



A panoramic analysis of safe infusion practices compliance among healthcare providers in a tertiary care hospital in India

¹Dr. Garima Gautam, ²Garima, ³Jyoti Pal and ²Priya

¹Department of Microbiology, Infection Control Officer), SSB Central Hospital and Research Centre, Faridabad, Haryana, India

²Department of ICN, SSB Central Hospital and Research Centre, Faridabad, Haryana, India

³Department of Nursing, SSB Central Hospital and Research Centre, Faridabad, Haryana, India

Corresponding Author: Dr. Garima Gautam

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Abstract

Introduction: Unsafe infusion procedures in healthcare institutions contribute to several preventable healthcare-related problems and it is necessary to ensure safe and appropriate infusion by a well-trained, professional healthcare provider. The aim of the study was to analyse the nurses' compliance with safe injection and infusion practices in a tertiary care setting.

Material & Methods: This study included IPD patients who had infusion therapy from January to March 2023. The data was gathered using a safe infusion audit checklist and medication chart, and Microsoft Excel has been utilized to analyse both the input and output data.

Results: During the pre-audit phase, only 32 ± 4.55 nurses properly identified the patient. In the post-audit phase, the average was 44 ± 3.09 . There were statistically significant differences in all components of the checklist between the pre-audit and post-audit phases ($p > 0.05$); nurses demonstrated the higher levels of awareness during the post-audit phase.

Conclusion: The current study elucidates several factors that necessitate a specific training program that serves as a baseline for the timely upgrade of practices, understanding, and disposal procedures. Furthermore, this study can serve as a benchmark for the creation of infusion trainings and guidelines.

Keywords: Safe infusion, practice, awareness, nurses

Introduction

Injections are one of the world's most common healthcare operations, yet they occasionally entail the danger of transmitting serious infections. The Safe Injection Global Network (SIGN) describes safe injection practices as a collection of measures aiming to promote safe patient injection behaviour while not jeopardizing the healthcare provider or the broader community^[1, 2]. Unsafe injection procedures are widespread in developing nations' healthcare institutions, contributing to a number of preventable healthcare-related problems despite significant attempts to limit the frequency of harmful injections in poor countries^[3, 4].

In the year 2000, improper injection practices caused estimated 20 million new hepatitis B virus (HBV) infections, 2 million new hepatitis C virus (HCV) infections, and 250,000 new human immunodeficiency virus (HIV) infections^[5]. In developing nations, the world health organisation (WHO) estimates that approximately 16 billion injections are delivered each year^[6]. The anticipated number of injections per person per year is 3.4 (range 1.7-11.3), with 39% being hazardous injections (range 1.2-75%)^[7]. The WHO South East Asia (including India) estimates that more than 75% of injections are dangerous. It has been

estimated that in India, around three billion injections are delivered annually, with 1.89 billion being dangerous^[8].

According to Yusefzaden *et al*, the root causes of the problem can be divided into three pillars: the major hazards of the problem, the risks of health care professionals, and the dangers of the working environment. There is a risk that the problem will be exacerbated by health care workers who lack understanding, do not obtain adequate training, and fail to fully adhere to the safe injection practices rules for handling injections or disposal. These limitations, in turn, indirectly increase the number of blood-borne illnesses. The absence of waste management protocols that ensure everyone's safety, as well as a failure to comply with them, is regarded as a dangerous risk to the entire community. In addition, inconsistent monitoring of practice and a lack of control measures played a role^[9, 11]. Safe injection practices used by any health care organizations, including primary health care (PHC), should pose no risk and is extremely beneficial to the patient, the practitioner, as well as the entire community^[10].

Ensuring the safe appropriate administration of an injection by a well-trained safe professional healthcare provider using a sterile device (needle, syringe, etc.) and its proper disposal in a puncture-proof sharps disposal container in a well-

equipped and protected environment is the rational preventative measure that any medical facility should implement [6, 1]. There has been few published studies that examined the applied safe injection techniques extensively, including health care providers and the working environment, particularly in primary health care facilities [4]. Hence the aim of the current study was conducted to analyse nurses' compliance with safe injection and infusion practices in a tertiary care setting, as well as to identify staff education needs with the safe injection and infusion practices policy.

