e - ISSN – 2349-0691

**AMERICAN JOURNAL OF ADVANCES IN NURSING RESEARCH**

Journal homepage: www.mcmed.us/journal/ajanr

# INTRA VENOUS (IV) SAFETY NURSE: FROM ROUTINE PRACTICE TO SAFE PRACTICE

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**Article Info**

*Received 05/04/2016*
*Revised 12/04/2016*
*Accepted 19/04/2016*

**Key word:**
Benchmarks, Insertion, Management, Patient satisfaction, Peripheral intravenous cannulation (PIVC).

**ABSTRACT**

First, do no harm" is the ethical imperative for every patient safety effort. Peripheral intravenous cannulation (PIVC) is a minor procedure but it has the potential to introduce infection into the local tissue at site of cannulation or directly into the blood stream and can cause serious complications. It is painful and distressing procedure for patients, and is traditionally carried out by medical personnel. Our aim is to develop an IV safety Nurses team to provide high quality; evidence based intravenous therapy to patients. A team of 10 registered staff nurses trained into IV safety certification programme according to CDC and WHO benchmarks. It led to outcomes such as 100% cannulation by IV safety nursing team, 1st Prick success rate-100%, number of calls received by anesthetists: Nil, Patient Satisfaction 4.68 to 4.93 on the scale of 5, reduced pain, decline in IV complications. This project resulted in building up of competency and development of a specialized team in Nursing "IV Safety Nursing Team". It won FICCI Heal 2014 award and Six Sigma best project award 2015 among all Apollo group of hospitals. It has been continuously making a difference in our patients' experience and lives.

## INTRODUCTION

Although intravenous therapy is one of the most commonly performed procedures in hospitalized patients, it remains susceptible to infections and noninfectious complications [1]. At least 90% of the hospitalized patients, have a peripheral cannula inserted during their admission due to changes in prescribing patterns and the acute nature of the cases [2].

Peripheral intravenous cannulation (PIVC) complications are classified into minor and major categories based on the severity of symptoms. Minor complications include catheter occlusions, accidental removals, fear of sharp catheters (needle phobia), and pain. On the other hand, major complications tend to be more severe, such as phlebitis, infection, extravasation, and even skin injuries [3].

One systematic review showed incidence of infection to be 0.1–0.2/100 catheters or 0.2–0.9/1,000 catheter days [4]. The patients' characteristics and condition are also risk factors for phlebitis [5].

Previous studies investigated PIVC complications mainly in pediatrics, [6,7] which is reported as a nurse-sensitive quality indicator in hospitals worldwide [8]. In one of the study, failure rate for inserting IV cannula ranging from 10 to 40% [9].

Another study has claimed that success rates in

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multiple attempts for admitted patients at a children's hospital ranges from 23% for physicians, 44% for nurses to 98% for IV nurse clinicians [10].

A delay in establishing vascular access can result in a delay in the administration of a fluids and/or medications. Patients frequently experience delays in diagnosis and initiation of treatment. In addition, multiple attempts at attaining vascular access result in frustration and a loss of productivity by the treating team [11].

It is further noted that venous cannulation at the hands of a more experienced health care provider was associated with an increased success rate [12].

Indraprastha Apollo Hospital is a tertiary care hospital with a complex set up covering various super specialties. Occupancy for our hospital is 90-95%. Average number of patients on vascular and invasive devices/day is > 96%. In current scenario the assigned Staff Nurse is performing IV Cannulation and for difficult Cannulation they seek the help of Anaesthetist or Duty Doctor. Calls made to anesthetics for inserting IV cannula- average 500/ month.

Sometimes it leads to delay in insertion of IV cannula due to Non-availability of Doctors.

They have to leave a patient in OT table just for a Cannulation. It can cause delay in medication administration in the ward / delay in OT cases and ultimately results in patient dissatisfaction.

## NEED FOR THE PROJECT

There are 3 major issues observed in this setting.

