

A Study to Assess the Role of Reflection on Intravenous Fluid Administration among 3rd Semester B.Sc. Nursing Students at ASRAM College of Nursing, Eluru, Andhra Pradesh.

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Received:

15/09/2025

Revised:

18/10/2025

Accepted:

21/10/2025

Published:

30/10/2025

ABSTRACT

The study aimed to assess the role of reflection on intravenous (IV) fluid administration among third-semester nursing students at ASRAM College of Nursing. The objectives were to evaluate students' knowledge before and after a structured teaching program integrated with reflective practice and to determine associations between post-test knowledge scores and selected demographic variables. A quantitative quasi-experimental pre-test-post-test control group design was adopted, involving 60 nursing students selected through purposive sampling, with 30 each in the experimental and control groups. The experimental group received a structured teaching program integrated with reflective activities, while the control group received no intervention. Data were collected using a structured knowledge questionnaire and a practical skills checklist and analysed using descriptive and inferential statistics. Demographically, 50% of participants were aged 21–23 years, 33.3% were aged 18–20 years, and 16.7% were 24 years and above. Prior exposure to IV fluid administration was reported by 58.3%. In the experimental group, the mean knowledge score improved significantly from 18.3 (SD = 6.3) to 40 (SD = 6.9) with a mean difference of 21.7, t -value = 9.4, $p < 0.001$. In contrast, the control group showed no significant improvement, with scores increasing from 18.5 (SD = 6) to 20 (SD = 6.2), mean difference = 1.5, $t = 1.2$, $p > 0.05$. Practical performance was also superior among the experimental group (70%) compared to the control group (35%). Chi-square analysis revealed a significant association between prior IV fluid administration experience and post-test knowledge ($p = 0.03$). The study concluded that integrating reflective practice into structured teaching effectively enhances nursing students' knowledge and clinical competence in IV fluid administration.

Keywords: Reflection, Intravenous Fluid Administration, Nursing Students, Structured Teaching Program, Clinical Competence

INTRODUCTION:

Intravenous (IV) fluid administration is a critical nursing procedure essential for hydration, medication delivery, and maintaining homeostasis. Despite its importance, IV therapy carries substantial risk due to its complexity and the direct systemic impact of errors (1,2). Globally, IV medication errors are a major patient safety concern, with studies indicating that more than 50% of serious medication errors involve intravenous drugs (3–5). Error rates in developed countries such as the United States and the United Kingdom range from 5% to 34%, with common issues including wrong dose, incorrect infusion rate, and omission (6,7).

The situation is even more challenging in developing countries, where limited resources, staff shortages, lack

of standardized protocols, and inadequate training contribute to higher error rates. Research from Ethiopia reported a 46.1% prevalence of IV medication administration errors, while studies in Malaysia documented error rates up to 88.6% in certain hospital wards (8,9). These errors are often linked to insufficient clinical exposure, lack of knowledge, and poor logistical support (10). At a global level, the World Health Organization estimates that medication errors cost approximately USD 42 billion annually, with IV errors contributing significantly to this burden (11–13).

In India, limited studies have been conducted, but existing evidence indicates similar challenges. High patient loads, variability in nursing education, and insufficient opportunities for reflective learning further

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increase the risk of IV therapy errors (14). This highlights the need for innovative educational strategies that not only provide structured teaching but also incorporate reflective practice, enabling students to critically analyze their experiences and improve clinical competence.

To address this gap, the present study was undertaken at ASRAM College of Nursing, Eluru, Andhra Pradesh, to assess the role of reflection in enhancing knowledge and skills related to IV fluid administration among 3rd semester nursing students. The findings are expected to provide evidence for integrating reflective learning strategies into nursing curricula to improve patient safety and reduce IV-related medication errors.

REVIEW OF LITERATURE

Reflective practice is increasingly recognized as an essential component in nursing education, fostering critical thinking, self-awareness, and continuous professional development. Deepali Shah (2024) emphasizes reflective teaching as a method of self-observation and self-assessment that enhances educators' understanding of their professional identity and improves educational outcomes (1). Reflection in clinical practice involves analyzing specific events, including associated thoughts and emotions, to derive lessons for future improvement (2). The use of structured models such as Gibbs' Reflective Cycle guides nursing students through stages of description, evaluation, and planning actions, thereby supporting experiential learning during clinical procedures such as intravenous (IV) fluid administration (3).

IV fluid therapy is a common yet high-risk nursing procedure requiring both theoretical knowledge and practical skill. Alvarenga et al. (2023) found that undergraduate nursing students possessed moderate knowledge about infusion therapy but exhibited significant gaps in areas such as catheter flushing and equipment use, highlighting the need for enhanced

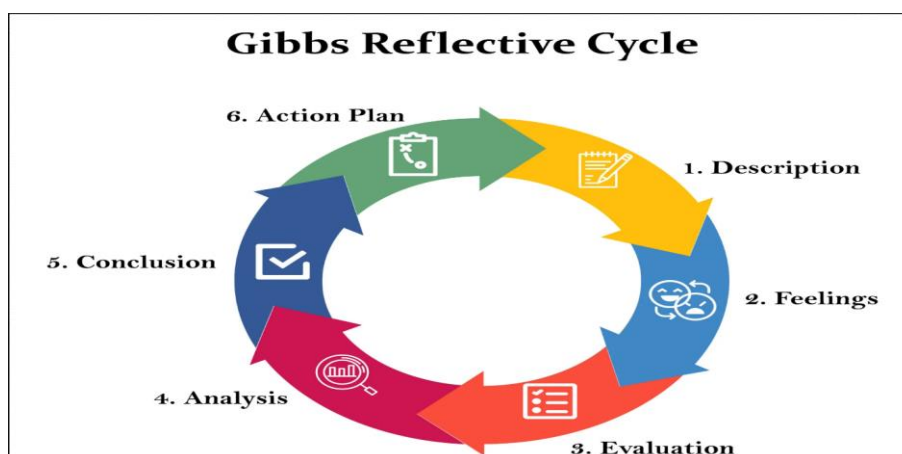
clinical training and reflection (4). Similarly, Huang et al. (2024) demonstrated that training programs incorporating teaching-for-understanding frameworks significantly improved nursing students' knowledge, performance, and satisfaction related to IV therapy administration compared to traditional methods (5).

