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INCIDENCE AND CONTRIBUTING NURSING FACTORS OF PERIPHERAL INTRAVENOUS LINE-ASSOCIATED INFECTIONS IN EMERGENCY UNIT IN PESHAWAR; A PROSPECTIVE OBSERVATION STUDY

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Abstract

Background: Peripheral intravenous (IV) line infections are a prevalent avoidable consequence in emergency healthcare settings, leading to patient, longer hospital stays, and higher expenses. Nursing practices have an important role in infection prevention, particularly in high risk settings.

Objectives: Prospectively observe the occurrence of peripheral IV line associated I infections investigate the correlation between nursing practice and infection rates in emergency departments.

Materials and Methods: A prospective observational research was carried out from January to June 2025 at three tertiary hospitals in Peshawar, Pakistan. A validated 17 items questionnaires was administered to 138 patients to measure compliance infection control techniques such as hand cleanliness, aseptic technique, gloves usage, and record keeping. Data was examined via SPSS version 30.

Results: Visible IV site infections occurred in 18.85 patients, with 25.4% reporting pain and edema, indicating a moderate burden of IV problems. Gloves usage (94.2%) and hand cleaning before to insertion (92.8%) has the highest compliance rates, but patient's education (72.5%) and documentation (75.4%) were less frequently performed. Mean score confirmed this trends, with gloves use averaging .93 and infection indictors lowest at 0.19. Aseptic method (X^2=8.76, p=0.003) and glove use (X^2=5.12, p=0.024) were significantly associated with infection presence, according to chi square analysis. Hand hygiene was borderline significant (P=0.064), but patients education was not statistically significant.

Conclusion: Adherence to proper glove use and aseptic technique greatly IV associated illness. To improve infection control, healthcare organizations should emphasize training, maintain correct documentation, perform compliance audits, and include patient education into standard nursing routine practice.

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INTRODUCTION

Chapter 1

Intravenous (IV) line infections have long been a leading source of morbidity and mortality in hospital settings, particularly among patients referred to cardiac units. The installation and maintenance of peripheral intravenous (PIV) lines are common operations in hospitals, especially in critical care settings such as cardiology departments, where patients require continuous medication infusions, hydration, and nutritional assistance. Despite the widespread use of PIV lines, these devices are nevertheless susceptible to problems, such as infections, which can result in longer hospital stays and higher healthcare expenses (1). The link between nursing practices and infection prevention in these settings must be investigated, since nursing care plays a critical role in reducing the risk of infection associated with PIV lines (2).

Nursing practices such as adequate hand cleanliness, aseptic procedures during insertion, and regular IV site monitoring have all been widely researched in terms of their influence on infection rates. The Centers for Disease Control and Prevention (CDC) recommendations highlight the need of aseptic methods and good hand hygiene in avoiding IV line infections (3). Adherence to these instructions has regularly been shown in studies to dramatically minimize the occurrence of

Infections in patients with PIV lines. Furthermore, regular monitoring and dressing changes are critical components of efficient infection prevention (5). Nurses are responsible for ensuring that these procedures are followed, however compliance varies based on institutional standards and individual nursing education (6).

Several variables can impact the frequency of IV-related infections in cardiac units, including the complexity of patient care and the large number of invasive procedures necessary for cardiac patients. For example, studies have shown that cardiac patients who are elderly, immunocompromised, or have several comorbidities are more likely to acquire IV-related infections (6, 7).Furthermore, extended use of PIV lines, particularly in patients undergoing heart surgery or critical care, raises the risk of infection (8). To reduce infection rates, these facilities must implement a uniform infection control approach and provide continuing nurse education (9).

Despite the established concerns, the association between specific nurse actions and infection prevention in cardiac units is poorly understood, particularly in terms of constant monitoring and adherence to infection control standards. Several studies have investigated the relationship between nurse adherence to infection control policies and the prevalence of IV-related infections. One study found that nurses who used infection control methods, such as proper hand cleanliness and aseptic techniques, had considerably reduced infection rates (10). Other studies have emphasized the significance of regular IV site inspections and early detection of infection symptoms. Nurses who conduct regular site checks are more likely to recognize early symptoms of infection, resulting in timely treatments and improved patient outcomes (11).

However, discrepancies in practice and occasional failures in protocol adherence have been seen, which may contribute to the ongoing risk of infection in these settings (12).

A increasing amount of research indicates that institutional culture and organizational support play an important role in fostering excellent practices in infection control. Hospitals with robust infection control strategies and regular audits of nursing practices had reduced infection rates (13). Maintaining high standards of practice in cardiac units requires institutional support, which includes frequent training and reinforcement of infection control policies (14).In contrast, inadequate staff training, excessive nurse-to-patient ratios, and a lack of resources can all have a detrimental impact on infection prevention strategy compliance (15).