**Issue-1**

**Staff Nurse Incompetency in IV cannula insertion**

- Lack of competency of staff nurses as it is not well structured in the education curriculum
- Number of new nurses in the system - 45-50/month
- Attrition rate of nurses-30/month
- Multiple pricks and attempts
- Varied experience of pain by patients

**Issue 2**

**IV Complications and its related cost**

- Lack of monitoring and tracking mechanism can lead to an increase in morbidity and prolonged stay of patients.
- Complications associated with infiltration -20%
- Phlebitis associated with IV therapy-30%
- Increased ALOS due to CR-BSI - 7-14 days
- Cost of treatment due to CR-BSI - $3000-$56000

**Issue 3**

**Delay in treatment and patient dissatisfaction**

- Delay in medications, blood transfusions, medication infusions
- Delay of OT procedure's because of non-availability of Doctors to perform difficult Cannulation
- Patient dissatisfaction

## AIM

The aim of this project is to develop an IV Safety Nurses Team to provide high quality; evidence based intravenous therapy to patients.

## OBJECTIVES

- To develop and implement IV Safety Nursing Team- A specialized nursing service
- To reduce Catheter Related-Blood Stream Infection due to Peripheral IV Cannulation
- To identify and track peripheral IV related complication
- To up skill Nursing staff competency on Peripheral IV Cannulation & Safety
- To induct I/V Nurse into the system- a specialist Nurse ( an innovative approach)
- To build partnership with industry experts (Becton Dickinson-BD)

## IMPLEMENTATION

Development of the IV Nurses Service in Indraprastha Apollo Hospital – in 3 Phases

**Phase 1- Development of expertise in IV Cannulation – 3 day Certificate Program for the IV Nurses**

**Day 1 - Topics covered**

- Anatomy &Physiology Related to IV Nursing
- Introduction to concept of IV team
- Patient considerations
- Therapy considerations

**Day 2 - Topics covered**

- Initiation of therapy
- Catheter care
- Flushing &dressing

**Day 3- Topics covered**

- Management of complications
- Education on use of IV tracker
- Safety of the health care worker

**Phase 2 – Development of expertise in Infusion Nursing**

**Phase 3 – Development of expertise in insertion and management of PICC / central lines**

An IV team of 10 Nurses was created from the staff nurses. Nominations were made by the unit staff and In-charges. The selected team underwent 3 days of intensive training. The training included topics like Introduction to concept of I/V team, Anatomy & Physiology, Patient considerations, Therapy considerations, Management of complications and Safety of health care worker. Pre and Post tests were done and their skill assessment was performed. Practice was conducted on I/V arms specialized mannequins in a

simulation environment by "BD".

According to CDC guidelines, [13] adult patient's catheters should be replaced within a 72–96-hour period in order to reduce complications.

The Visual Inspection Phlebitis (VIP) scale from the third edition of the standards for infusion therapy [5] 'is an internationally adopted tool that has been used to assess phlebitis. Phlebitis was defined as the presence of two or more signs of pain, tenderness, warmth, erythema, swelling, or a palpable cord, 6, 10 with or without purulent drainage from the catheter insertion site [14]. The VIP scale can range from 0, indicating no symptoms of phlebitis, to 5, with signs of purulent drainage, redness, and a palpable cord greater than 3 inches [15]. Infiltration was defined as permeation of IV fluid into the interstitial compartment, causing swelling of the tissue around the site of the catheter.

An IV kit was launched and handed over to the team. The team was awarded with course completion certificate and recognized as an IV nurse with a Badge. Quiz programme was conducted in each nursing unit and the participants were given appreciation prizes.

**Launching the 10 Commandments of Infusion Therapy**

I will

1. Practice hand hygiene
2. Wear appropriate PPE
3. 'Scrub the Hub'
4. Use VIP scale (Visual infiltration/Phlebitis scale)
5. Safely dispose sharps

I will not

6. Forget to use safety cannula
7. Reinsert the needle
8. Forget to remove tourniquet
9. Forget to flush the cannula
10. Forget to observe complication

**Data Tracker for Tracking IV Therapy Related Complications Patient feedback form**

**OUTCOME**

There was a steady rise in Patient satisfaction score (Voice of Customer-VOC) done by the IV Nursing team

**Table 1. Pain Score 2015**

| | |
|---|---|
| **January** | **0** |
| **February** | **0** |
| **March** | **0** |