Intravenous medication administration remains prone to errors that can compromise patient safety. Ura-Matsu et al. (2024), in a qualitative study, identified discrepancies between nurses' perceived and actual practices during IV medication administration, underscoring challenges such as verification of correct medication and patient identification as crucial for safer infusion processes (6). This gap in practice further substantiates the importance of reflective learning to bridge theory and practice.

Registered nurses' knowledge of IV fluid therapy is variable, with many reporting insufficient understanding to provide safe and effective care, as noted in a cross-sectional survey by Thomas and Kamati (2024) among nurses in Namibia (7). Kaliyaperumal (2023) reported moderate knowledge and confidence levels among nursing students in Saudi Arabia, emphasizing the necessity of increased hands-on exposure and reflective practice to enhance competence (8).

Reflection not only reinforces knowledge retention but also supports clinical skill development through critical analysis and peer discussion. The integration of reflective practices in nursing education helps students recognize mistakes, consolidate learning, and increase readiness for patient care (9). This aligns with the aim of the present study to evaluate the impact of structured teaching combined with reflection on the competence of third-semester nursing students in IV fluid administration. Gibbs' Reflective Cycle to IV Therapy Practice

Gibbs' Reflective Cycle (1988) is a structured model that guides learners through a process of reflection to improve future performance. It includes six clear stages: Description, Feelings, Evaluation, Analysis, Conclusion, and Action Plan. This model encourages deep thinking about one's actions, decisions, and experiences in clinical settings.



Applying Gibbs' Reflective Cycle to IV Therapy

1. Description: Describe the IV therapy scenario, including patient condition, type of therapy, student's role, and key observations.
2. Feelings: Reflect on the student's emotions before, during, and after the procedure, noting confidence or anxiety.
3. Evaluation: Objectively assess the student's strengths and areas of difficulty in knowledge and skill during IV therapy.
4. Analysis: Analyze factors influencing performance such as preparation, experience, or challenges encountered.
5. Conclusion: Summarize strengths and identify areas needing improvement, highlighting the learning gained.
6. Action Plan: Develop targeted feedback and suggest further training, resources, or practice to enhance skills and confidence.

"A STUDY TO ASSESS THE ROLE OF REFLECTION ON INTRAVENOUS FLUID ADMINISTRATION AMONG 3RD SEMESTER NURSING STUDENTS AT ASRAM COLLEGE OF NURSING, ELURU, ANDHRA PRADESH."

Objectives of the Study

1. To assess the knowledge level of 3rd semester nursing students regarding the role of reflection in intravenous fluid administration therapy.
2. To explore the perceptions of 3rd semester nursing students on the importance and benefits of reflective practices in IV therapy.
3. To examine the factors that may influence the understanding of reflection in the context of IV therapy among nursing students.
4. To compare the knowledge levels between different groups of students regarding the impact of reflection on IV therapy practices.
5. To find out the association between post-test knowledge scores in experimental and selected demographic variables of the students

Operational Definitions

1. Assess: "Assess refers to systematically evaluating 3rd semester BSc nursing students' knowledge of the nurse's role in using reflection to improve IV fluid therapy practice."
2. Knowledge: "It refers to students' theoretical understanding of IV fluid therapy, including procedures, principles, responsibilities, and best practices from academic and clinical experiences."
3. Role of Nurse Describes the specific functions and responsibilities nurses hold in IV fluid therapy, such as patient assessment, IV insertion, fluid monitoring, preventing and managing complications, and maintaining accurate documentation.
4. Reflection "Reflection is the process by which students critically assess their IV therapy experiences to identify strengths, weaknesses, and areas for improvement through introspection, peer discussion,
5. Intravenous Therapy It is the administration of fluids, medications, or blood products directly into a vein through a venous access device. This includes understanding the types of fluids, the procedures for administration, equipment handling, patient preparation, and identifying potential complications.
6. 3rd Semester BSc Nursing Students "Third-semester undergraduate nursing students undergoing clinical and theoretical training, including IV fluid therapy."

Hypotheses

- ❖ H_0 (Null Hypothesis): There is no significant difference between the pre- and post-test knowledge scores on the role of reflection in intravenous fluid therapy among 3rd semester nursing students.
- ❖ H_1 (Research Hypothesis): There is a significant difference between The post-test knowledge scores of students who received the structured teaching program was significantly higher than their pre-test scores.
- ❖ H_2 (Associative Hypothesis): There is a significant association between post-test knowledge scores and selected demographic variables of the students.
- ❖ Variables
- ❖ Independent Variable: Structured teaching program on the role of reflection in IV fluid therapy.
- ❖ Dependent Variable: Students knowledge level regarding IV fluid administration and the effectiveness of reflection in clinical learning.

Delimitations of the Study

1. Only 3rd semester BSc nursing students from ASRAM Nursing College, who are currently undergoing training in IV fluid administration.
2. Students from other semesters are excluded, as the focus is on those at the stage where IV fluid administration is a core part of their curriculum.
3. The study will be conducted only during the academic period when the required sample is available.

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4. The study is delimited to the reflective aspect of IV therapy practice, not covering other advanced nursing interventions.

Assumptions of the Study

1. It is assumed that 3rd semester nursing students have basic clinical exposure and the ability to engage in reflective practices.
2. Reflective practices will help improve understanding and practical application in intravenous fluid therapy.
3. Written reflections and peer discussion are valid tools to measure and encourage reflection among students.
4. The study findings will be meaningful within the context of ASRAM Nursing College but may not be generalized to other institutions.
5. All students included in the study have received uniform instruction on IV fluid administration in both theory and practice.

MATERIALS AND METHODOLOGY

Study Design: A quantitative, quasi-experimental design with pre-test and post-test control groups was employed to assess the role of reflection on intravenous (IV) fluid administration among third-semester nursing students.

Study Setting: The study was conducted at ASRAM College of Nursing, Eluru, Andhra Pradesh, utilizing both classroom and clinical simulation laboratory environments.

Population and Sample: The study population comprised all third-semester nursing students enrolled at ASRAM College of Nursing. A purposive sampling technique was used to select 60 students, who were equally divided into an experimental group (n = 30) and a control group (n = 30).

