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ORIGINAL ARTICLE

Frequency, Causative Organisms, Excess Cost and Short-Term Outcomes of Peripheral and Central Line Associated Nosocomial Blood Stream Infection in Adult Patients Admitted in a Tertiary Care Hospital

MUHAMMAD OWAIS KHAN[1], NASEEM SALAH UDDIN[1], AIMAN MAHMOOD KHAMISANI[1], RABEEA SHAH[1]
[1]Infection Diseases Department, Indus Hospital, Karachi
Corresponding author: M. Owais Khan, Email: khanowais_84@hotmail.com

ABSTRACT

Background: Hospital acquired Blood Stream Infections is one of the major type of nosocomial infection. As compared to 1.3-2.1 per 1000 central line days in high income nations, CLABSI occurs more frequently in middle- and low-income countries, with rates ranging from 7.4 to 12.2 per 1000 central line days. The incidence of both type of BSI is also reported to be different in different regions. Staphylococcus aureus, E. coli, enterococcus species, and candida species are some examples of common causative organisms.

Objective: The primary objective:

- To study the incidence of CLABSI per 1000 line days among patients with inserted central line during hospital stay
- To study the incidence of PLABSI per 1000 line days among patients with inserted peripheral line during hospital stay

The secondary objective:

- Frequent pathogens isolated from patients
- Additional length of stay in patients with blood stream infection (CLABSI and PLABSI)
- Excess cost incurred from excess investigations and medications

Material and Methods: Total 250 patients of age ≥15 years and acquired CLABSI or PLABSI during hospital stay after 48 hours of admission were included. Sensitivities of the cultured organism were recorded. Antibiotics and other drugs for management of blood stream infection were recorded with dosage, duration and excess cost. Excess length of hospital stay due to blood stream infection along with total length of in hospital stay was checked. Finally outcome of every patient was analyzed. Descriptive statistics were calculated. Independent T test / Man Whitney U test was applied to compare the length of hospital stay and cost among patients with and without BSI (CLABSI/PLABSI). P value of less than or equal to 0.05 was considered significant.

Results: There were 44% male and 56% female patients. Mean hospital stay was 11.30±7.24 days. Mortality rate was 17.2% while 8.8% patients were found with infection. Most common isolated organisms were pseudomonas (31.8%), staphylococcus aureus (18.2%), klebsiella (9.1%), acenatobacter (9.1%) and candida tropicalis (9.1%). Sixteen patients have excess hospital stay from infection acquisition day with average of 9.31±4.97 days. Majority (40.9%) of patients spends more than 35,000 PKR (7,062 PKR to 70,988 PKR) as excess cost in terms of treatment. Mortality rate among infected patients was 50%.

Conclusion: Patients had to bear a heavy burden as a result of infections contracted when using central venous catheters, which lengthened hospital stays and raised treatment costs.

Keywords: Central line, Peripheral, Blood Stream Infections, pathogens, length of stay, excess cost

INTRODUCTION

Despite central venous catheters (CVCs) are frequently used to save patients' lives, they are strongly linked to significant morbidity and mortality. [1,2] Additionally, there is a higher chance of infections and mechanical problems..[3] One of the main reasons for increased morbidity and mortality in hospitals is hospital-associated infection (HAI), which also raises the price of hospital stays. [4,5] An estimated 70% of patients who are admitted to a hospital receive some kind of venous catheter. [6] The prevalence of catheter-related bacteraemias is higher in intensive care units (ICUs), for services including oncology, haematology and nephrology, as well as in university hospitals with more than 500 beds. [7,8]

Peripherally inserted central venous catheters (PICCs), a safer alternative to the common type of CVCs that have been used to treat hospitalised patients in recent years, have acquired increasing recognition, especially for patients who need long-term venous access.[9] Central line associated bloodstream infections (CLABSIs) continue to be a significant healthcare-associated complication that can negatively affect patient care and is still closely linked to higher mortality rates.[10,11] The CLABSI monitoring criteria are used by the Centers for Disease Control and Prevention (CDC) to identify bloodstream infections in CVC patients without a definite secondary cause of bacteremia. [12,13] Laboratory-confirmed bloodstream infection (CLABSI) is reported when a patient has a central line in place for more than two days and when the central line is in situ on the day of (or the day before) the first sign or symptom that meets the definition. [14] There shouldn't be a connection between the infection and any other infections the patient may have.[15]