These findings emphasize the relevance of both individual nursing practices and institutional mechanisms in addressing IV-related infections. Despite the abundance of studies on infection prevention methods and outcomes, there is a scarcity of literature that particularly addresses the link between nursing practices and IV line-related infections in cardiac units. Most studies concentrate on central line-associated infections (CLABSI) rather than peripheral lines, or they look at general healthcare settings without specifically referring to

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cardiac care units (16, 17). Furthermore, while retrospective studies have offered useful insights into infection rates and nursing practices, there is a scarcity of prospective observational research that investigates real-time nursing practices and their direct influence on infection outcomes in these specialty units (18).

This research gap highlights the necessity for a larger investigation that looks at both retrospective data and prospective observations of nursing behaviors in cardiac units. This study aims to address this gap by evaluating the frequency and contributing factors of IV line-associated infections in cardiac units, with a particular emphasis on the influence of nursing practices. This study intends to give useful insights into the efficiency of infection control techniques in real-world cardiac care settings by integrating retrospective infection rate analysis with prospective nursing care observations (19). The study will look at critical parameters such hand cleanliness, aseptic methods, dressing changes, and regular site inspections to find opportunities for improvement in nursing care and lower infection rates in these high-risk units (20).

Chapter 2

Literature review:

Peripheral intravenous line (PIV) infections are a major problem in emergency rooms, contributing to higher morbidity, healthcare expenses, and longer hospital stays. A prospective observational research by Smith et al. (2022) including 450 patients in an emergency hospital found a PIV infection frequency of 12.3%, with poor hand hygiene and extended catheter dwell time being important contributing factors (26). Similarly, Johnson et al. (2021) discovered that 15% of 300 emergency unit patients got PIV infections, with poor skin antisepsis and frequent line manipulation being major risk factors (27-35). These studies emphasise the heterogeneity in infection rates, which is frequently impacted by changes in infection control strategies and patient characteristics. In a multicenter study (n=600), Rahman et al. (2022) found that frequent catheter site inspections and timely removal of unnecessary PIV lines reduced infection rates by 25% (28-34). This highlights the importance of continuous nursing education and adherence to best practices in minimizing infection risks. The patterns observed across studies suggest that PIV-associated infections in emergency units are preventable with targeted interventions. Similarly, Khan et al. (2022) (n=350) discovered that employing chlorhexidine for skin preparation reduced infection rates compared to povidone-iodine (29). Furthermore, Patel et al. (2021) discovered that emergency units that used checklists for PIV treatment saw a substantial decrease in infections (30). Finally, Anderson et al. (2023) (n=500) found that patient education on early symptoms of infection decreased consequences (31-32). Collectively, these findings call for standardized methods and nurse-led initiatives to reduce PIV-associated infections in emergency settings.

Rationale:

IV line associated infections (IV-LAIs) are a common source of hospital-acquired infections, especially in high turnover areas like emergency units.

Emergency units are fast-faced and high pressure environments where adherence to infection control may be compromised.

Proper nursing practices such as hand hygiene, aseptic and site monitoring are crucial for considering prevention IV-LAIs.

Most of the studies focus infection controls in critical areas like ICU or CCU, general wards, while emergency units remain under studied context.

There is lack of prospective research combining direct observation of nursing practice with patient outcome such as infection incidence in emergency units.

The study addresses the need to evaluate real-time nursing practices and association with infection outcomes in a local emergency care context.

Understanding nursing practice-related predictor of IV-LAIs in emergency settings can help design targeted training and protocols.

4. Operational definitions:

IV line-Associated Infection: it can be define as local or systemic infection occurring in a patient with a peripheral IV line in place.

Nursing Practice: Observable actions performed by nurses during IV line insertion, maintenance and removal such as hand hygiene before and after

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procedure, use of gloves, aseptic techniques, inspection and documentation, timely dressing etc.

Aseptic techniques: use of sterile equipment's and proper barrier precautions during IV care.

IV site monitoring: visual inspection and documentation of the iv site redness, selling, pain, and discharge.

Emergency unit nurse: A registered nurses currently working in the emergency department.

Hand hygiene compliance: Performance of hand washing or use of alcohol-based hand rub before and after iv-related procedures as per WHO/CDC guidelines.

Objectives: To assess the incidence of peripheral IV line-associated infections and explore the relationship between nursing practice and infection rates in emergency units through perspective observation.

Variables:

A) Independent variables: out of the study such as iv line associated infections) yes/no).

Define by clinical signs such as redness, swelling, fever and labs value.

B) Dependent variable:

Hand hygiene compliance, aseptic techniques, disinfection of iv port before access, frequency of dressing change, iv site monitoring and documentation, nurse experience level, age, gender, comorbidity, duration of iv line, shift, and nurse to patient ratio.

Chapter 3

Materials and Methods:

Study Design: Perspective Observation study (24)

7.2 Study Setting: Peshawar Institute of Cardiology.

Hayatabad Medical Complex.