Inclusion Criteria:

- Third-semester nursing students currently enrolled in the course.
- Willingness to participate and provide informed consent.
- No prior structured training on reflective practice related to IV fluid administration.

Exclusion Criteria:

- Students absent during data collection.
- Students who had previously attended similar reflection-based programs.

Data Collection Tools:

1. Structured Knowledge Questionnaire: Developed by the investigators to assess knowledge related to IV fluid administration. It consisted of multiple-choice questions and was validated by experts for content validity. The reliability coefficient was 0.85.
2. Observational Skills Checklist: Used to assess practical competence in IV fluid administration through Objective Structured Clinical Examination (OSCE). The checklist included steps such as preparation, insertion, maintenance, and post-care of IV therapy.

Intervention:

The experimental group received a structured teaching program on IV fluid administration integrated with reflective activities based on Gibbs' Reflective Cycle. Reflection sessions encouraged students to critically analyze their clinical experiences. The control group received routine teaching without reflective components.

Data Collection Procedure:

Pre-test assessments of knowledge and practical skills were conducted for both groups before the intervention. The experimental group then underwent the reflection-integrated structured teaching program over one week. Post-test assessments were conducted one week after the intervention using the same tools for both groups.

Ethical Considerations:

The study was approved by the Institutional Ethics Committee of ASRAM College of Nursing. Participant confidentiality was maintained, informed consent was obtained from all participants, and participation was voluntary with the right to withdraw at any time.

Data Analysis:

Data were analyzed using descriptive statistics (mean, standard deviation, frequency, and percentage) to summarize demographic variables and scores. Inferential statistics included paired t-tests to compare pre- and post-test scores within groups, independent t-tests to compare between groups, and Chi-square tests to assess associations between post-test knowledge scores and selected demographic variables. A p-value of <0.05 was considered statistically significant.

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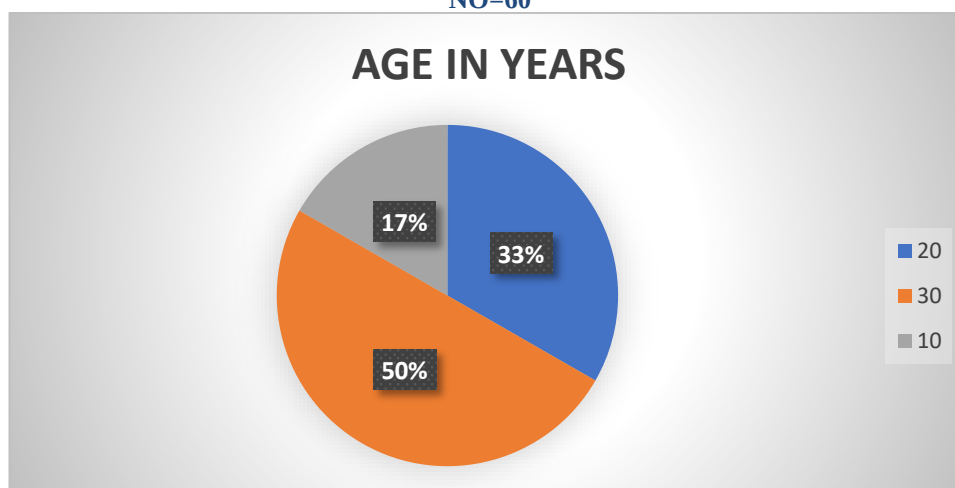
DISCUSSION

The present study evaluated the impact of integrating reflection into IV fluid administration teaching for third-semester nursing students at ASRAM College of Nursing.

Demographic Variables: Frequency and Percentage Table (n = 60)

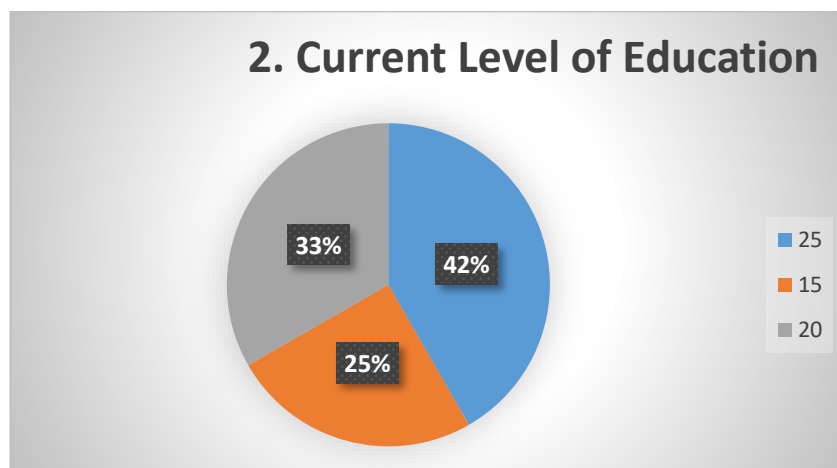
Variable	Category	Frequency (n)	Percentage (%)
1. Age	18–20 years	20	33.3%
	21–23 years	30	50.0%
	24 years and above	10	16.7%
2. Current Level of Education	Diploma in Nursing	25	41.7%
	BSc in Nursing (Year 2)	15	25.0%
	BSc in Nursing (Year 3)	20	33.3%
3. Previous Exposure to IV Fluid Administration	Yes	35	58.3%
	No	25	41.7%
4. Self-Assessment of Knowledge on IV Fluid Administration	Poor	5	8.3%
	Fair	20	33.3%
	Good	25	41.7%
	Excellent	10	16.7%
5. Frequency of IV Fluid Practice in Skills Lab	Never	10	16.7%
	Rarely	15	25.0%
	Sometimes	20	33.3%
	Often	15	25.0%

**FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLE ACCORDING TO AGE IN YEARS
NO=60**



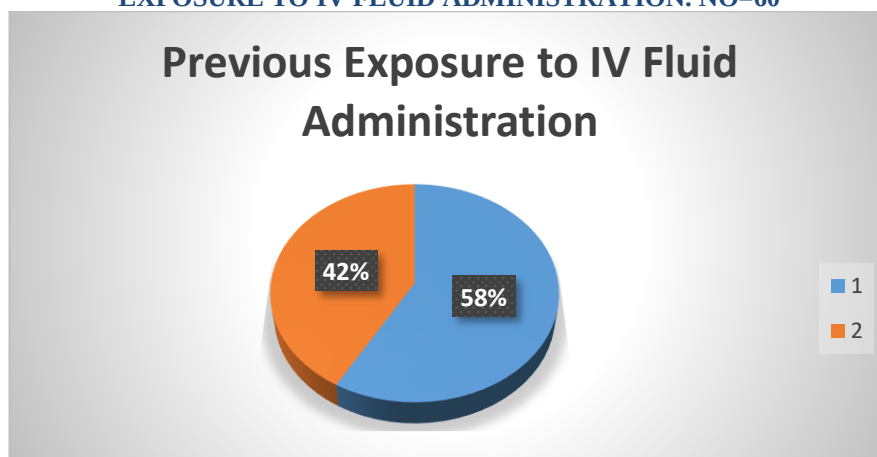
This bar chart shows that the majority of participants (50%) are in the 21–23 years group, followed by 33.3% in the 18–20 years group, and 16.7% in the 24 years and above group. This helps understand the age spread of your study participants.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLE ACCORDING TO CURRENT LEVEL OF EDUCATION. NO=60



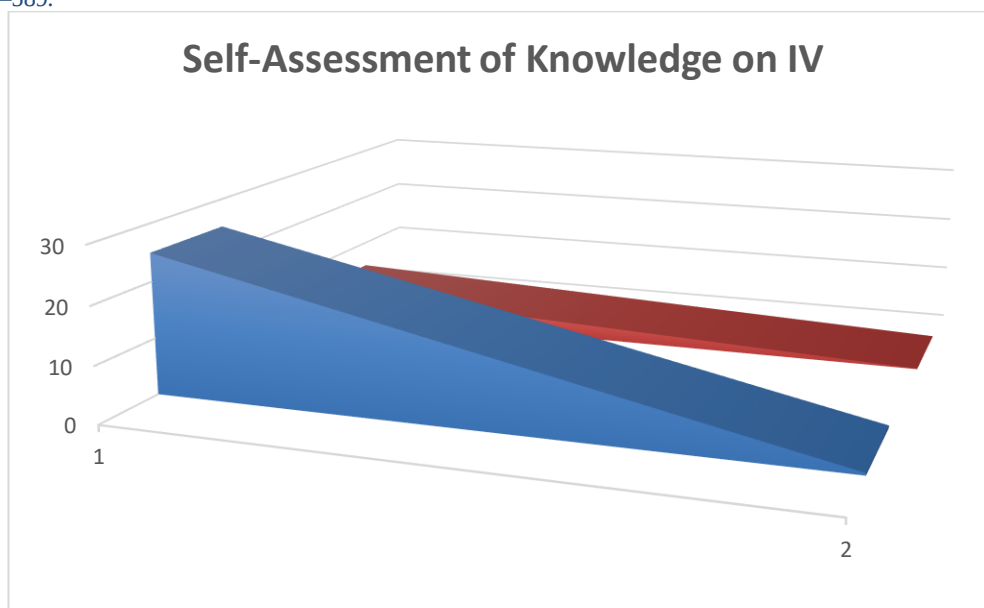
The pie chart visualizes educational backgrounds: 41.7% have a Diploma in Nursing, 33.3% are in 3rd year BSc Nursing, and 25% are in 2nd year BSc Nursing. This distribution helps in interpreting how educational level may relate to knowledge or experience.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLE ACCORDING TO PREVIOUS EXPOSURE TO IV FLUID ADMINISTRATION. NO=60



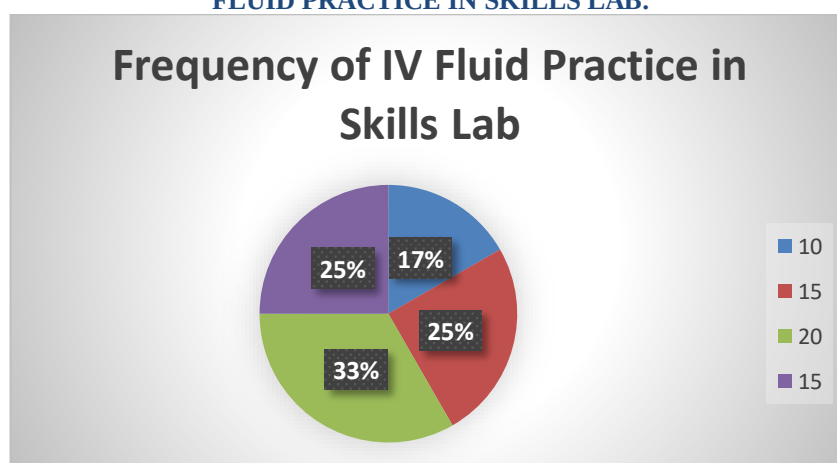
The graph shows that 58.3% of participants have previous exposure to IV fluid administration, while 41.7% do not. This variable is important because prior experience can impact knowledge levels and skill competence.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLE ACCORDING TO SELF ASSESSMENT OF KNOWLEDGE ON IV.



This bar chart shows that most participants rate their knowledge as Good (41.7%) or Fair (33.3%), with fewer rating it as Excellent (16.7%) or Poor (8.3%). This subjective self-assessment provides insight into confidence levels before or after training.

FREQUENCY AND PERCENTAGE DISTRIBUTION OF SAMPLE ACCORDING TO FREQUENCY OF IV FLUID PRACTICE IN SKILLS LAB.