Prior to the implementation of preventative bundles, femoral catheterization, higher catheterization times, use of whole parenteral nourishment, numerous catheter manipulations, and a lower nurse-to-patient ratio were all identified as CLABSI risk factors.[16,17] CLABSI significantly affects patient morbidity and mortality[18] and healthcare systems, as it creates a financial burden that lengthens hospital stays (LOS) [18,19] Longer LOS is usually associated with higher fixed expenses for beds, buildings, staffing, and equipment.[20] GNR associated blood stream infection in patients with central lines is associated with high risk of mortality.[21] The incidence of both type of BSI is also reported to be different in different regions. A study from India have reported CLABSI rates of 12.5 per 1000 catheter days[22] while another study from India showed 17.04 per 1000 catheter-days.[23] A study from Germany showed the incidence of CLABSI to be 10.6 per 1000 CVC days.[24] The incidence of PLABSI is reported 0.5 per 1000 in ICU from Australia, Italy and US, while 2.32 per 1000 cases in ICUs from Middle east countries.[25]

Comparing 1.3-2.1 per 1000 central line days in high income nations to 7.4 to 12.2 per 1000 central line days in moderate to low income countries, CLABSI is more frequent there.[26] According to a study done in SIUT, Pakistan, Infection with a multi-drug resistant organism, an ICU stay of more than 48 hours, and more than one positive blood culture for that organism are risk factors for mortality.[27]

Forty four patients with CLABSI were discovered during a 47-month period in a retrospective review of 250 patients in a Japanese academic hospital.[28,29] According to a study, CLABSIs had a mortality rate of 12–15% and an odds ratio of 2.75 for death in the hospital.[30,31]

One study conducted in Germany identified an additional hospital cost of 8810€ (equivalent to 17,54,749.71 PKR) per case in CLABSI in patients with hematologic and oncologic malignancies. Patients with CLABSI the mean duration of hospital stay was 47 days vs 22 days (in patient without CLABSI).[24] Another study showed a mean duration of stay of 16.84 days as compared to 5.84 days in patients with PLABSI vs no PLABSI respectively.[25]

In comparison to other clinical settings, the intensive care unit (ICU) has a larger proportion of catheter-related infections caused by Gram-positive cocci and Gram-negative bacilli.[32,33] Resistance to antimicrobial medication has also been noted as a key factor in catheter-related infections, in addition to the formation of biofilm in device-related infections..[34] Causative germs and their resistance also vary in different countries. Common causative organisms include Staphylococcus aureus, E coli, enterococcus species and candida species. E coli was the most common pathogen reported in a study in Pakistan.[35] But in a study from India Klebsiella pneumoniae (40%) was the most common isolate, followed by Pseudomonas aeruginosa and Acinetobacter species (9%), enterococcus (9.09%) and Staph aureus (7.27%).[23] But in middle east staphylococcus aureus was reported as the most common pathogenn.[25]

Study Rationale: BSI is associated with hazardous effects on a patient's outcome; it is also associated with increased length of stay and financial burden on the hospital. The data is limited and mean additional duration of stay and cost burden on health care facilities is not well known. Different studies have reported different pathogens as the cause of BSI. Additional data is needed to rule out the most common pathogen in our health care settings

MATERIAL AND METHODS

This observational cohort study conducted from 01-06-2021 to 31-21-2021 at Department of infectious diseases, Indus Hospital (a free of cast tertiary care hospital of 303 beds facility), Karachi. Prior to starting the trial, the institutional ethical review committee granted its approval. Participants were informed of the goal of the research and its advantages before to enrollment in the study, and a verbal consent was obtained. The sample size was calculated with the help of Open-Epi 3.01 and total 250 patients were included in the study. Patients of both genders with age equal or more than 15 years and given informed consent were participated in this study. Patients with positive blood cultures within first 48 hours of admission, patients who had pre-existing blood stream infection referred from another hospital, patients with signs and symptoms suggestive of sepsis at the time of admission, patients who had BSI secondary to other systemic infections, and patients with contaminated blood cultures were not part of this study.

