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RESEARCH ARTICLE
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IMPACT OF STRUCTURED DOAP METHOD ON SKILL RETENTION AND CONFIDENCE IN IV CANNULATION AMONG PHASE II MBBS STUDENTS.

Dr. Anubhuti Shukla[1], Dr. Sharvan Kumar Bhargawa[2], Dr. Vikas Chaudhary[3*], Dr. Devarshi Dixit[4]

[1](Assistant Professor) Department of Pharmacology, Dr. B.S. Kushwah Institute of Medical Sciences, Lakhanpur, Kanpur Uttar Pradesh. **Email:** anubhuti.kgmu008@gmail.com
[2](Associate Professor) Department of Pathology, Government medical College, Badaun. **Email:** drshravan21@gmail.com
[3*](Junior Resident) Department of Pharmacology, Sarojini Naidu Medical College, Agra. **Email:** vkscdy@gmail.com
[4] (Assistant Professor) Department of Physiology, Dr. B.S. Kushwah Institute of Medical Science, Lakhanpur, Kanpur Uttar Pradesh. **Email:** devarshidixit87@gmail.com

***Corresponding Author:** Dr. Vikas Chaudhary
* (Junior Resident) Department of Pharmacology, Sarojini Naidu Medical College, Agra.
Email: vkscdy@gmail.com

Abstract

Background: Traditional teaching often fails to ensure consistent clinical competency among Indian Medical Graduates. IV cannulation, a key skill, shows variable performance in Phase II MBBS students. The DOAP method provides a structured, competency-based approach to improve clinical skill training.

Objective: To evaluate the impact of the structured DOAP method on skill retention and confidence in IV cannulation among Phase II MBBS students, and to gather perceptions from both students and faculty regarding its effectiveness.

Methods: An observational study was conducted from Jan to June 2023 at SN Medical College, Agra, with 60 Phase II MBBS students. They were randomly divided into Group A (DOAP method) and Group B (conventional teaching). Skill performance was assessed via OSCE and confidence using a 5-point Likert scale at baseline, post-training, and after 4 weeks. Student and faculty feedback was also collected.

Results: Group A showed significant improvement in OSCE scores post-intervention (Pre-DOAP: 11.74 ± 1.55, Post DOAP-I: 16.39 ± 2.70, Post DOAP-II: 18.50 ± 1.87; $p < 0.001$). Self-reported confidence also improved markedly. Students appreciated the hands-on, stepwise structure, while faculty noted increased student engagement and better skill retention. Challenges included time constraints and the need for more facilitators and resources.

Conclusion: The structured DOAP method significantly enhances both skill retention and self-confidence in IV cannulation among Phase II MBBS students compared to traditional teaching. Its stepwise, interactive approach makes it an effective tool for procedural skill training in undergraduate medical education.

Keywords: DOAP, intravenous cannulation, skill retention, medical education, MBBS students, clinical competency, OSCE

Introduction: Traditional teaching and learning approaches often fall short in ensuring that Indian Medical Graduates (IMGs) consistently achieve required clinical competencies. The newly implemented curriculum, which emphasizes communication and fundamental clinical skills, has shown to enhance performance in these areas.[1] However, significant variability remains in the ability of 2nd-phase MBBS students to competently perform routine bedside procedures such as male bladder catheterization, despite undergoing conventional training and assessment methods.[2]
DOAP sessions facilitate institutions and faculty to develop and implement skills and so these sessions are part of training in implementation of new undergraduate curriculum.[3] This study with aimed to motivate the students for DOAP method of learning and to impart standard skill in intravenous cannulation in IMG with objectives viz. to determine the perception of students and faculty regarding DOAP method of teaching and learning, to determine factors that promote and determine DOAP method of teaching and learning and to assess and compare adaptability of DOAP as a teaching learning method by II MBBS students for intravenous cannulation.[4] Students were confident enough to perform I.V. cannulation on mannequin independently after these sessions. Students were well worse with the technique and skill to perform I.V. cannulation on patients in future. This method is beneficial to the students.[5]

Methods: This study educational research was conducted in department of pharmacology in January 2023 to June 2023 at Sarojini Naidu Medical College, Agra. The study population in this research involved was pharmacology faculty and II phase MBBS student's of 2023 batch of the institution. The study population in this research involved was pharmacology faculty and II phase MBBS students' of 2023 batch of the institute. Total 60 students and 5 faculties (12 students per faculty).
Since this is a certified skill required for Phase II MBBS students according to NMC guidelines, each student must complete it to demonstrate their competency. Prior to the activity, the Phase II MBBS students discussed the procedure and obtained informed consent, stating that the study data would be used for medical education research.

Type of Study: This is an observational descriptive study
Study duration: Research study will be duration of 6 months
A total of 60 Phase II MBBS students were randomly assigned to:
- Group A (DOAP method) – 30 students
- Group B (Conventional teaching) – 30 students