**Table 2. Measurable Elements by challenges and have difficult & in accessible veins for cannulation**

| S.NO. | Measurable Elements | Outcome |
|---|---|---|
| 1. | Cannulation by IV team | 100% |
| 2. | Number of patients cannulated (February 2013 to March 2014 | 40569 |
| 3. | Average number of patients cannulated by each team member per month | 245 |
| 4. | 1st Prick success ( No repeat cannulation) | 99% |
| 5. | Average number of calls received by Anesthetists | Nil / Earlier per month |
| 6. | Voice of customer(VOC)- Patient Satisfaction | 4.68 to 4.93 on the scale of 5 |
| **Please note IMCL being a complex tertiary care hospital – patients pose by challenges and have difficult & in accessible veins for cannulation** | | |
| 7. | Number of staff Certified as IV Nurse | 10 |
| 8. | Number of staff trained on IV safety by I/V team | 1400 |
| 9. | Number of companies involved | 01(BD) |

**Figure 1.**

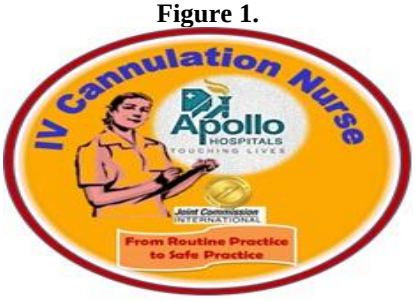



**Figure 2.**

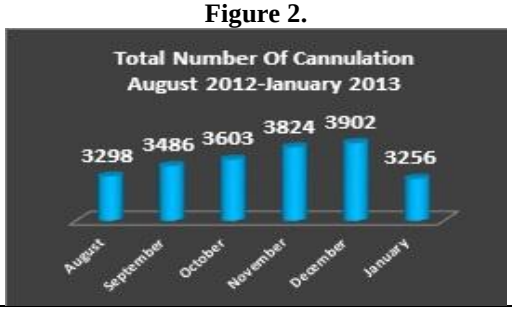


**Figure 3.**

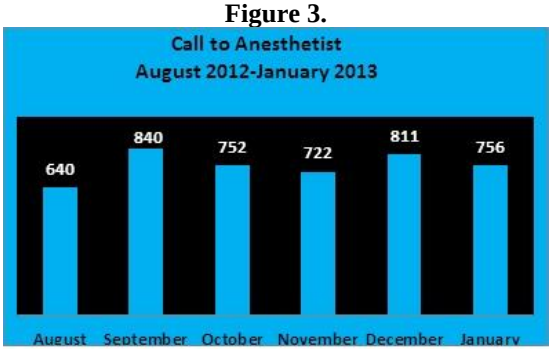



**Figure 4.**

**Figure 5. IV Cannulation Certification**

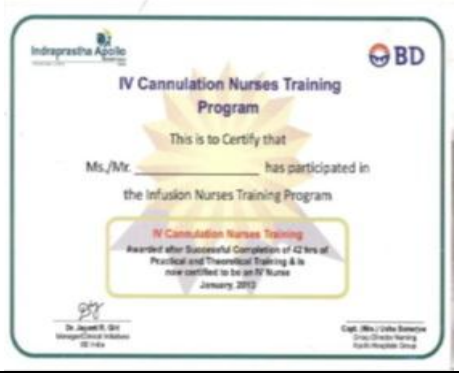