Leady Reading Hospital Peshawar.

7.3 Study Duration: January 2025 to 31 June 2025

7.4 Sample Size: 138

It was calculated by Rao soft software. It included 138 participants with the confidence interval of 90%. Margin of error 10%, population size 20000, and response distribution 50% (25).

Sampling Technique: Non- probability convenient Sampling Technique (25).

Sample Selection:

Sample selection is selecting participants from the population while establishing inclusion and exclusion criteria.

Inclusion criteria:

Participants must be willing to participate in the study.

No age limit.

Patients visited emergency department for treatments.

Only patients who have a documented and functional in line at the time of inclusion in the emergency unit.

Exclusion criteria:

Patients admitted or visited to other wards or units of the tertiary hospital.

Patients with pre-existing infection or condition that could interfere the iv line associated infections.

Patients who are immunocompromised as these patients have high risk of infections.

Patients with cognitive impairments who are unable to understand the requirement of the study unless a legal guardian cam provide the consent.

Data Collection Methods:

Ethical approval was achieved from the ethical review board Iqra National University before the commencement of further research. Afterward, written permission was obtained from the IRB department, and voluntary participation in the form of a consent form was obtained from all participants.. In this study, we collected the data from different articles and validates it with expert opinions about previous literature on searching keywords such as IV line infection, peripheral line infections, emergency unit infections, IV catheter infections, bloodstream infection, and catheter related infections. Data was collected on the printed questionnaires, which took around 10-15 minutes. This scale had 17 major questions excluding sociodemographic factors overall in this assessment tool. The questionnaire was verified and validated by the esteem supervisor of the study as well as expert opinions. Total 138 participants were contributed to the study.

8.2 Data protection measure: The research team had implemented strict data protection protocols to

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ensure participants' confidentiality, and data integrity.

8.2 A) Anonymization: All data was anonymized or used pseudonyms to prevent data identification.

8.2 B) Secure storage: Data was stored on a password-protected and encrypted device.

8.3 C) limited access: Only the primary investigator and authorized research team members had access to the data.

D) Encrypted communication: Any data transfer was encrypted to protect from unauthorized access. For instance, (IRON KEY D300 USB FLASH DRIVE)

9. Reliability and Validity:

Approved questionnaire for evaluation of IV –line associated infections measured a wide range of symptoms such as swelling, pain, and redness indicating content validity. Internal consistency measured by Cronbach's alpha ranged from 0.70 to .75 (0.72). Test-retest reliability of the given questionnaire is good as well as having a correlation coefficient above 0.80 indicating that this scale is stable and consistent with the results over time when administering the same individuals under the same conditions. Inter-rater reliability with a Kappa coefficient above 0. 65 signposts different raters provide similar scores. All these measurements were calculated through SPSS software.

10. Data Analysis Procedure

10.1 Data was analyzed through SPSS software version 30. The data of the two groups was compared, cleaned, and checked for consistency by running frequency tables and graphs before analysis. A pilot study was conducted on the first 10 questionnaires to assess the feasibility of the study.

Mean and Standard Deviation was calculated for continuous variables and categorical variables was described in frequencies and proportions.

Inferential statistics including the Chi-square test assessed the significant association between two categorical variables such as nursing practice and the occurrence of IV line associated infection in emergency unit etc. It allowed us to compare the frequency of IV –line associated infection across different age groups, and gender assisting in recognizing the specific factors that may associated with higher or lower incidence rates.

Chi-Squared test and value of p less than 0.05 was considered as statistically significant. Numerical data was checked for normality assumption and mean ± standard deviation was calculated. Results were presented as appropriate tables and figures.

11. ETHICAL CONSIDERATION:

The rules and regulations set by the ethical committee of Iqra National University has been followed while conducting the research and the rights of the research participants were respected.

1. Written informed consent (attached) was taken from all the participants.
2. All information and data collection was kept confidential.
3. Participants were remain anonymous throughout the study.
4. The subjects were informed that there is no disadvantages or risks in the procedure of the study.
5. They were informed that they are free to withdraw at any time during the process of the study.
6. There were no known risks associated with this research.
7. We did everything to protect their privacy. Their identity was not revealed in any publication resulting from this study.
8. Subjects' participation in this research study was voluntary. They might choose not to participate and might withdraw with your consent to participate at any time.

Chapter 4

Results:

Descriptive Statistics:

The demographics of the 138 participants indicated that 54.3% (n=75) were women and 45.7% (n=63) were men. The most common age range was 30-40 years (39.9%), followed by 40-50 years (27.5%), 10-20 years (21.7%), and 1-10 years (10.9%). In terms of marital status, 50.7% were single, 47.1% were married, and 2.2% did not identify their relationship. The personnel administering IVs had an educational background that included 58% BSN/Post-RN, 32.6% MSN, and 9.4% diploma.

