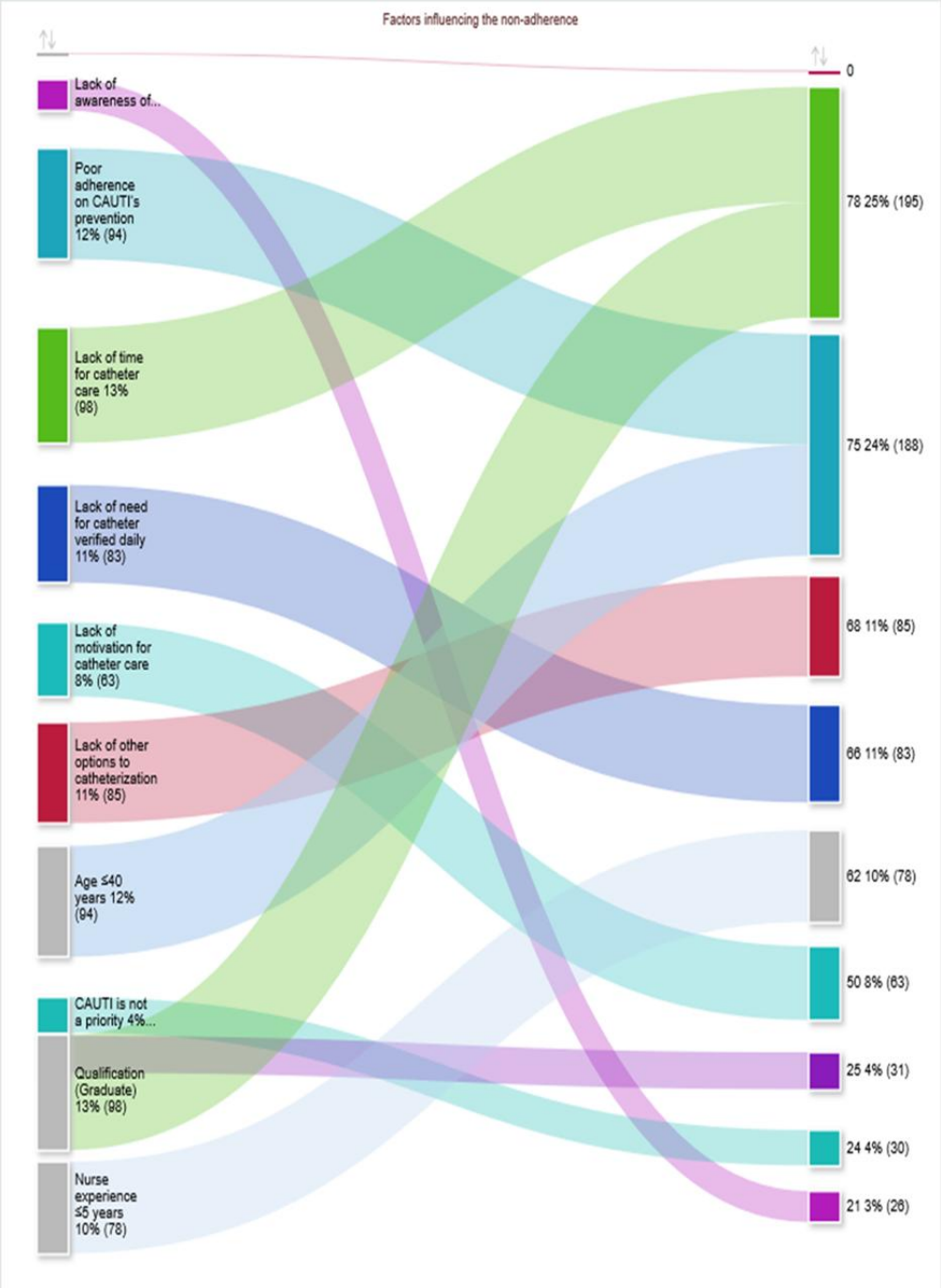

Figure5. Sankey chart showing frequency and Percentage distribution of factors influencing the Nurses non-adherence to CAUTI guidelines