Materials and Methods

The current study was carried out during the period between January 2023 to August 2023 at SSB Heart and Multispecialty Hospital in Faridabad, Haryana. The setting where the study was conducted included nursing staff of intensive care units, emergency departments, and inpatient wards. This study included 2 phases i.e., the pre-audit phase from January to March 2023, and the post-audit phase from June to August 2023. Between these two audit phases, a training session was conducted which aimed to develop awareness and knowledge about safe infusion.

Inclusion criteria: Inpatient department (IPD) patients undergoing infusion therapy,

Exclusion Criteria: Out-patient department (OPD) or IPD patients who are not receiving infusion therapy.

Study tool: A pre-designed, pretested, semi-structured self-administered checklist was used to collect the required information. The questionnaire consisted of 15 aspects:-

1. Identify the patient correctly
2. Crosscheck the doctors written order
3. Explain the procedure to the patient
4. Advised items are available at patient's bedside
5. Washed hands and usage of required standard precautions
6. Ready the required fluid in proper tray

7. Ensures required dilution and well labelled
8. IV extension line (Hub decontamination with 70% alcohol swab)
9. Checked the patency of IV access (5-10ml NS)
10. Comfortable position the patient with respect to the IV line side
11. Discarded waste as per the Biomedical Waste management and replaced the articles
12. Complete documentation: I/O chart, medication chart, ICU/CCU chart (if any)
13. Staff is able to explain about infusion/drop rate
14. Know about hypertonic/hypotonic and isotonic sol"
15. Wash hands

Data analysis: The collected data was entered in Microsoft Excel and represented in percentages with appropriate tables. Mean of compliance, standard deviation and chi-square test were done to find out factors affecting the knowledge, attitude and practice of injection safety of the participants (p <0.05 was considered significant). Individuals scoring more than the mean were considered to have good knowledge, attitude and practice respectively.

Results

A total of 116 and 140 checklists were observed during pre-audit and post-audit phases, respectively. As compared to another aspect of the checklist "Crosscheck the doctors written order" was found to have higher compliance followed by identifying the patient correctly. Only an average of 32±4.55 nurses were found to identify the patient using name and UHID during the pre-audit phase while in the case of the post-audit phase, an average of 44±3.09 nurses identified the patient by 2 parameters. 33±3.09 nurses explained the procedure to the patient in a good manner and correctly in the pre-audit phase. Moreover, 44.00±3.56 nurses explained the procedure to the patient. Furthermore, the significance of compliance was recorded in all aspects in the post-audit phase. Table 1 represents all aspects covered in the checklist along with their average compliance during the pre-audit and post-audit phases.

Table 1: Safe infusion audit compliance status

| Aspects covered in the checklist | Compliance | |
|--|------------|------------|
| | Pre-audit | Post-audit |
| Identify the patient using 2 parameters | 32.00±4.55 | 44.33±3.09 |
| Crosscheck the doctors written order | 34.00±3.74 | 43.67±4.78 |
| Explain the procedure to the patient | 33.33±3.09 | 44.00±3.56 |
| Advised items are available at patient's bedside | 27.00±1.41 | 33.33±3.09 |
| Washed hands and usage of required standard precautions | 26.67±1.89 | 39.00±2.83 |
| Ready the required fluid in proper tray | 29.33±4.64 | 39.67±3.40 |
| Ensures required dilution and well labelled | 24.33±2.05 | 38.33±3.86 |
| IV extension line (Hub decontamination with 70% alcohol swab) | 20.33±3.86 | 38.00±3.56 |
| Checked the patency of IV access (5-10ml NS) | 19.00±5.72 | 36.67±2.62 |
| Comfortable position the patient with respect to the IV line side | 28.33±7.41 | 39.67±4.71 |
| Discarded waste as per the Biomedical Waste management and replaced the articles | 30.00±3.56 | 39.33±3.86 |
| Complete documentation: I/OChart MedicationChart ICU/CCU Chart (if any) | 20.00±7.79 | 37.00±2.16 |
| Staff is able to explain about infusion/drop rate | 25.00±7.26 | 38.33±3.09 |
| Know about hypertonic/hypotonic & isotonic sol" | 22.33±2.49 | 30.33±3.09 |
| Wash hands | 26.33±1.70 | 41.67±3.40 |

There were statistically significant differences between all aspects of the checklist across both pre-audit and post-audit phases ($p > 0.05$); nurses showed the highest levels of awareness in post-audit phase (Table 2).