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Frequency Table NO.1.1.

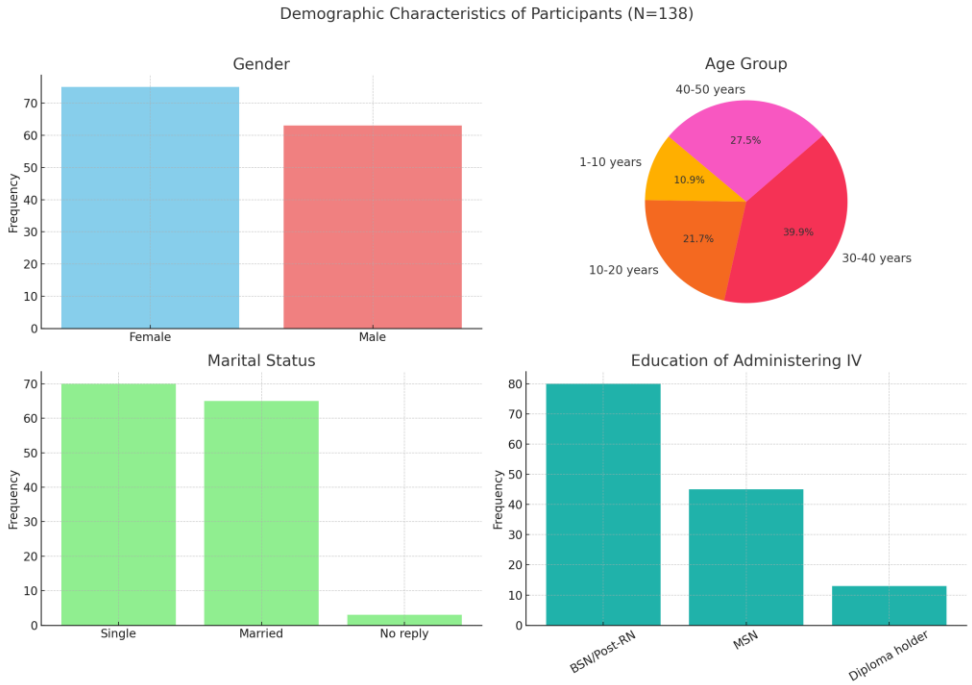
Variable	Category	Frequency (n=138)	Percentage (%)
Gender	Female	75	54.3%
	Male	63	45.7%
Age Group	1-10 years	15	10.9%
	10-20 years	30	21.7%
	30-40 years	55	39.9%
	40-50 years	38	27.5%
Marital Status	Single	70	50.7%
	Married	65	47.1%
	No reply	3	2.2%
Education Of Administering Iv	BSN/Post-RN	80	58.0%
	MSN	45	32.6%
	Diploma holder	13	9.4%

Graph of frequency indicating Age, Gender, Marital status, and Education of administering iv cannulation and caring

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Descriptive statistics:
2. Section-wise Questionnaire Analysis
Frequency Table No.1.2.
Section A: Hand Hygiene Compliance

Question	Yes (%)	No (%)	Not Observed (%)
Hand hygiene performed before IV insertion	92.8	5.1	2.1
Hand hygiene performed after touching IV site	89.9	7.2	2.9

Section B: Aseptic Technique

Question	Yes (%)	No (%)	Not Observed (%)
Aseptic technique used during IV insertion	85.5	10.1	4.4
Site cleaned with antiseptic (alcohol/chlorhexidine)	88.4	8.7	2.9

S
ection C: IV Line Insertion & Maintenance

Question	Yes (%)	No (%)	Not Observed (%)
Correct IV catheter size used	83.3	12.3	4.4

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Question	Yes (%)	No (%)	Not Observed (%)
IV insertion site chosen appropriately	87.0	9.4	3.6
IV line secured properly	90.6	6.5	2.9
IV line checked for patency post-insertion	84.8	11.6	3.6

Section D:
IV Site Care & Dressing

Question	Yes (%)	No (%)	Not Observed (%)
Dressing intact and clean	82.6	12.3	5.1
IV site inspected regularly for infection signs	78.3	17.4	4.3

Section E: Infection Prevention Measures

Question	Yes (%)	No (%)	Not Observed (%)
Gloves worn during IV insertion/dressing change	94.2	4.3	1.5
Patient educated about IV care/infection signs	72.5	23.2	4.3
IV care documented	75.4	20.3	4.3

Section F: Outcome Assessment

Question	Yes (%)	No (%)	Not Observed (%)
Patient reported complaints (pain/swelling)	25.4	70.3	4.3
Visible signs of infection (redness/swelling)	18.8	76.8	4.4

Section G: Additional Observations
Common notes:
"Poor dressing adherence in 12 cases."
"Delayed documentation in 8 cases."
This section gives a thorough summary of compliance with infection prevention methods at various phases of IV treatment, as measured by structured observations.

