
Impact of a Targeted Training Module on competencies towards the use of S.T.I.C.K. Bundle among nursing officers at selected hospitals, Lucknow

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ABSTRACT

Background and Objective

Peripheral Intravenous Cannulation (PIVC) is common but often leads to complications such as infiltration, phlebitis, and bloodstream infections. These arise from gaps in knowledge, improper practices, or failing to reassess line necessity. The S.T.I.C.K. Bundle offers a structured protocol to improve Intravenous care and reduce complications. This study evaluated a Targeted Training Module regarding S.T.I.C.K. Bundle on knowledge, practice, and attitude bases on PIVC among nursing officers in selected tertiary care hospitals in Lucknow. Four tool were used; Tool I: The sociodemographic tool, Tool II: Structured Knowledge Questionnaire, Tool III: Structured Observation Checklist, Tool IV: Structured Likert Scale

Material and Methods

A quantitative true-experimental design with pre and post-test control groups was adopted. The study was conducted in tertiary care hospitals in Lucknow over 23 days. nursing officers working in both general wards and critical care units were included in the study. Using proportional stratified random sampling, 80 nursing officers were selected and equally assigned to experimental (n = 40) and control (n = 40) groups. The experimental group received a Targeted Training Module on the S.T.I.C.K. and control group continued routine practice.

Results

The experimental group showed a marked improvement in competency scores versus the control group. Post-test scores for knowledge, practice, and attitude were significantly higher in the experimental group ($p < 0.05$) than pre-test scores and controls. Findings shows that general-ward nursing officers demonstrate greater proficiency in Intravenous management including emergency and triage compared with those working in ICUs.

Conclusion

The current findings revealed that implementing the S.T.I.C.K. Bundle provides a structured and evidence based approach to improving Intravenous care. By addressing common causes of adverse outcomes, such as inadequate knowledge, improper practices, and failure to review line necessity, this protocol enhances patient safety and reduces complications.

Keywords

Competency, training, Intravenous cannulation and its management, Intravenous complications.

INTRODUCTION

Peripheral Intravenous Cannulation (PIVC) is one of the most frequently performed nursing procedures. However, it has high complication rates, with a 25–70% incidence of infiltration and phlebitis, along with preventable bloodstream infections. ^[1] These complications persist largely because of inconsistent adherence to aseptic techniques, poor site and device selection, and lack of structured competency based training. ^[2,3]

In many Indian tertiary hospitals, nursing officers often learn cannulation informally through observation rather than standardized instructions, creating wide variations in practice and increasing patient risk. ^[4] To address these gaps S.T.I.C.K. Bundle - sterility & securement, time management, insertion site selection, cannula selection, and “keep it?” (daily review of necessity) was developed as an evidence based framework to standardize Intravenous care.

Existing studies strongly support structured skill-based training; Bhunia et al. (2021) showed significant improvement in Intravenous practice after S.T.I.C.K. based teaching ^[5] Alexandrou et al. (2018) reported that one-third of PIVCs globally were unjustified or poorly maintained ^[6] Epic3 guidelines reinforce the need for aseptic technique and regular line assessment ^[7] and Rickard et al. (2012) emphasized clinically indicated removal guided by judgment. ^[8] Simulation-based and hands-on training approaches have also been shown to reduce complications and enhance nursing officer’s confidence. ^[1,3]

Despite this evidence, standardized competency based Intravenous care training is not routinely implemented in Indian hospitals. The persistently high incidence of complications and inconsistent practice patterns demonstrate the need to evaluate structured S.T.I.C.K. Bundle training. ^[4,5] This study aimed to fill this gap by assessing its impact on the knowledge, practice, and attitude of nursing officers in tertiary care hospitals in Lucknow.

Aim

To evaluate the effectiveness of a targeted training module based on the S.T.I.C.K. bundle in enhancing the knowledge, practice, and attitude competencies of nursing officers regarding peripheral intravenous cannulation in selected tertiary care hospitals of Lucknow.

Objectives

1. To assess the level of competencies towards the use of S.T.I.C.K. Bundle among nursing officers.
2. To determine the Impact of Targeted Training Module towards the use of S.T.I.C.K. Bundle among nursing officers.
3. To find out the association between selected demographic variables and level of competencies among nursing officers.