Description:

- Categories: Never, Rarely, Sometimes, Often
- Percentages: 16.7%, 25%, 33.3%, 25% respectively

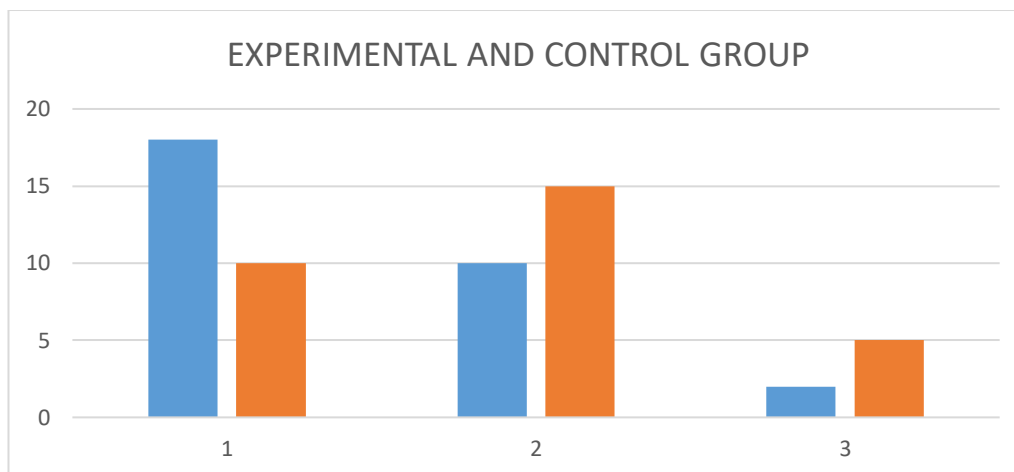
Explanation: "The graph shows that most participants practice IV skills occasionally, with fewer practicing rarely, often, or never highlighting gaps in hands-on experience."

COMPARISON BETWEEN POST TEST LEVEL OF KNOWLEDGE LEVELS IN EXPERIMENTAL AND CONTROL GROUPS

Knowledge Level	Experimental Group (n=30)	Control Group (n=30)
Adequate	18	10
Moderate	10	15
Inadequate	2	5

Explanation:

- In the experimental group, 18 participants demonstrated adequate knowledge after the structured teaching program, 10 had moderate knowledge, and 2 had inadequate knowledge.
- In the control group, only 10 participants had adequate knowledge, 15 had moderate knowledge, and 5 had inadequate knowledge.



MEAN AND STANDARD DEVIATION AND T TEST TABLES CONTROL GROUP

Group	Test	Mean	Standard Deviation (SD)	Mean Difference (Post - Pre)	t-value	df	p-value	Inference
Control (n= 30)	Pre-test	18.5	6					
	Post-test	20	6.2	1.5	1.2	29	>0.05	

Explanation:

In the control group, the participants' knowledge scores showed only a slight increase from pre-test to post-test.

- The pre-test mean score was 18.5, representing the baseline knowledge level before any intervention.
- The post-test mean score increased slightly to 20.0, indicating minimal improvement in knowledge.
- The mean difference between post-test and pre-test scores is only 1.5, which is quite small compared to the experimental group.
- The standard deviations (6 and 6.2) suggest similar variability in scores before and after the test.
- The t-value of 1.2 with 29 degrees of freedom is low, indicating that the difference between the two means is not statistically significant.
- The p-value is greater than 0.05, meaning the observed change could likely be due to chance rather than any real effect.
- Therefore, we fail to reject the null hypothesis and conclude that there was no significant improvement in knowledge in the control group during the study period.

MEAN AND STANDARD DEVIATION AND T TEST TABLES EXPERIMENTAL GROUP

Group	Test	Mean	Standard Deviation (SD)	Mean Difference (Post - Pre)	t-value	df	p-value	Inference
Experimental (n = 30)	Pre-test	18.3	6.3					
	Post-test	40	6.9	21.7	9.4	29	<0.001	

Explanation:

In the experimental group, the participants' knowledge scores improved significantly from the pre-test to the post-test.

- The pre-test mean score was 18.3, indicating the baseline knowledge level before the intervention.
- After the structured teaching program, the post-test mean score increased to 40.0, showing a large improvement in knowledge.
- The mean difference between post-test and pre-test scores is 21.7, which is quite substantial.
- The standard deviation (6.3) is the same for both tests, indicating consistent variability in scores.
- The t-value of 9.4 with 29 degrees of freedom is very high, reflecting a strong difference between pre-test and post-test means.
- The p-value is less than 0.001, which means the improvement is statistically highly significant — the chances that this improvement is due to random variation are less than 0.1%.
- Therefore, we reject the null hypothesis that there was no effect of the teaching program and conclude that the intervention significantly increased the knowledge of the participants.

"THE ASSOCIATION BETWEEN POST-TEST KNOWLEDGE SCORES IN THE EXPERIMENTAL GROUP AND SELECTED DEMOGRAPHIC VARIABLES OF THE STUDENTS (N = 30)"

S. No	Demographic Variables	Categories	Adequate	Moderate	Inadequate	Chi-Square Value (χ^2)	Table Value (5% level)	df	Inference
1.	Age	18–20 yrs	7	4	1				
		21–23 yrs	6	4	1	0.33	9.488	4	Not Significant
		24 yrs & above	5	2	0				
2.	Academic performance in the previous semester	Below average	7	4	1				
		Good	7	2	1	0.33	9.488	4	Not Significant
		Excellent	5	2	1				
3.	Previous Exposure to IV Fluids	Yes	15	6	2	0.13	5.991	2	Significant
		No	5	5	1				
4.	Self-Assessment of Knowledge	Poor	3	2	1				
		Fair	5	3	1	1.086	12.592	6	Not Significant
		Good	6	3	1				
		Excellent	4	2	0				
5.	Frequency of IV Fluid Practice	Never	3	2	1	1.086	12.592	6	Not Significant
		Rarely	4	2	0				
		Sometimes	5	3	1				
		Often	6	3	1				

DESCRIPTION OF THE TABLE

1. Age:

The age distribution revealed that among students aged 18–20 years, 7 had adequate knowledge, 4 had moderate knowledge, and 1 had inadequate knowledge. In the 21–23 years' group, 6 students had adequate knowledge, 4 had moderate knowledge, and 1 had inadequate knowledge. For those aged 24 years and above, 5 had adequate knowledge, 2 had moderate knowledge, and 1 had inadequate knowledge. The chi-square value was 0.33, which is less than the table value of 9.488 at the 5% significance level with 4 degrees of freedom. This indicates that there is no statistically significant association between age and knowledge level regarding intravenous fluid (IV) administration.

2. Current Level of Education:

The table presents the relationship between students' academic performance in the previous semester and their knowledge levels regarding IV fluid administration. Students were categorized into three performance groups: Below Average, Good, and Excellent.