Table 4

Odds Ratio of selected Risk Factors for Nurses' Adherence

n= 80

Factors influencing the non- adherence		Adherence		Odds Ratio (OR)	95% CI	p value
		Fair *f (%)*	Poor *f (%)*			
Modifiable factors						
Lack of awareness of nurses	Good	04(5.0)	55(68.75)	0.688	0.072-6.525	0.743
	Fair	01(1.25)	20(25.0)			
Lack of time for catheter care	Yes	00(0.0)	02(2.5)	0.936	0.883-0.992	0.712
	No	05(6.25)	73(91.25)			

Lack of verification of catheter daily	Yes	01(1.25)	13(16.25)	0.839	0.087-0.102	0.879
	No	04(5)	62(77.5)			
Lack of motivation for catheter care	Yes	01(1.25)	49(61.25)	7.538	0.801-70.975	0.043*
	No	04(5.0)	26(32.50)			
Lack of other options to catheterization	Yes	2(2.5)	10(12.50)	0.231	0.034-1.557	1.06
	No	3(3.75)	65(81.25)			
CAUTI is not a priority	Yes	04(5)	52(65)	0.565	0.060-5.339	0.614
	No	01(1.25)	23(28.75)			
Heavy workload (Nurse- Patient Ratio 1:3)	1:3	01(1.25)	24(30)	1.882	0.200-17.759	0.575
	1:2	04(5)	51(63.75)			
Non- Modifiable factors						
Nurse experience ≤5 years	≤5 yrs.	03(3.75)	60(75)	2.667	0.408-17.415	0.290
	>5 yrs.	02(2.5)	15(18.75)			
Age (≤40 years)	≤40 yrs.	03(3.75)	72(90.0)	0.063	0.007-0.526	0.001**
	>40 yrs.	02(2.5)	03(3.75)			
Qualification (Graduate)	Diploma	00(0.0)	02(2.5)	1.068	1.008-1.132	0.712
	Graduate.	05(6.25)	73(91.25)			

IV. Discussion

CAUTIs are the most common type of HAI and are associated with increased morbidity and mortality (AHQR, 2015; CDC, 2019; CDC, 2018; Fekete, 2020; & NHSN, 2020). CAUTIs cause increased pain, discomfort, and hospital length of stay (AHRQ, 2017; & CDC, 2019). Indwelling Urinary Catheters are frequently placed before alternative measures are implemented, without appropriate indication, and remain longer than medically necessary (CDC, 2019). This leads to prolonged and unnecessary use of IUCs. Each day the IUC remains in the patient, an increased risk of developing a CAUTI 5-7%, and after 30 days the risk increases to 100% (Fekete, 2020; & IHI, 2020). CAUTIs are preventable with proper care and with the implementation of evidence-based practice (AHRQ, 2015; CDC, 2019; & Fekete, 2020).

The present study was found that out of 80 nurses who working in the intensive care unit most 75 (93.75%) of them have poor adherence towards the CAUTI guidelines while 5 (6.25%) of nurses have fair adherence towards the CAUTI guidelines and zero percent of nurses have good adherence towards the CAUTI guidelines. An inconsistent finding was elicited in a descriptive survey study conducted by Kaur *et al.,* (2022) that the majority (64.55%) of nurses were having adequate practice towards the CAUTI guidelines while 19.09 percent of nurses were having excellent practice towards the CAUTI guidelines and 16.36 percent of nurses were having inadequate practice towards the CAUTI guidelines. In dissimilar with the findings in a study conducted by Shanmukhe *et al.,* (2022), were found that majority 99.0 percent of nurses were having good adherence while 1.0 percent of nurses were having excellent adherence to the CAUTI guidelines.

This present study finding showed that majority (73.75%) of nurses have good awareness while 26.25 percent of nurses have fair awareness and zero percent of nurses have poor awareness towards the indwelling catheter care. The finding goes dissimilar with the findings in a study conducted by Teshager *et al.,* (2022), were found that majority 63.04 percent of nurses were having poor awareness and 36.96 percent of nurses were having good awareness related to indwelling catheter care. An inconsistent finding was elicited in a descriptive cross-sectional study conducted by A. A. Haza'a *et al.,* (2021) were found that majority (72.0%) of nurses were having fair awareness while 18.3 percent of nurses were having good awareness and 9.7 percent of nurses were having poor awareness related to indwelling catheter care.