MATERIAL AND METHODS

The study was conducted in Era's Lucknow Medical College and Hospital (Experimental Group) and Combined Tuberculosis Hospital (Control Group), including 80 nursing officers from each group from general wards and intensive care units. This study used a quantitative, True experimental approach to evaluate measurable outcomes related to knowledge, practice, and attitude before and after the intervention. Methodology adopted to assess the effectiveness of a Targeted Training Module regarding the S.T.I.C.K. Bundle in the competencies of nursing officers working in selected tertiary care hospitals in Lucknow. The study adopted a true-experimental research design, specifically a pre-test and post-test control group design. This design is considered one of the most robust methods for evaluating the effectiveness of an intervention, as it allows for comparison between an experimental group that receives the intervention and a control group that does not.

Inclusion Criteria

- Registered nursing officers working in selected tertiary care hospitals in Lucknow
- A minimum of 6 months of clinical experience
- Involvement in Peripheral Intravenous Cannulation as part of regular duties
- Willingness to participate and provide informed written consent
- Availability for the entire data collection and training period

Exclusion Criteria

- Nursing officers on extended leave, night duty rotation, or unavailable during the data collection window
- Nurses assigned exclusively to non-clinical or administrative roles
- Participants who had recently undergone similar Intravenous cannulation training from other programs
- Those unwilling to consent or participate fully in pre and post-intervention assessment

The data was collected according to the predetermined criteria. Formal permission was obtained from the respective hospitals. The study was conducted for a period of 23 days from 23/06/2025 to 27/07/2025. The data collection process was carried out in three planned phases to ensure accuracy and consistency. First, during the pre-test phase, informed consent was obtained, and baseline competency levels of both experimental and control groups were assessed using four tools: a structured demographic tool, structured knowledge questionnaire, structured observation checklist, and structured Likert scale. This helped establish the existing understanding and clinical performance related to Intravenous cannulation and the S.T.I.C.K. Bundle. In the second phase, the Targeted Training Module on the S.T.I.C.K. Bundle was implemented only for the experimental group through structured teaching sessions supported by audiovisual aids, live

demonstrations, and supervised return demonstrations to reinforce correct techniques and safety measures. Meanwhile, the control group continued their usual clinical activities without additional training. In the final post-test phase, the same assessment tools were readministered to both groups after the intervention period to measure improvements in competency and determine the effectiveness of the training module. This systematic procedure allowed accurate comparison of outcomes within and between the groups.

The collected data were organized, coded, and analyzed using both **descriptive** and **inferential statistics** in accordance with the objectives of the study. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize demographic characteristics and competency scores in knowledge, practice, and attitude. Inferential statistics included the **paired t-test** to compare pre- and post-test scores within groups, the **independent t-test** to compare experimental and control groups, and the **chi-square test** to determine associations between demographic variables and competency levels. A significance level of **p < 0.05** was considered statistically significant. This systematic approach ensured a rigorous assessment of the effectiveness of the targeted training module.

Elements of S.T.I.C.K. Bundle

- **Sterility and Securement:** Ensures the insertion site remains clean and the device is properly fixed to prevent movement or dislodgement.
- **Time Management:** Encourages timely insertion and removal of cannulas to avoid unnecessary delays and prolonged dwell times.
- **Insertion Site Selection:** Involves assessing the patient's condition and vein quality to choose the most appropriate site.
- **Cannula Selection:** Requires selecting the correct device based on treatment purpose and vein characteristics.
- **Keep it?** Promotes daily reassessment of cannula necessity to reduce infection risk and avoid unnecessary catheterization.

Description of The Tools

The data collection instruments used in this study consisted of the following four structured tools:

Tool 1: Structured Sociodemographic tool

Tool 2: Structured Knowledge Questionnaire

Tool 3: Structured Observation Checklist

Tool 4: Structured Likert Scale

Tool 1: A self-administered questionnaire to assess demographic variables which comprised of 7 items seeking information on demographic data of nursing officers. It consists of age, gender, working experience, professional qualification, area of posting, previous knowledge related to the use of S.T.I.C.K. Bundle and its source.