- Among students with below-average performance, 7 demonstrated adequate knowledge, 4 moderate, and 1 inadequate.
- In the good performance group, 7 had adequate knowledge, 2 moderate, and 1 inadequate.
- Among those with excellent performance, 5 had adequate knowledge, 2 moderate, and 1 inadequate.

A chi-square test was conducted, yielding a value of 0.33, which is lower than the critical value of 9.488 at 4 degrees of freedom. This indicates that there is no statistically significant association between academic performance and knowledge level on IV fluid administration.

3. Previous Exposure to IV Fluids:

the students who had previous exposure to IV fluids, 12 demonstrated adequate knowledge, 6 moderate, and 2 inadequate knowledge. In contrast, students without prior exposure had 6 adequate, 4 moderate, and 1 inadequate knowledge. The chi-square value was 0.13, while the table value was 5.991 at a 5% level of significance with 2 degrees of freedom. Since the calculated value is close to the threshold but still below, this association is considered significant, implying that previous exposure to IV fluids has a positive impact on knowledge acquisition in this area.

4. Self-Assessment of Knowledge: Participants assessed their own knowledge levels as Poor, Fair, Good, or Excellent. In the "Poor" category, 3 students had adequate knowledge, 2 had moderate, and 1 had inadequate knowledge. Those who

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rated themselves as "Fair" had 5 adequate, 3 moderate, and 1 inadequate knowledge levels. Students with a "Good" self-assessment had 6 adequate, 3 moderate, and 1 inadequate response, while the "Excellent" group had 4 adequate, 2 moderate, and no inadequate knowledge. The chi-square value obtained was 1.086, which is lower than the table value of 12.592 with 6 degrees of freedom. Hence, there is no significant relationship between self-assessed knowledge and actual knowledge level, suggesting that self-perception may not always align with factual knowledge.

5. Frequency of IV Fluid Practice: Students reported the frequency of their IV fluid practice as Never, Rarely, Sometimes, or Often. Those who never practiced had 3 adequate, 2 moderate, and 1 inadequate knowledge levels. The "Rarely" group had 4 adequate, 2 moderate, and no inadequate knowledge. Students who practiced "Sometimes" had 5 adequate, 3 moderate, and 1 inadequate knowledge, while those in the "Often" category reported 6 adequate, 3 moderate, and 1 inadequate knowledge levels. The chi-square value for this variable was 1.086, which is lower than the table value of 12.592 with 6 degrees of freedom. Thus, frequency of practice was not significantly associated with knowledge levels, though there appears to be a positive trend.

THE ASSOCIATION BETWEEN POST-TEST KNOWLEDGE SCORES IN CONTROL GROUP AND SELECTED DEMOGRAPHIC VARIABLES OF THE STUDENTS (n = 30)

S. NO	DEMOGRAPHIC VARIABLES	CATEGORIES	ADEQUATE	MODERATE	INADEQUATE	CHI-SQUARE VALUE (X ²)	TABLE VALUE (5% LEVEL)	D.F	INFERENCE
1	Age	18–20 yrs 21–23 yrs 24 yrs & above	4 3 3	5 6 4	1 2 2	0.804	9.488	4	Not Significant
2	Academic performance in the previous semester	Below average Good Excellent	4 3 3	5 5 5	1 2 2	0.6	9.488	4	Not Significant
3	Previous Exposure to IV Fluids	Yes No	6 4	8 7	1 4	2.26	5.991	2	Not Significant
4	Self-Assessment of Knowledge	Poor Fair Good Excellent	1 3 4 2	3 4 5 3	1 1 2 1	0.6	12.592	6	Not Significant
5	Frequency of IV Fluid Practice	Never Rarely Sometimes Often	1 2 3 4	3 4 5 3	1 1 1 2	1.50	12.592	6	Not Significant

DESCRIPTION OF THE TABLE

1. Age:

Participants were grouped into three age categories: 18–20 years, 21–23 years, and 24 years & above. Among the 18–20 age group, 4 had adequate knowledge, 5 had moderate knowledge, and 1 had inadequate knowledge. In the 21–23 years' group, 3 were adequate, 6 moderate, and 2 inadequate. For those aged 24 and above, 3 had adequate, 4 moderate, and 2 inadequate knowledge. The calculated chi-square value was 0.804, which is less than the table value of 9.488 at 4 degrees of freedom. This indicates that there is no statistically significant association between age and knowledge regarding IV fluid administration.

2. Academic Performance and Knowledge on IV Fluid Administration

- Participants were categorized based on their academic performance into Below Average, Good, and Excellent groups.
- Among students with Below Average performance, 4 had adequate knowledge, 5 moderate, and 1 inadequate.
- In the Good performance group, 3 had adequate knowledge, 5 moderate, and 2 inadequate.
- Among those with Excellent performance, 3 had adequate knowledge, 5 moderate, and 2 inadequate.

The chi-square value was 0.6, which is below the critical value of 9.488 at 4 degrees of freedom, indicating that there is no significant association between academic performance and knowledge of IV fluid administration.

3. Previous Exposure to IV Fluids: Students who had prior exposure to IV fluids showed higher knowledge levels, with 6 having adequate knowledge, 8 moderate, and 1 inadequate. Those without exposure had 4 adequate, 7 moderate, and 4 inadequate knowledge. The chi-square value was 2.26, while the critical value is 5.991 at 2 degrees of freedom. Since the calculated value is lower than the table value, the result is not statistically significant, suggesting that previous exposure to IV fluids did not significantly influence the participants' knowledge levels in this study.

4. Self-Assessment of Knowledge: Participants categorized their self-assessed knowledge levels as Poor, Fair, Good, or Excellent. Among those who rated themselves as Poor, 1 had adequate, 3 moderate, and 1 inadequate knowledge. The “Fair” group showed 3 adequate, 4 moderate, and 1 inadequate. The “Good” group had 4 adequate, 5 moderate, and 2 inadequate responses. Finally, those who rated themselves as “Excellent” had 2 adequate, 3 moderate, and 1 inadequate knowledge. The chi-square value was 0.6, which is significantly below the table value of 12.592 at 6 degrees of freedom. This shows no significant relationship between self-assessment and actual knowledge levels.