**Figure 6. IV Kit Launch**

**Figure 7.**

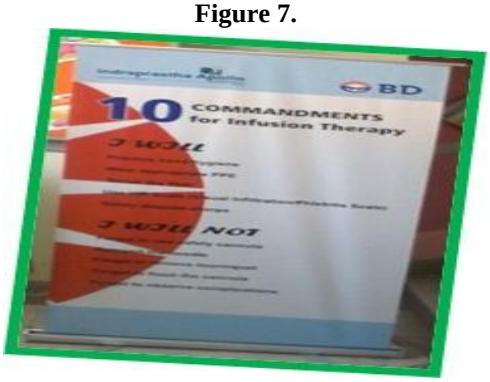



**Figure 8. Related Complications**

**Figure 9. Patient feedback form**

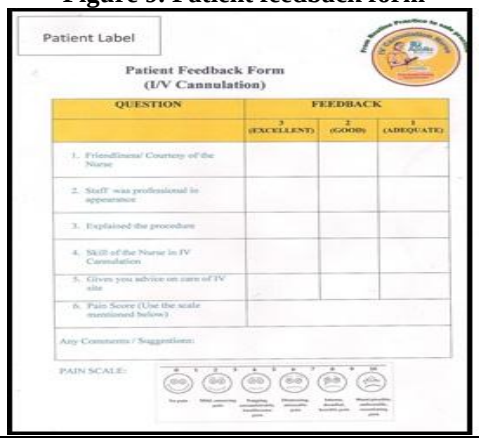



**Figure 10.**

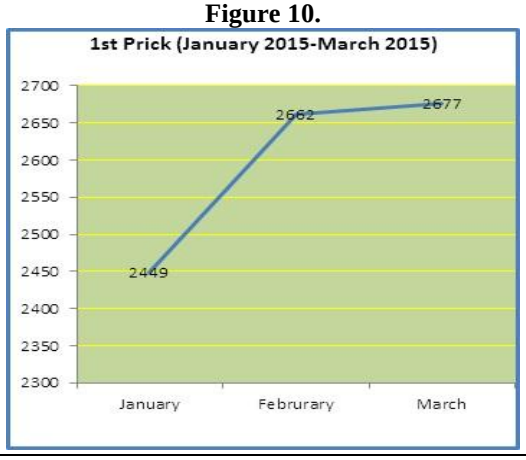


**Figure 11.**

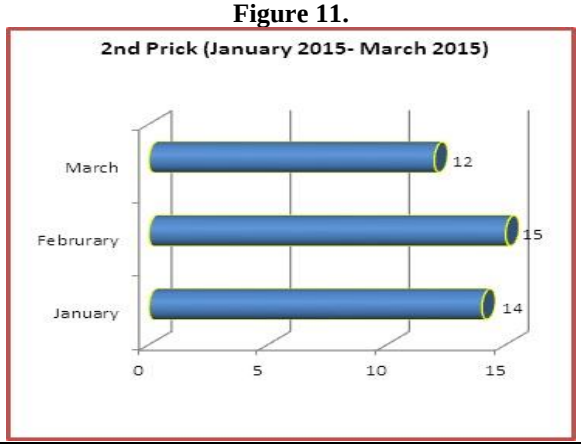



**Figure 12.**

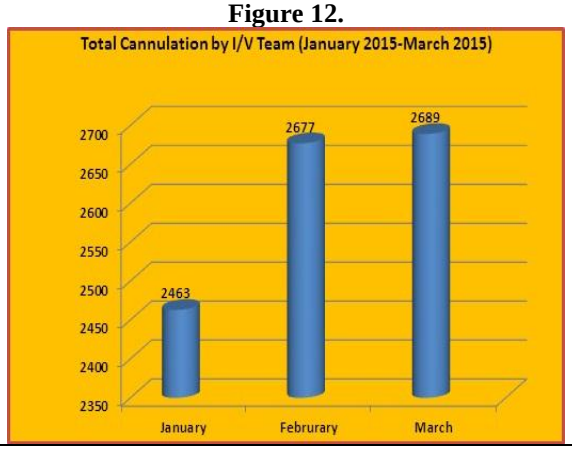
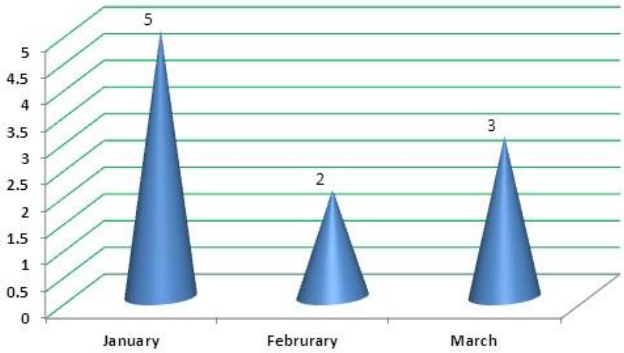



**Figure 13.**

Number of Complication ( January 2015-March 2015)




## DISCUSSION AND CONCLUSION

Development of IV safety nurses team led to specialized service in the organization, which has decreased the risk of liability and litigation from patient side. Standardized and uniform experienced by all the patients having IV Cannulation. It is suggested by our team of Oncologists to scale up the competency of IV safety team by training them on non-coring needle insertion for chemotherapy. Changing catheters is recommended when clinically indicated rather than routinely post-72 hours of insertion which in return minimizes the frequency of insertions per patient and subsequent complications.

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