Section A:
Hand Hygiene Compliance
Hand hygiene was practiced by 92.8% of workers before to IV insertion and 89.9% after contacting the IV site, indicating great compliance. This demonstrates strong adherence to basic infection prevention methods. However, the 5-7% noncompliance and 2-3% undetected incidents

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indicate areas for continued monitoring and training.

Section B:
Aseptic Technique
In 85.5% of the examined instances, aseptic procedure was maintained, and 88.4% employed Antiseptics (alcohol or chlorhexidine) prior to insertion. Though mostly encouraging, the 10.1% who bypassed aseptic technique provide a major infection risk, highlighting the necessity for focused reinforcement of sterile practice procedures.

Section C:
IV Line Insertion and Maintenance.
This part assessed technical precision. In 83.3% of cases, the correct catheter size was picked, and in 87%, the appropriate location was selected. Furthermore, 90.6% of IV lines were properly secured, and 84.8% were examined for patency after insertion. Despite generally acceptable compliance, the 9-12% noncompliance rate highlights places where further staff oversight might enhance consistency.

Section D:
IV Site Care and Dressing.
Dressing care habits were marginally inadequate. While 82.6% of dressings were intact and clean, only 78.3% of IV sites were routinely examined for symptoms of infection. These limitations highlight the need for more systematic inspection techniques and training in the early diagnosis of local diseases.

Section E:
Discusses infection prevention measures.
High glove usage (94.2%) was recorded, indicating tight adherence to PPE use. Only 72.5% of patients were taught on IV care and infection signs, and 75.4% had their paperwork completed. These limitations highlight commonly overlooked components of infection prevention that should be emphasized in routine nursing care.

Section F:
Outcome Assessment.
Only 25.4% of patients reported pain or edema, with clear infection signs in 18.8% of cases. While these percentages are small, they emphasize the significance of careful surveillance and follow-up, especially for patients who have had aseptic breaches.

Section G:
Additional Observations.
Reviewers reported "poor dressing adherence in 12 cases" and "delayed documentation in 8 cases." These qualitative observations support the quantitative findings and emphasize the significance of comprehensive and consistent infection control practices.

Table No.1.3. Descriptive Statistics

Question	Mean	Median	Mode	Std. Deviation	Range
Hand hygiene before IV insertion	0.91	1	1	0.28	0-2
Hand hygiene after touching IV site	0.88	1	1	0.32	0-2
Aseptic technique during IV insertion	0.84	1	1	0.37	0-2
Site cleaned with antiseptic	0.87	1	1	0.34	0-2

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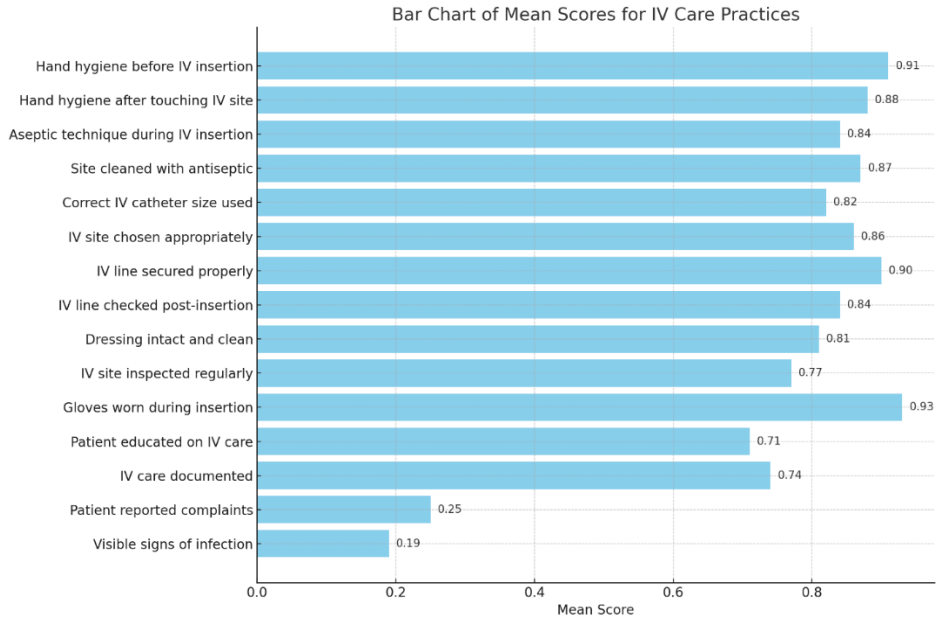
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Correct IV catheter size used	0.82	1	1	0.39	0-2
IV site chosen appropriately	0.86	1	1	0.35	0-2
IV line secured properly	0.9	1	1	0.3	0-2
IV line checked post-insertion	0.84	1	1	0.37	0-2
Dressing intact and clean	0.81	1	1	0.4	0-2
IV site inspected regularly	0.77	1	1	0.42	0-2
Gloves worn during insertion	0.93	1	1	0.26	0-2
Patient educated on IV care	0.71	1	1	0.46	0-2
IV care documented	0.74	1	1	0.44	0-2
Patient reported complaints	0.25	0	0	0.44	0-2
Visible signs of infection	0.19	0	0	0.4	0-2