In our study a laboratory-confirmed bloodstream infection not related to an infection at another site that develops within 48 hours of central line placement was considered as central line-associated bloodstream infection (CLABSI). The peripheral line without a central venous catheter and either with the presence of phlebitis or resolution of clinical symptoms after withdrawal of the peripheral line, with careful exclusion of an alternative explanation for bacteremia was considered as peripheral line-associated bloodstream infection (PLABSI).

Nosocomially acquired infections that are typically not present at the time of admission and acquired after hospitalization and manifest 48 hours after admission to the hospital was considered as Hospital acquired infection. The short term outcomes of this study included end organ damage as a result of blood stream infection manifested by deranging creatinine, electrolytes and BUN in kidney injury, deranged liver functions in Liver injury, rising High sensitivity trop-I in myocardial injury, and abnormalities of ABGs and CXR in Lung injury and their effect on morbidity. The additional hospital stay days and excess cost were considered as additional number of days and amount patient having acquired blood stream infection, a part of duration of stay in the hospital and cost due to primary disease, as expected.

Demographic data was collected in the pre-designed Performa. Every patient followed by diagnosis at the time of admission and date of confirmation of blood stream infection. Number of time central and peripheral lines passed was recorded. Peripheral line blood stream infection was diagnosed on the basis of positive blood cultures but a part of that also on the basis of signs of local phlebitis and improvement of signs of infection after peripheral line is removed. Blood culture report and type of blood stream infection (CLABSI and PLABSI) with causative organism were recorded. Sensitivities of the cultured organism were recorded. History regarding comorbidities including Diabetes mellitus, hypertension, chronic liver disease, chronic kidney disease, cardiovascular disease, cerebrovascular accident, chronic obstructive pulmonary disease, HIV–infection, autoimmune disease and others were also recorded. Antibiotics and other drugs for management of blood stream infection were recorded with dosage, duration and excess cost. Additional length of hospital stay due to blood stream infection along with total length of in hospital stay was checked. Associated investigations after confirmation of blood stream infections including Blood cultures, complete blood count (CBC), Liver function tests (LFTs), C-reactive protein (CRP), Erythrocyte sedimentation rate (ESR), serum creatinine and procalcitonin were collected. Patients were also monitored for end organ damage including kidney, liver, heart, and lung. Complications of CLABSI and PLABSI were observed. Finally outcome of every patient was analyzed.

Data were compiled and analyzed using SPSS v26.0. Quantitative variables such as age, excess & total length of hospital, and excess cost of investigations etc. were presented as mean±SD if normally distributed. The assumption of normality was tested with the Shapiro-Wilk test and if non-normally distributed then quantitative variables were summarized as median with inter-quartile range. Frequency and percentage were reported for qualitative variables such as gender, comorbids, type of BSI, Organism cultured from BSI, sensitivity of isolated organism, use of antibiotics, complications, outcome of the patients. The incidence of CLABSI and PLABSI were calculated separately per 1000 line days. The organisms isolated from each group were then presented as frequency and percentages. Independent T test / Man Whitney U test were applied to compare the length of hospital stay and cost among patients with and without BSI (CLABSI/PLABSI). P value of less than or equal to 0.05 were considered as significant.

RESULTS

The results showed that there were 44% male and 56% female patients with the majority (42.4%) of patients from age group above 50 years. Mean hospital stay was 11.30±7.24 days. Among all study participants, 42.4% patients were found with hypertension, 37.2% patients had diabetes mellitus, and 14.8% patients were found with chronic kidney disease (CKD). Majority of admissions (73.6%) were done through medicine/allied services department. Mortality rate in our study was 17.2% while 8.8% patients were found with infection. A total of 64.8% of patients had their peripheral IV sites canolated, compared to 35.2% of patients who had their central IV sites canolated. Detailed descriptive statistics about study participants are presented in Table-1. Infection according to IV site canolation is presented in Figure-1.