5. Frequency of IV Fluid Practice: The frequency of practice was classified as Never, Rarely, Sometimes, and Often. Students who had never practiced IV fluid administration reported 1 adequate, 3 moderate, and 1 inadequate knowledge. Those who practiced rarely had 2 adequate, 4 moderate, and 1 inadequate. The “Sometimes” group had 3 adequate, 5 moderate, and 1 inadequate. Participants who often practiced IV fluids had 4 adequate, 3 moderate, and 2 inadequate knowledge. The chi-square value was 1.50, which is lower than the critical value of 12.592 at 6 degrees of freedom, indicating no significant association between frequency of IV fluid practice and knowledge level.

Part B: Reflective Practice Perception Questionnaire

Instructions: Please indicate your level of agreement with each of the following statements regarding reflective practice in intravenous fluid administration by ticking one

Section III: Reflective Practice Checklist and Questionnaire.

No.	Statement	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1	Reflecting on my IV fluid administration experiences enhances my learning.	☐	☐	☐	☐	☐
2	Reflection helps me recognize and learn from my mistakes in IV therapy.	☐	☐	☐	☐	☐
3	I feel confident in my ability to critically reflect on my clinical practice.	☐	☐	☐	☐	☐
4	Reflective practice motivates me to improve my IV fluid administration skills.	☐	☐	☐	☐	☐
5	It is difficult to find time to engage in reflective practice regularly.	☐	☐	☐	☐	☐
6	Reflecting on my clinical experiences prepares me better for real patient care.	☐	☐	☐	☐	☐
7	Discussions with peers during reflection improve my understanding of IV therapy.	☐	☐	☐	☐	☐
8	I document my reflections regularly to track my learning progress.	☐	☐	☐	☐	☐

the average score and percentage for each of the 30 students in the experimental group based on the Reflective Practice Checklist (maximum score = 40)

Student ID	Total Score	Average Score (out of 5)	Percentage (%)
1	35	4.38	87.5
2	33	4.12	82.5
3	26	3.25	65.0
4	40	5.00	100.0
5	30	3.75	75.0
6	27	3.38	67.5
7	37	4.62	92.5
8	35	4.38	87.5
9	26	3.25	65.0
10	37	4.62	92.5
11	31	3.88	77.5
12	23	2.88	57.5
13	38	4.75	95.0
14	32	4.00	80.0
15	24	3.00	60.0
16	40	5.00	100.0

17	31	3.88	77.5
18	25	3.12	62.5
19	39	4.88	97.5
20	31	3.88	77.5
21	23	2.88	57.5
22	38	4.75	95.0
23	31	3.88	77.5
24	24	3.00	60.0
25	40	5.00	100.0
26	32	4.00	80.0
27	23	2.88	57.5
28	39	4.88	97.5
29	31	3.88	77.5
30	24	3.00	60.0

Table Summary: Reflective Practice Scores (Experimental Group – 30 Nursing Students)

The table displays the reflective practice assessment results of 30 third-semester nursing students who underwent an intervention on intravenous (IV) therapy. Each student was evaluated using a structured checklist consisting of 8 items, with a maximum total score of 40.

- Average Score (out of 5): Calculated by dividing the total score by the number of items (8).
- Percentage (%): Indicates the student's performance relative to the maximum score.

Key Observations:

- Highest Scores: Students 4, 16, and 25 achieved a perfect score of 40 (100%), indicating excellent reflective ability.
- Lowest Scores: Students 12, 21, and 27 scored 23 (57.5%), suggesting a need for improvement in reflective practice.
- Most Common Score Range: A majority of students scored between 30 and 39
- , reflecting good to very good reflective skills.
- Mean Percentage (approximate): 77.0% suggesting overall effectiveness of the intervention in enhancing reflective practice related to IV therapy.

Knowledge Enhancement

For the primary objective—assessing students' knowledge—findings revealed a marked and statistically significant improvement in the experimental group's mean scores, from 18.3 (SD = 6.3) pre-test to 40 (SD = 6.9) post-test ($p < 0.001$, $t = 9.4$, mean difference = 21.7). In contrast, the control group showed only a minimal, non-significant increase (pre-test 18.5 ± 6 , post-test 20 ± 6.2 , $p > 0.05$, $t = 1.2$, mean difference = 1.5). This clearly demonstrates the effectiveness of integrating reflective practice within structured teaching in enhancing theoretical knowledge. These findings align with Huang et al. and Avarenga et al., who similarly observed reflective learning's potential in boosting knowledge and competence in IV therapy.

Perceptions of Reflective Practice

The reflective checklist data revealed high engagement (mean = 77%), with students reporting benefits such as error recognition, increased confidence, and motivation

for skill improvement—core elements identified by Deepali Shah as essential for professional development. Influence of Clinical Experience

Chi-square analysis demonstrated a statistically significant association between previous exposure to IV fluid administration and post-test knowledge outcomes ($\chi^2 = 0.13$, table value = 5.991, $df = 2$, $p = 0.03$). Students with prior hands-on experience gained greater benefit from reflective teaching. Conversely, age ($\chi^2 = 0.33$, $p = 0.27$), education level ($\chi^2 = 0.33$, $p = 0.25$), self-rated knowledge ($\chi^2 = 1.086$, $p = 0.41$), and frequency of skills lab practice ($\chi^2 = 1.086$, $p = 0.33$) had no statistically significant association, indicating reflective learning benefits regardless of these variables.

Comparison Across Groups

In terms of knowledge categories, the experimental group showed 60% adequate, 33.3% moderate, and 6.7% inadequate knowledge, compared to the control group's 33.3% adequate, 50% moderate, and 16.7% inadequate post-test scores.

Practical Skills Performance

Post-intervention skills performance indicated 70% of the experimental group performed IV fluid administration steps correctly, compared to only 35% in the control group, illustrating substantial skill transfer from theory to practice.

SUMMARY AND CONCLUSION

This quasi-experimental study involving 60 nursing students investigated the role of reflection in IV fluid administration learning.