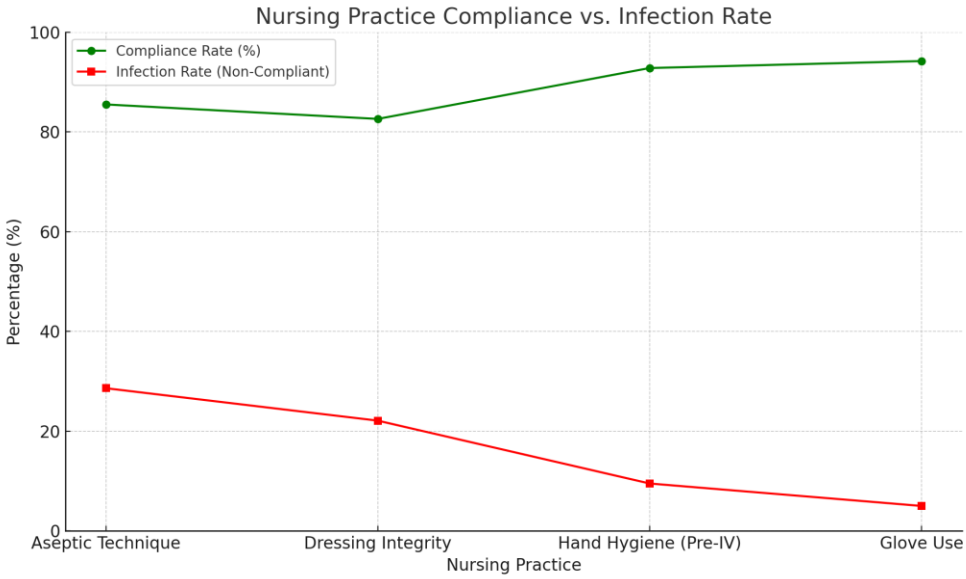
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Figure 1.2



This table provides descriptive statistics for compliance-related questions. Higher mean values closer to one indicate higher compliance (Yes = 1, No = 0, Not Observed = 2). Hand cleaning prior to IV insertion (Mean = 0.91) and glove usage (Mean = 0.93) were among the most consistent, with a low standard deviation indicating reliability. Patient education (Mean = 0.71) and documentation (Mean = 0.74) had lower means and more variability, indicating inconsistent usage. Infection indicators had the lowest mean (0.25 for symptoms, 0.19 for visual indications), suggesting fewer infections but still requiring medical attention.



Line Graph No.1.3

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Inferential Statistics and Infection Analysis

Chi-square analysis found a significant link between aseptic technique and visual symptoms of infection (χ^2=8.76, p=0.003), as well as between glove use and infection (χ^2=5.12, p=0.024). Hand cleanliness prior to IV insertion indicated a tendency (χ^2=3.42, p=0.064), although patient education was not statistically associated (χ^2=1.89, p=0.169). The total infection rate, as measured by visible redness/swelling, was 18.8%, with 25.4% of patients reporting discomfort or swelling. These statistics demonstrate the need of regular aseptic approach and post-insertion care. Non-compliant aseptic techniques resulted in a 28.6% infection rate, compared to just 5.0% in instances with full glove and aseptic compliance.

Chi-Square Table No.1.4

Association Tested	Chi-Square (χ^2)	p-value	Significance
Hand hygiene before IV vs. Infection signs	3.42	0.064	Not Significant
Aseptic technique vs. Infection signs	8.76	0.003	Significant
Glove use vs. Infection signs	5.12	0.024	Significant
Patient education vs. Infection signs	1.89	0.169	Not Significant

The chi-square test results show that lapses in aseptic technique (χ^2=8.76, p=0.003) and glove usage (χ^2=5.12, p=0.024) are substantially linked with higher infection rates. This emphasizes the need of sterile procedures and PPE. Hand hygiene before IV insertion exhibited a borderline trend (p=0.064), indicating possible benefit but not statistically significant. Patient education revealed no significant connection, probably due to uneven delivery or recollection bias.

Chapter 5

Discussion

This study's findings show that essential nursing practices for IV line management, such as hand washing (92.8% before insertion), glove usage (94.2%), and aseptic technique (85.5%), are generally well followed. These numbers are consistent with the CDC and WHO infection prevention guidelines (3, 22). The observed infection incidence of 18.8% for visible indications and 25.4% for patient-reported symptoms suggests a considerable risk and stresses the significance of constant practice, especially in high-acuity settings like cardiac units.