Out of total study participants, 22(8.8%) patients acquired blood stream infection during their hospital stay. It was noted that 22 infected patients, 12.5% acquired from central line and 6.8% were acquired from peripheral line. Among all blood stream infected patients, laboratory investigations were done for blood culture, CBC, C-reactive protein, erythrocyte sedimentation, liver function test, creatinine and procalciton in 72.7%, 72.7%, 40.9%, 4.5%, 40.9%, 45.5% and 22.7% patients respectively after confirmation of blood stream infection. Around 91.0% infections have positive bacterial organisms and 9.1% have positive fungal organisms. Most common organisms were pseudomonas (31.8%), staphylococcus aureus (18.2%), klebsiella(9.1%), acenatobacter

(9.1%) and candida tropicalis (9.1%). Out of total 22 infected patients, 16 (72.7%) patients have excess hospital stay from infection acquisition day with average of 9.31±4.97 days. Among infected patients majority (40.9%) spent more than 35,000 PKR (7,062 PKR to 70,988 PKR) as excess cost in terms of treatment during their stay. As far as damage of organs is concerned among 22 infected patients, 9.1% had kidney damage, 13.6% had liver damage, 13.6% had heart damage and 4.5% had lungs damage. Detailed descriptive statistics of patients with blood stream infection are presented in Table-2.

Table-1: Descriptive Statistics of Study Participants

	n(%)
Gender	
Male	110(44)
Female	140(56)
Age(years)ǂ	45.89±17.82
≤35 years	82(32.8)
36-50 years	62(24.8)
>50 years	106(42.4)
Hospital Stay(days)ǂ	11.30±7.24
≤12 days	175(70)
>12 days	75(30)
No. of Times line Passed from admission till outcome ǂ	2.36±1.70
No. of line days ǂ	10.27±6.77
Comorbidities	
Diabetes	93(37.2)
COPD	9(3.6)
CKD	37(14.8)
Autoimmune disease	7(2.8)
CLD	4(1.6)
Hypertension	106(42.4)
CVA	4(1.6)
CVD	36(14.4)
Carcinoma	2(0.8)
Admissions	
Medicine/Allied Services	184(73.6)
Surgery	66(26.4)
Outcome	
Cured	207(82.8)
Expired	43(17.2)
IV Site Canolation	
Peripheral	162(64.8)
Central	88(35.2)
Infection	
Yes	22(8.8)
No	228(91.2)

ǂ Mean± Standard Deviation

Table-2: Descriptive Statistics of Study Population with infection (n=22)

	n (%)
Blood Culture after confirmation of Blood Stream Infection	16(72.7)
Blood Culture (n=16)ǂ	3.31±1.85
CBC after confirmation of Blood Stream Infection	16(72.7)
Frequency of CBC (n=16)ǂ	8.43±5.42
C-reactive protein after confirmation of Blood Stream Infection	9(40.9)
Frequency of CPR (n=9) ǂ	2.66±.70
Erythrocyte sedimentation rate after confirmation of Blood Stream Infection	1(4.5)
Liver Function Test after confirmation of Blood Stream Infection	9(40.9)
Frequency of LFT's (n=9) ǂ	6.66±5.65
Creatinine after confirmation of Blood Stream Infection	10(45.5)
Frequency of Creatnine(n=10) ǂ	2.90±4.35
Procalciton after confirmation of Blood Stream Infection	5(22.7)
Frequency of Procalciton (n=5) ǂ	1.60±0.89
Kidney Damage	2(9.1)
Liver Damage	3(13.6)
Heart Damage	3(13.6)
Lungs Damage	1(4.5)
Hospital Stay in days before BSI ǂ	6.59±6.05
Excess hospital stay from infection acquisition day (n=16)ǂ	9.31±4.97
Excess cost in terms of Treatment (PKR)ǂ	27483.45±21681.36
≤10,000 PKR	6(27.3)
11,000-35,000 PKR	7(31.3)
>35,000 PKR	9(40.9)
Organism	
Bacterial	20(90.9)
Fungal	2(9.1)
Isolated Organisms	
Staphylococcus Aureus	4(18.2)
E.Coli	2(9.1)
Pseudomonas	7(31.8)
Klebsiella	2(9.1)
Acenatobacter	2(9.1)
Serratia	1(4.5)
Burkholderia	1(4.5)
Enterobacter	1(4.5)
Candida tropicalis	2(9.1)