Tool 2: This Structured Knowledge Questionnaire, consists of 23 questions categorized into 4 sections regarding Intravenous cannulation, possible complications, preventive interventions,

and the S.T.I.C.K. Bundle to assess the knowledge of nursing officers.

SCORING CRITERIA

Level of Knowledge	Scores	Scores Weightage
Adequate	16–23	(69.6 – 100%)
Moderately Adequate	8–15	(34.8 – 65.2%)
Inadequate	0–7	(0 – 30.4%)

Tool 3: This Structured Observation Checklist, consists of 20 items designed to **assess the practice of nursing officers to the S.T.I.C.K. bundle** during Intravenous cannulation procedure and its maintenance.

SCORING CRITERIA

Level of Practice	Scores	Scores Weightage
Excellent	18 – 20	(90 – 100%)
Good	14 – 17	(70 – 85%)
Fair	10 – 13	(50 – 65%)
Poor	< 10	(0 – 45%)

Tool 4: The 5 point Structured Likert Attitude Scale includes 10 statements designed to assess the perceptions of **nursing officers** regarding the use of the S.T.I.C.K. Bundle in clinical practice, particularly in relation to Intravenous cannulation procedure.

SCORING CRITERIA

Level of Attitude	Scores	Scores Weightage
Positive Attitude	34 – 50	(68 – 100%)
Neutral Attitude	17 – 33	(34 – 66%)
Negative Attitude	0 – 16	(0 – 32%)

Statistical analysis

The collected data were organized, coded, and analyzed using both **descriptive** and **inferential statistics** in accordance with the objectives of the study. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize demographic characteristics and competency scores in knowledge, practice, and attitude. Inferential statistics included the **paired t-test** to compare pre- and post-test scores within groups, the **independent t-test** to compare experimental and control groups, and the **chi-square test** to determine associations between demographic variables and competency levels. A significance level of **p < 0.05** was considered statistically significant. This systematic approach ensured a rigorous assessment of the effectiveness of the targeted training module.

RESULTS

The experimental group showed a marked improvement in competency scores versus the control group. Post-test scores for knowledge, practice, and attitude were significantly higher in the experimental group ($p < 0.05$) than pre-test scores and controls. Findings shows that general-ward nursing officers demonstrate greater proficiency in Intravenous management compared with those working in ICUs.

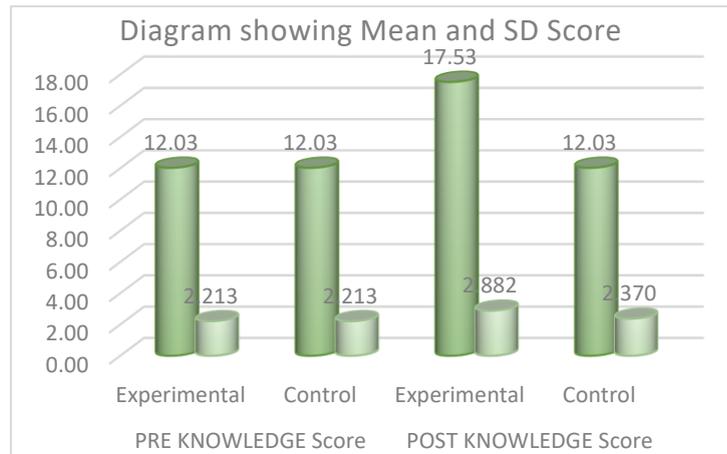


Figure no. 1: Showing knowledge mean scores in pre and post experimental and control groups