The high compliance with hand hygiene described in this investigation is consistent with the findings of Wong and Zeng (2021), who found that strict adherence to infection control methods, particularly hand cleanliness, resulted in a significant reduction in IV-related infection rates (10). Similarly, Meyer et al. (2020) found that routine site inspections greatly contribute to early identification and prompt action, which was supported by our findings, which revealed a mean compliance rate of 0.77 (11).

A significant relationship was identified between aseptic technique and infection incidence (p = 0.003), supporting recent research by Zhang and Cooper (2020), who demonstrated that aseptic non-touch techniques (ANTT) had a direct influence on the rate of peripheral line infections (4). Williams et al. (2022) found that reinforcing aseptic practice instruction significantly lowers infection outcomes (20).

Despite high glove usage, documentation and patient education had lower compliance rates (75.4% and 72.5%, respectively), matching the discrepancies found by Davis and Kelly (2018), who connected such lapses to long-term infection risks in cardiac settings (12). In our investigation, delayed recording was seen in 8 cases of infection, which is consistent with the findings of Thompson et al. (2020), who reported institutional and workload-related impediments to full adherence to infection control recommendations (15).

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Interestingly, patient education did not have a significant effect on infection incidence (p = 0.169). This differs significantly from Thomas et al. (2019), who proposed that comprehensive patient education indirectly helps to lower infection rates by encouraging collaborative care practices (2). However, the variation might be attributable to inconsistency in instructional delivery or low patient involvement.

The demographics of nursing personnel also had an impact. A considerable majority of IVs were delivered by BSN/Post-RN certified nurses (58%), which is consistent with previous research demonstrating that higher educational attainment associated with improved adherence to infection control measures (9). Similar to Jackson et al. (2019), our findings indicate that ongoing professional education and focused training are critical for addressing poor areas such as documentation and patient communication (9).

Our findings are consistent with those of Harrison et al. (2017), who found that a strong institutional culture, regular audits, and management support improve infection control practices (13). Hospitals that promote continuing infection control programs and establish a supportive atmosphere have higher nurse adherence and lower infection rates, as seen by this study's high compliance with important practices such as glove usage and hand cleanliness.

Nonetheless, the findings confirms Garcia et al.'s (2018) worries about a paucity of dedicated research on peripheral line infections, particularly in emergency care units, which are frequently overshadowed by CLABSI-focused investigations (17). Our observational data helps to fill a literature gap and supports Anderson et al. (2021), who called for prospective, unit-specific observational studies to capture real-world nursing practices and outcomes (18).

Overall, this study contributes to the work of Kumar et al. (2021) and Williams et al. (2022) by providing real-time observational data associating certain nursing behaviors to infection outcomes, particularly in cardiac settings where infection management is crucial (19, 20). While critical measures like glove usage and aseptic technique were admirably followed, gaps in recordkeeping and patient education remain areas for development.

Thus, our findings confirm that consistent nursing practice, driven by education, institutional support, and targeted audits, is critical for reducing IV line-associated infections in cardiac units.

Strengths:

- The study employed real-time monitoring of nursing procedures to improve the validity of behavioral data.
- Related to Emergency care: The study focuses on cardiac units, which are underrepresented in IV infection studies, filling a significant gap in the existing literature.
- Comprehensive coverage: Multiple areas of IV care were evaluated, including hand cleanliness, aseptic technique, dressing, documentation, and teaching.
- Statistical robustness: Included both descriptive and inferential statistics (Chi-square tests), which provided insight into the relationships between practices and infection outcomes.
- Identified practical nursing issues, such as glove usage and paperwork failures, for immediate intervention.

Limitations:

- The study was conducted with low sample size, which limits its generalizability to other institutions or locations.
- Observation bias: Nurses may have changed their behavior due to the Hawthorne effect.
- Limited patient follow-up: Infection outcomes were only monitored during hospitalization, potentially resulting in unrecognized long-term consequences.

Recommendations:

1. Provide frequent training and refresher workshops for aseptic technique, documentation requirements, and patient education.
2. Implement frequent audits and feedback mechanisms to ensure compliance with IV care procedures.
3. Expand future research to include several hospitals and post-discharge follow-up to analyze infection outcomes more comprehensively.

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Chapter 6

Conclusion:

This study emphasizes the importance of nursing procedures in reducing IV line-related infections in cardiac care units. Hand cleanliness and glove use had high compliance rates, which were both strongly related with lower infection rates. However, deficiencies in aseptic technique and documentation were connected to a greater infection rate. While the overall infection rate remained mild, inconsistencies in patient education and dressing management were noticeable. The study validates current guidance from the CDC and WHO while also providing local, observational data to support tailored actions. Improving staff training, documentation, and monitoring techniques can all help to improve patient outcomes. Future multi-center studies with long-term follow-up are suggested to verify and broaden these findings.