Table 1: Pre-audit and post-audit assessment regarding safe infusion.

| Aspects covered in the checklist | Compliance | | P Value |
|--|-----------------|------------------|---------|
| | Pre-audit n (%) | Post-audit n (%) | |
| Identify the patient correctly | 96 (82.76) | 133 (95.00) | 0.05 |
| Crosscheck the doctors written order | 102 (87.93) | 131 (93.57) | |
| Explain procedure to the patient | 100 (86.21) | 132 (94.29) | |
| Advised items are available at patient's bedside | 81 (69.83) | 100 (71.43) | |
| Washed hands and usage of required standard precautions | 80 (68.97) | 117 (83.57) | |
| Ready the required fluid in proper tray | 88 (75.86) | 119 (85.00) | |
| Ensures required dilution and well labelled | 73 (62.93) | 115 (82.14) | |
| IV extension line (Hub decontamination with 70% alcohol swab) | 61 (52.59) | 114 (81.43) | |
| Checked the patency of IV access (5-10 ml NS) | 57 (49.14) | 110 (78.57) | |
| Comfortable position the patient with respect to IV line side | 85 (73.28) | 119 (85.00) | |
| Discarded waste as per the Biomedical Waste management and replaced the articles | 90 (77.59) | 118 (84.29) | |
| Complete documentation: I/O chart Medication chart ICU/CCU chart (if any) | 60 (51.72) | 111 (79.29) | |
| Staff is able explain about infusion/drop rate | 75 (64.66) | 115 (82.14) | |
| Know about hypertonic/hypotonic & isotonic sol" | 67 (57.76) | 91 (65.00) | |
| Wash hands | 79 (68.10) | 125 (89.29) | |

$p \leq 0.05$ is considered significant

Discussion

It is critical to protect patients and healthcare providers from infection transmission at all points of care. Because nurses are primarily involved in patient care, they must be aware of the hazards to which they may be exposed while working. They should also be aware of their susceptibility to blood-borne illnesses [11]. As a result, safe injection techniques and good infection control are basic standards at all health care facilities [2]. According to the current study, 60-80% of nursing workers followed the correct protocol prior to the audit. In a study conducted by Paul et al, 60% of similar compliance was documented from the tertiary care centre of West Bengal, India, where nursing personnel maintained the correct protocol when providing injections and infusion [12]. Post-audit analysis revealed 78.57 to 95% compliance, indicating a high degree of understanding of the implemented policies and procedures for safe infusion. A study conducted by Ismail et al, in Gharbia, Egypt reported only 41% of proper needle manipulation before disposal and safe needle disposal was seen in 47.5% of health care workers [13].

In our study pre-audit revealed that only 77.59% of nursing staff had high compliance in terms of waste management, whereas after successful training of nursing staff according to the guidelines of Biomedical Waste (Management and Handling) Rules 1998 [14], it rose up to 84.29%. Furthermore, our data revealed statistically significant differences in levels of awareness and practice across various categories. Ali and Eldessouki also reported 76.2% of immediate disposal of used needles [3]. This study is one of the few that included nurses and investigated differences in awareness and practice, additional research is recommended to back up the findings and explore different paths for achieving optimal compliance and preventing serious consequences.

Conclusion

The current study elucidates several issues that necessitate a specific training program that serves as a baseline for the timely upgrade of practices, understanding, and disposal procedures. Overall, the results show that SSB Heart and Multispecialty Hospital in Faridabad, Haryana has high level of safe infusion practices and patient care. It is advised that effective infection control methods be implemented through particular training courses, tight restrictions, and supervision. It also highlights the necessity of periodic audit on safe injection practices and its awareness among healthcare workers.

Conflict of Interest

Not available

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Not available

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