The present study included 80 observation of the patient in which 12 patients were found CAUTI infection in which majority (50.0%) of patients were found E. Coli bacteria in the urine culture, while 25.0 percent were found Candidiasis, 16.67 percent were found Klebsiella Pneumonia and 8.33 percent of patient were found Enterobacter Aerogenes. In similar study findings which was conducted by Leelakrishna P. *et al.,* (2018), were found that 36.7 percent of patient were CAUTI due to E. Coli bacteria and 18.6 percent of patient were having CAUTI due to Klebsiella Pneumonia. In similar study findings which was conducted by Qiao *et al.,* (2022), were found that 62.50 percent of patient were having CAUTI due to E. Coli bacteria.

The present study found that majority (97.5%) of nurses influence the non-adherence towards CAUTI guidelines due to lack of time for catheter care and Qualification while 93.75 percent of nurses influence the non-adherence due to poor adherence on CUTI prevention and age, 85 percent of nurses influence the non-adherence due to lack of other options to catheterization, 82.5 percent of nurses influence the non-adherence due to lack of need for catheter verified daily, 77.5 percent of nurses influence the non-adherence due to experience less than or equal to 5 years, 62.5 percent of nurses influence the non-adherence due to lack of motivation for catheter care, 31.3 percent of nurses influence the non-adherence due to heavy workload, 30.0 percent of nurses influence the non-adherence due to CAUTI is not a priority and 26.25 percent of nurses influence the non-adherence towards CAUTI guidelines due to lack of awareness of nurses.

An inconsistent finding was elicited in a descriptive cross-sectional study conducted by Teshager *et al.,* (2021) were found that majority (61.4%) of nurses were non-adhere to CAUTI guidelines due to not got job

training about catheterization, while 48.4 percent of nurses were non-adhere to CAUTI guidelines due to not having proper guidelines for catheter insertion, 54.7 percent of nurses were non-adhere to CAUTI guidelines due to not having enough supply for catheterization and 44.6 percent of nurses were non-adhere to CAUTI guidelines due to not having facilities for hand washing.

The present study found that lack of motivation for catheter care and age independently associated factors which influencing non-adherence to CAUTI guidelines. The similar finding was also reported by Leelakrishna P *et al.,* (2018) that age independently associated factors which influencing non-adherence to CAUTI guidelines.

The present study found that gender, qualification, shift, Nurse-Patient ratio, total experience, department, experience in current ICU, total number of catheter insertion done, received any training related to CAUTI guidelines, aware of the existence of guidelines, infection, culture report and days of antibiotics was not associated with nurses' adherence to CAUTI guidelines while age has statistically significant association with nurses' adherence to CAUTI guidelines. The findings of the present study had similar with a study conducted by Shanmukhe *et al.,* (2022) that age, gender, educational qualification, specialty area, work experience and CNE programme was not associated with nurses' adherence to CAUTI guidelines. Present study had similar with a study conducted by Teshager *et al.,* (2022) that gender, age, level of education, professional experience, marital status and current workin department was not associated with nurses' adherence to CAUTI guidelines.

Limitations

This study has some limitations such as: The study is limited to Liver Coma ICU and High Dependency Unit of the selected hospital only. Standardized tools could not be located by the investigator, so investigator developed the tool for the study. The findings of the study were influenced by Hawthorne effect. The study's sample size was small. The participant practice could be checked using a direct/indirect observational checklist by the researcher herself rather directly questioning them to see the actual implementation of practices by nurses towards the catheter care.

V. Conclusion

Overall nurse's adherence level was poor while knowledge level was good to CAUTI guidelines. Patient culture report having bacterial growth more than 20000 CFU was 8.75 percent and in term of type of organism found in 8.75 percent patient 50 percent of urine culture showed E. Coli. Study found some factors which influence the nurse's adherence to CAUTI guidelines. The health system can use surveillance to assess the burden of cases, related risk factors, identify outbreaks, assess the effectiveness of preventative measures, and keep an eye on the standard of infection control procedures.

Clinical Significance

Hospital-acquired infections are a direct reflection of hospital and intervention quality. Bundle care is a phenomena that is "all or none." The findings of our study highlight that, despite the fact that just a small number of the care bundle's components were currently in use, adhering to them all together significantly reduced the incidence of CAUTI. In terms of lowering the average number of catheter days per patient and the device use ratio, adherence to each component will have some impact on lowering CAUTI. Monitoring the adherence to the care bundle through auditing is improving the results. Regular HICC activities should involve implementing the care package and auditing the adherence to each component.

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