ǂ Mean± Standard Deviation

Table-3: Association of Blood Stream Infection with risk factors

	Infection		P-Value
	Yes	No	
Gender			
Male	7(31.8)	103(45.2)	0.228
Female	15(68.2)	125(54.8)	
Age Group			
≤35 years	7(31.8)	75(32.9)	0.961
36-50 years	6(27.3)	56(24.6)	
>50 years	9(40.9)	97(42.5)	
Hospital Stay			
≤12 months	7(31.8)	168(73.7)	0.000*
>12 months	15(68.2)	60(26.3)	
Comorbidities			
Diabetes	10(45.5)	83(36.4)	0.402
COPD	0(0)	9(3.9)	1.000
CKD	9(40.9)	28(12.3)	0.002
Autoimmune disease	1(4.5)	6(2.6)	0.480
CLD	1(4.5)	3(1.3)	0.310
Hypertension	10(45.5)	96(42.1)	0.761
CVA	0(0)	4(1.8)	0.690
CVD	5(22.7)	31(13.6)	0.334
Carcinoma	0(0)	2(0.9)	1.000
Admissions			
Medicine/Allied Services	19(86.4)	165(72.4)	0.155
Surgery	3(13.6)	63(27.6)	
Outcome			
Cured	11(50)	196(86)	0.000*
Expired	11(50)	32(14)	

Pearson chi-square/fisher exact test was applied. *P-value less than 0.05 considered as significant.

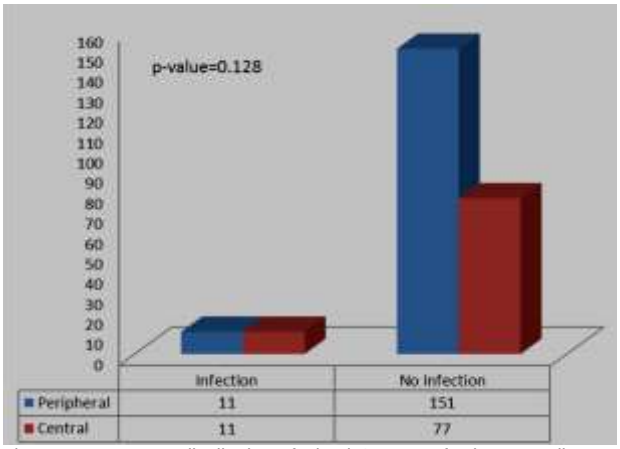

Figure-1: Frequency distribution of Blood Stream Infection according to IV Site Canolation

Mortality rate among infected patients was 50%. A significant association of infection with hospital stay (p=0.000), chronic kidney disease (p=0.002), and with outcome i.e. cured or expired (p=0.000) was observed. The detailed results are presented in Table-3. Among study results significant association of IV site canolation with hospital stay (p=0.013) and with outcome (p=0.000) was also observed. The detailed results are presented in Table-4.

Table-4: Association of IV Site Canolation with risk factors

	IV Site Canolation		P-Value
	Peripheral	Central	
Gender			
Male	65(40.1)	45(51.1)	0.094
Female	97(59.9)	43(48.9)	
Age Group			
≤35 years	51(31.5)	31(35.2)	0.785
36-50 years	42(25.9)	20(22.7)	
>50 years	69(42.6)	37(42)	
Hospital Stay			
≤12 months	122(75.3)	53(60.2)	0.013*
>12 months	40(24.7)	35(39.8)	
Comorbidities			
Diabetes	62(38.3)	31(35.2)	0.634
COPD	4(2.5)	5(5.7)	0.285
CKD	21(13)	16(18.2)	0.267
Autoimmune disease	6(3.7)	1(1.1)	0.427
CLD	3(1.9)	1(1.1)	1.000
Hypertension	75(46.3)	31(35.2)	0.091
CVA	1(0.6)	3(3.4)	0.127
CVD	23(14.2)	13(14.8)	0.902
Carcinoma	1(0.6)	1(1.1)	1.000
Admissions			
Medicine/Allied Services	113(69.8)	71(80.7)	0.061
Surgery	49(30.2)	17(19.3)	
Outcome			
Cured	148(91.4)	59(67)	0.000*
Expired	14(8.6)	29(33)	

Pearson chi-square/fisher exact test was applied. *P-value less than 0.05 considered as significant.