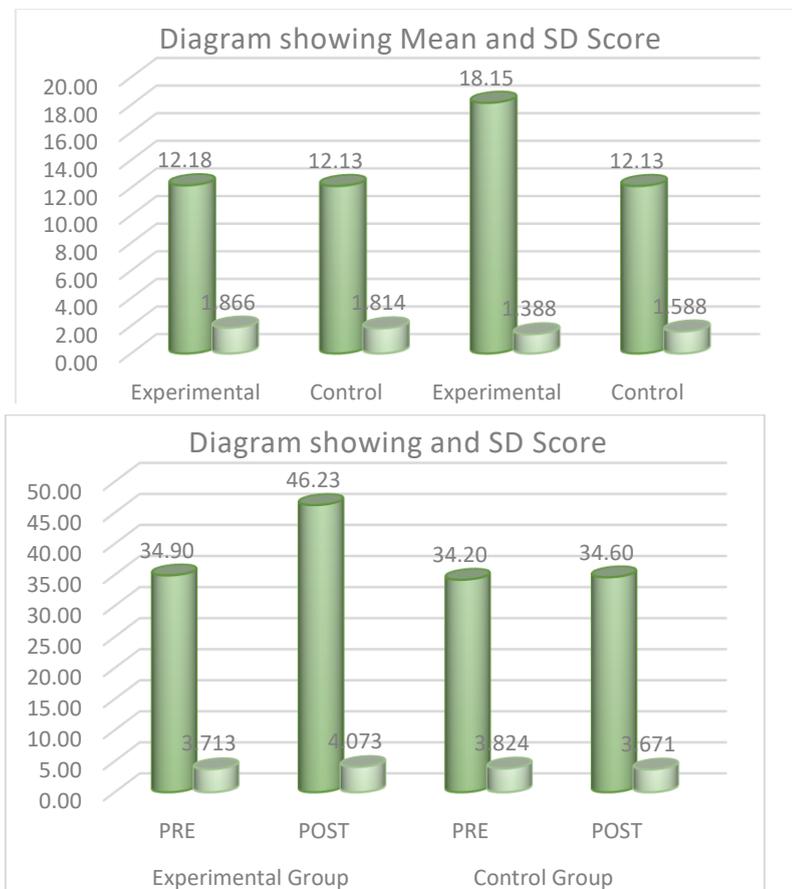


Figure no. 3: Showing attitude mean scores in pre and post experimental and control groups

DISCUSSION

This study evaluated the effects of Targeted Training Module on S.T.I.C.K. Bundle in nursing officer's competencies. Baseline comparisons showed both groups were nearly identical across demographic variables and pre-test knowledge, practice, and attitude scores, confirming true comparability. After the intervention, the experimental group demonstrated a clear and statistically significant improvement across all competency domains. Knowledge enhanced from 52.28% to 76.20%, attitude improved sharply (97.5% positive), and practice scores moved predominantly into the "Excellent" and "Good" categories. Conversely, training module had a significant impact ($p < 0.001$) on knowledge, practice, and attitude. Findings show that general ward nursing officers demonstrate greater proficiency in Intravenous management including emergency and triage compared with those working in ICUs. This indicates the training was effective across all subgroups.

These findings are consistent and align strongly with those of previous studies. Bhunia, Das & Sahoo (2021) demonstrated S.T.I.C.K. Bundle reduced complications phlebitis to 7%, infiltration to 5%, and improved adherence by 35%.^[4] This study complements this by showing that structured training reliably builds the competencies required to achieve these outcomes. Similarly, Keleekai et al. (2016) showed that simulation-based training significantly improved PIVC knowledge (+31%), skills (+24%), and marginally affected confidence (-0.5%).^[9] Taken together, the evidence confirms that competency-based and simulation-driven modules substantially enhance the quality of Intravenous practice quality and support safer patient care.

CONCLUSION

The study clearly demonstrates that the Targeted Training Module on S.T.I.C.K. Bundle significantly improves nursing officer's competencies in terms of knowledge, practice, and attitudes toward Intravenous cannulation and maintenance. After training, nursing officers demonstrated better aseptic technique, more accurate site and cannula selection, improved securement, faster procedure execution, and consistent daily line reassessment. These gains confirm that structured, evidence-based training closes the practice gaps common in routine care. The findings also emphasize that competency based programs standardize practice, reduce complications such as phlebitis, infiltration, and bloodstream infections, and strengthen nursing officer's confidence and accountability. By adopting such modules, hospitals can achieve greater uniformity, minimize practice variation, and elevate care quality across units. This study reinforces the value of integrating targeted, competency driven training into regular professional development to improve both patient outcomes and nursing performance.

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