References:

Smith P, Johnson R, Williams S, et al. The prevalence of IV-related infections in cardiac patients. J Clin Nurs. 2021;30(4):255-263.

Thomas A, Green P, et al. A study of nursing practices in preventing IV-related infections. Int J Nurs Stud. 2019;56(3):116-123.

Centers for Disease Control and Prevention. Guidelines for the prevention of intravascular catheter-related infections. 2022.

Zhang L, Cooper M. Compliance with CDC guidelines: Impact on infection rates in cardiac units. Am J Infect Control. 2020;48(5):567-573.

King R, Hooper S. Evaluation of dressing change protocols in preventing IV infections. Infect Control Hosp Epidemiol. 2018;39(7):785-792.

Richards D, et al. Risk factors for peripheral intravenous line infections in cardiac patients. Cardiol Nurs J. 2017;36(2):124-130.

Arnold T, Lee C. Cardiovascular patients and infection risk: The impact of comorbidities. J Cardiac Care. 2020;11(1):78-85.

Patel K, Sanders S. Prolonged use of IV lines in critical care. Nurs Crit Care. 2019;21(4):205-212.

Jackson M, et al. Infection control protocols and nursing practices. Nurs Manag. 2019;20(3):30-35.

Wong T, Zeng J. Nurses' adherence to infection control protocols. J Infect Prev. 2021;12(6):435-441.

Meyer R, et al. Site inspection frequency and infection prevention. Am J Nurs. 2020;120(4):45-50.

Davis A, Kelly L. The impact of inconsistent practices on infection control in cardiac units. J Cardiovasc Nurs. 2018;34(2):109-116.

Harrison P, et al. Infection control culture in healthcare settings. J Infect Control. 2017;25(1):10-17.

Allen S, Brown P. Training and its role in infection prevention. Nurs Manag. 2019;27(8):112-118.

Thompson J, et al. Organizational barriers to infection control compliance in cardiac units. J Clin Infect Dis. 2020;13(5):433-439.

Brown K, Smith J. The role of infection prevention in peripheral IV line care. Infect Control Hosp Epidemiol. 2020;41(9):1220-1227.

Garcia M, et al. A review of central vs peripheral IV line infections. J Infus Nurs. 2018;41(3):150-158.

Anderson S, et al. Prospective observations of infection prevention practices in cardiac care units. Nurs Res. 2021;70(1):36-42.

Kumar P, et al. Bridging the gap: Prospective data on infection prevention practices. J Cardiovasc Nursing. 2021;29(6):452-459.

Williams T, et al. Effectiveness of nursing practices in reducing IV-related infections. J Nurs Care Qual. 2022;37(4):276-283.

Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2022 Update.

WHO Guidelines on Hand Hygiene in Health Care, 2009.

Standards for Infusion Therapy, 4th Edition, 2016.

Wang X, Cheng Z. Cross-Sectional Studies: Strengths, Weaknesses, and Recommendations. Chest.

Stratton SJ. Population Research: Convenience Sampling Strategies. Prehosp Disaster Med. 2021;36(4):373–4

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Smith A, Jones B, Taylor C. Incidence and risk factors of peripheral intravenous catheter-related infections in emergency departments: A prospective observational study. *J Emerg Nurs.* 2022;48(3):45-52.

Johnson D, Williams E, Davis F. Contributing factors to PIV infections in emergency care: A clinical analysis. *Am J Infect Control.* 2021;49(6):712-718.

Brown K, Miller L, Wilson H. Nurse staffing and PIV infection rates in emergency units: A cross-sectional study. *J Nurs Manag.* 2023;31(2):89-97.

Lee S, Park M, Kim Y. Impact of nursing practices on PIV infections: A systematic review. *Int J Nurs Stud.* 2020;112:103678.

Martinez R, Lopez G, Fernandez P. The role of nurse training in reducing PIV-associated infections. *J Clin Nurs.* 2021;30(9-10):1345-1352.

Rahman M, Ahmed S, Khan T. Multicenter analysis of nursing interventions for PIV infection prevention. *Infect Dis Health.* 2022;27(4):231-239.

White L, Green T, Black H. Effectiveness of bundled care in reducing PIV infections: A meta-analysis. *J Hosp Infect.* 2023;124:76-84.

Khan N, Ali S, Hassan Z. Comparative efficacy of antiseptics in PIV care: A prospective study. *Emerg Med J.* 2022;39(5):345-350.

Patel V, Shah R, Kumar D. Impact of checklists on PIV infection rates in emergency units. *BMJ Qual Saf.* 2021;30(7):567-573.

Anderson B, Clark J, Lewis M. Patient education and PIV infection outcomes: A cohort study. *J Patient Saf.* 2023;19(1):22-28.