DISCUSSION

This study was conducted to observe blood stream infection acquired during hospital stay. In our study female patients were more as compared to male patients. Majority of the patients were above 50 years. Mean hospital stay was 11.30±7.24 days. Most of the patients were hypertensive. Total 8.8% patients had blood stream infection and among them mortality rate was 50%. A total of 64.8% patients had peripheral line and 35.2% patients had central line canolation but majority of the patients with central line acquired blood stream infection during their hospital stay. Majority patient's infections have positive bacterial organisms. Most common organism was pseudomonas with 31.8%. Out of total 22 infected patients, 72.7% patients have excess hospital stay from infection acquisition day with average of 9.31±4.97 days. Among infected patients majority (40.9%) spent more than 35,000 PKR as excess cost in terms of treatment during their stay. According to studies, catheter-related bacteraemias result in longer hospital stays, higher expenses, and higher morbidity and fatality rates. [36] Catheter-related bacteraemias are among the most prevalent kinds of nosocomial infections and are typically associated with the use of central venous catheters, particularly in intensive care units. Peripheral catheter-related bacteraemia rates are lower than central catheter-related bacteraemia rates, despite the fact that peripheral catheter use is estimated to be 60 times more common than central catheter use. [6] The results of this study supported our findings and are equivalent to ours.

A study found that 77% of catheter-related bacteraemias were brought on by central catheters, as opposed to 23% for peripheral catheters. [6] These results are in line with a Spanish study on the frequency of nosocomial infections, in which survey respondents reported that of all catheter-associated bacteraemias, 73.85% were linked to central venous catheters and 26.14% were linked to peripheral catheters. [37] One study found that the cumulative incidence of catheter-related bloodstream infections per 1,000 hospitalised patients/day was more than three times higher for central catheters than for peripheral catheters. [6] This outcome is in line with findings from other studies, including those by Pujol et al., who calculated a rate of 0.18 episodes of bacteraemia per 1,000 days of peripheral catheter use at a university hospital; a related study also discovered a rate that was 5 times higher, 0.9 episodes per 1,000 days of central catheter use. [38] According to a study, Staphylococcus aureus and coagulase-negative staphylococci were the most common etiological agents of catheter-related bacteraemias. For bacteremias connected to the peripheral line compared to the central line, Staphylococcus aureus was 2.5 times more prevalent. [6] This agrees with other research that have been published. 62 blood stream infections linked to peripheral venous catheters were described by Akihiro Sato et al. Gram-positive bacteria were to blame for 58% of peripheral venous catheter-related bacteremias, with S aureus accounting for 17% of those. [39] Numerous studies have shown that peripheral venous catheters were the cause of a mean of 38% (range, 12-64%) of S. aureus catheter-related bacteremias and a mean of 19% (7.6-35%) of S. aureus bacteremias from infected peripheral venous catheters. [40]

Hospital LOS is a key outcome in studies examining the cost-effectiveness of CLABSI-prevention treatment. [41] The rise in LOS brought on by CLABSI has a considerable impact on hospital expenses. [42] As a result, the hospital's resources are depleted, the patient's experience is worsened, and the patient's chance of developing more hospital-acquired illnesses increases. [43]

This study found that the average number of days lost as a result of CLABSI was 13.139.53. This number was significantly associated with the total number of deaths and had a shorter LOS than patients who completed a full course of antibiotics (p 0.0001). This is comparable to the LOS discovered by Rosenthal et al. in their multicenter study, which comprised 69 tertiary care hospital ICUs from the International Nosocomial Infection Control Consortium (INICC) in 11 different countries. [44]