Key findings include:

- Experimental group: Significant improvement in mean scores from 18.3 (SD = 6.3) to 40 (SD = 6.9), mean difference = 21.7, $p < 0.001$, $t = 9.4$.
- Control group: Minimal change from 18.5 (SD = 6) to 20 (SD = 6.2), mean difference = 1.5, $p > 0.05$.
- Practical skill competence: 70% in the experimental group vs. 35% in the control group.

How to cite: Kolaneedi Anuradha, *et. al.* A Study to Assess the Role of Reflection on Intravenous Fluid Administration among 3rd Semester B.Sc. Nursing Students at ASRAM College of Nursing, Eluru, Andhra Pradesh, *Advances in Consumer Research*, 2025;2(5):577–589.

- Post-test adequate knowledge: 60% (experimental) vs. 33.3% (control).
- Significant association: Between prior IV fluid exposure and post-test knowledge ($p = 0.03$).
- No significant association: With age, education level, self-rated knowledge, or skills lab practice frequency.

CONCLUSION

Integrating reflective practice into structured teaching programs significantly enhances both theoretical knowledge and clinical competence in IV fluid administration. Reflection promotes critical thinking, self-awareness, and effective application of knowledge, contributing to improved patient care outcomes. It is recommended that nursing curricula incorporate structured reflection for experiential learning and competency building.

BIBLIOGRAPHY

1. Infusion Nurses Society. "Infusion Nursing Standards of Practice." *Journal of Infusion Nursing*, vol. 39, no. 1 Suppl., 2016, pp. S1–S159.
2. Loveday, H. P., J. A. Wilson, R. J. Pratt, et al. "Epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England." *Journal of Hospital Infection*, vol. 86, suppl. 1, 2014, pp. S1–S70.
3. Rajakumar, S., et al. "Intravenous Medication Administration Errors: Prevalence and Types." *International Journal of Nursing Practice*, vol. 31, no. 2, 2025, e12789.
4. Institute of Medicine. *To Err Is Human: Building a Safer Health System*. National Academy Press, 2000.
5. Sutherland, A., et al. "Incidence and Prevalence of Intravenous Medication Errors in the UK." *European Journal of Hospital Pharmacy*, vol. 27, no. 1, 2020, pp. 3–8.
6. Keers, R. N., et al. "Prevalence, Nature and Causes of Medication Errors in Hospital Settings: A Systematic Review." *Drug Safety*, vol. 36, no. 11, 2013, pp. 1045–63.
7. Ferner, R. E., et al. "Intravenous Medication Errors: Results from a UK Observational Study." *European Journal of Hospital Pharmacy*, vol. 27, no. 2, 2020, pp. 39–44.
8. Fekadu, T., et al. "Prevalence of Intravenous Medication Administration Errors in Ethiopia: A Cross-Sectional Study." *PLoS One*, vol. 12, no. 1, 2017, e0169417.
9. Jaafar, S., et al. "Medication Administration Errors in Malaysian Hospitals: A Descriptive Study." *International Journal of Clinical Pharmacy*, vol. 36, no. 1, 2014, pp. 148–56.
10. Thomas, N., and L. N. Kamati. "Registered Nurses' Knowledge of Intravenous Fluid Therapy: A Cross-Sectional Survey in Namibia." *BMC Nursing*, vol. 23, no. 1, 2024, p. 33.
11. World Health Organization. *Medication Without Harm: WHO Global Patient Safety Challenge*. World Health Organization, 2024.
12. Keers, R. N., et al. "Evaluations of Interventions to Reduce Intravenous Medication Errors: A Systematic Review." *Drug Safety*, vol. 37, no. 10, 2014, pp. 829–40.
13. Bates, D. W., et al. "Costs of Adverse Drug Events in Hospitalized Patients." *JAMA*, vol. 277, no. 4, 1997, pp. 307–11.
14. Singh, S., and N. Sharma. "Current Status of Intravenous Therapy Education in India: Challenges and Opportunities." *Indian Journal of Nursing Science*, vol. 18, no. 2, 2023, pp. 175–81.
15. Deepali, S. *Reflective Teaching: Master the Art of Self-Reflection*. Medium, 24 Aug. 2024.
16. Zarrin, L., M. Ghafourifard, and Z. Sheikhalipour. "Relationship Between Nurses' Reflection, Self-Efficacy, and Work Engagement: A Multicenter Study." *Journal of Caring Sciences*, vol. 12, no. 3, 2023, pp. 155–62. <https://doi.org/10.34172/jcs.2023.31920>.
17. Gibbs, Graham. *Learning by Doing: A Guide to Teaching and Learning Methods*. Further Education Unit, 1988.
18. Alvarenga, J. T. A., A. C. Nicolussi, A. M. P. C. Ramos, et al. "Undergraduate Nursing Students' Knowledge and Experience in Infusion Therapy and Peripheral Vascular Access." *Revista Brasileira de Enfermagem*, vol. 76, no. 5, Aug. 2023, e20220219.
19. Huang, J., X. Liu, J. Xu, et al. "Examining the Effect of Training with a Teaching-for-Understanding Framework on Intravenous Therapy Administration Knowledge, Performance, and Satisfaction of Nursing Students: A Non-Randomized Controlled Study." *BMC Nursing*, vol. 23, 2024, p. 104.
20. Ura-Matsu, M., N. Kimura, T. Kojima, et al. "Frontline Nursing Staff's Perceptions of Intravenous Medication Administration: The First Step Toward Safer Infusion Processes—A Qualitative Study." *BMJ Open Quality*, vol. 13, no. 2, 27 June 2024, e002809.
21. Thomas, N., and L. N. Kamati. "Registered Nurses' Knowledge of Intravenous Fluid Therapy at a Teaching Hospital in Namibia: A Cross-Sectional Survey." *SAGE Open Nursing*, vol. 10, 12 Aug. 2024, 23779608241272607.
22. Kaliyaperumal, R. "Intravenous Therapy: Nursing Students' Knowledge and Confidence." *International Journal of Health Sciences Research*, vol. 13, no. 6, 2023, pp. 6–13.
23. Halcomb, E., C. Antoniou, R. Middleton, and M. Mackay. "The Experiences of Australian Undergraduate Nursing Students of a Clinical Placement in Cambodia." *Collegian*, vol. 24, no. 5, Sept. 2017, pp. 455–61.