One of the study found that the LOS in patients with CLABSI was 14.53.08 days, which is 9.8 days longer than average. In contrast to patients on normal wards, it is noteworthy that ICU patients did not have a higher risk of LOS. The findings of Jia et al., study involved 68 hospitals, revealed that an organism's sensitivity to antibiotics may have an impact on LOS. [45] Age and gender were not shown to be substantially correlated with CLABSI-associated LOS, according to this study. The fact that CLABSI was unrelated to age and gender in these data supports those of Atilla et al. [46] According to the findings of a different study, LOS and costs related to HAI ranged from 16.86 to 25.06 days and $15,909.21 to $22,041.73, respectively. [47] According to a systematic review, LOS related to BSI varied between 1.2-26.4 days [48], which was at the lower end compared to a study.[47] According to studies that have been published, the costs associated with BSI ranged from $1430 (Brazil)[49] to $95,440. (US). [50] The attributable BSI charges in a study are quite modest as compared to the international study. [47] It is significantly more expensive than the study on CLABSIs in China ($3528.6), though. [51] Hospital costs associated with HAI are primarily attributed to excessive LOS. Two possible strategies—BSI prevention and LOS reductions for patients with BSI—can lower LOS and expenses. [47]

One of the most thorough analyses of the financial impact of CLABSI in adult patients admitted to Italian ICUs is provided in a study. In that study, hospital expenses for patients with CLABSI were, on average, about twice as high as those for patients without CLABSI. The majority of the extra expenses were brought on by a protracted hospital stay. The average cost of healthcare related to CLABSI was € 9,000. [52] These findings are comparable, for instance, to those obtained from 309 HAI patients treated in a local hospital in England. According to the UK study's author, CLABSI patients spent an additional 4 days in the ICU on average, and

their hospital expenses were 2.9 times greater than those of uninfected patients (extra cost of approximately € 10,000).[53] More recently, Warren and colleagues in a non-teaching hospital in the United States estimated the attributable costs of CLABSI among ICU patients. The findings demonstrated that CLABSI significantly increased the length of hospital and intensive care unit stays by 7.54 and 2.41 days, respectively, at an additional cost of about $11,971. [54] Patients with CLABSI in a cohort had a longer-than-average hospital stay. The average cost per CLABSI case was 8,810 euros. As a result of these extra expenses, there was an attributable median loss of 8,171 € per CLABSI case since expenses outweighed reimbursements. [55] The expenses of nosocomial BSI and CLABSI have previously been the subject of other research, which discovered a pertinent rise in expenditures of several thousand dollars or euros (e.g., between 10,000 and 70,000) per case relative to controls. [56–60]

The prevention of CLABSI uses a variety of techniques that take into account insertion- and catheter-related variables. The use of antibiotic-impregnated catheters and suture-less securement devices, coupled with efficient infectious control programmes, are factors connected to catheter insertion, including insertion under full sterile technique. Many other approaches, such as the passive approach, which entails receiving prompt feedback by adhering to surveillance protocols, may also be successful in lowering the incidence of CLABSI infection. In comparison to regimes without such programmes, it was discovered that dedicated infection control programmes and efficient surveillance decreased the rate of infection. The bundle idea, which was just recently launched, aims to lower the rate of CLABSI by implementing preventive measures after central line installation as well as as surveillance during the hospital stay.

Limitations of Study: First off, there were a few significant variables that were beyond the scope of analysis and control. These covered personnel qualifications and features as well as the severity of the patients' illnesses and any potential impact they may have on the death rate. Second, the LOS of patients with the same illness who acquired CLABSI against those who did not was not compared in this study.

CONCLUSION

Patients had to bear a heavy burden as a result of infections contracted when using central venous catheters, which lengthened hospital stays and raised treatment costs. Compared to peripheral line catheters, central line catheters had a higher rate of blood stream infections. Additionally, mortality rates with central line catheters were relatively greater. Future cost-effectiveness assessments of BSI therapies may find this study to be a beneficial source of information.

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