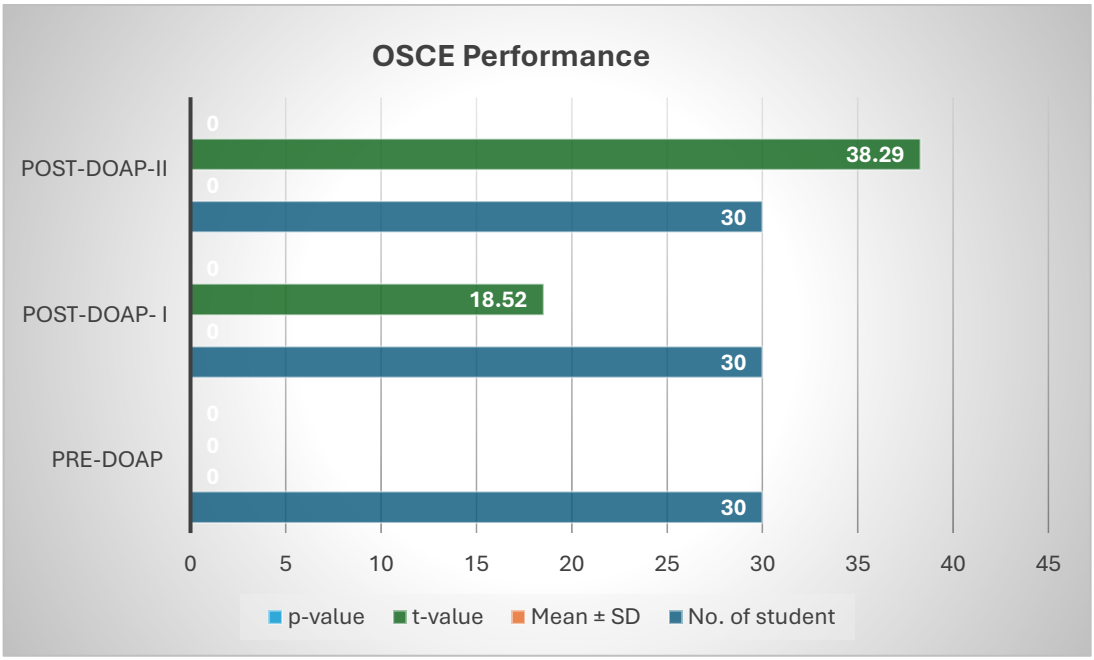
Inclusion criteria included students with no prior formal training in IV cannulation. Informed consent was obtained from all participants.
Intervention
- Group A (DOAP):
- Demonstration: Faculty demonstrated IV cannulation on a manikin.
- Observation: Students observed the demonstration again, noting steps.
- Assistance: Students performed the procedure with guidance.
- Performance: Students performed independently under supervision.
- Group B (Conventional):
- Received a standard lecture followed by a brief clinical demonstration without structured hands-on training**.**

Assessment Tools
1. Objective Structured Clinical Examination (OSCE):
    - Standardized checklist (10 steps, score out of 100).
    - Evaluated at baseline, immediately post-training, and at 4 weeks.
2. Self-Reported Confidence Questionnaire:

5-point Likert scale.
• Assessed at the same three time points.
3. Feedback Questionnaire:
• Open-ended and Likert-based questions to assess perceptions.

Result:
Objective Structured Clinical Examination (OSCE) Performance

Assessment Timepoint	No. of student	Mean ± SD	t-value	p-value	Significance
Pre-DOAP	30	11.74 ± 1.55	–	–	–
Post-DOAP- I	30	16.39 ± 2.70	18.52	$p < 0.001$	Significant*
Post-DOAP-II	30	18.50 ± 1.87	38.29	$p < 0.001$	Highly significant**



Pre-DOAP, Post-DOAP I, and Post-DOAP II.
• The mean score increased from 11.74 ± 1.55 at the pre-DOAP stage to 16.39 ± 2.70 after the first DOAP session. This improvement was statistically significant ($t = 18.52$, $p < 0.001$), indicating that the initial DOAP session had a positive impact on student learning.
• After the second DOAP session, the mean score further increased to 18.50 ± 1.87, with a highly significant difference compared to the pre-intervention score ($t = 38.29$, $p < 0.001$).
• The consistent rise in mean scores, along with highly significant *p*-values, suggests that repeated exposure to DOAP sessions enhances students' understanding and performance effectively.

Students' feedback: perception of students.

Category	Category Feedback / Question
Positive Feedback	The DOAP method helped me understand each step of IV cannulation more clearly.
	Hands-on practice under supervision boosted my confidence.
	The structured approach made it easier to remember and perform the procedure.

Positive Feedback	Immediate feedback during practice was very helpful in correcting mistakes.
	I felt more prepared to perform IV cannulation on real patients after the DOAP session.
Suggestions for Improvement	More time should be given for supervised practice in the 'Assistance' phase.
	Smaller groups would allow better one-on-one guidance.
	Refresher DOAP sessions would help retain skills long-term.
	Adding videos or animations to the demonstration could improve understanding.
Student Questions	How often should DOAP sessions be repeated to maintain competence?
	What are the most common errors to avoid during IV cannulation?
	How does DOAP compare to traditional teaching in long-term retention?
	Can DOAP be applied effectively to other clinical procedures?

Teachers' feedback: DOAP as A TL method

Category	**Feedback**
Effectiveness	Provides a clear, stepwise approach facilitating skill acquisition.
	Combines observation and practice, improving skill retention.
	Increases student engagement compared to traditional lectures.
	Immediate feedback helps correct errors early.
	Gradually builds learner confidence through increasing independence.
	Time constraints limit depth of practice per session.
	Time constraints limit depth of practice per session.
	Large groups reduce individual attention during 'Assistance'.

Challenges	Requires adequate resources (mannequins, trained facilitators).
Suggestions for Improvement	Some students need more repetition, difficult to accommodate in structured schedules.
	Use multimedia (videos, animations) alongside demonstrations.
	Smaller groups or additional sessions for personalized guidance.
	Periodic refresher sessions to sustain skill levels.
	Train faculty on DOAP to ensure uniformity and effectiveness.
Overall Impression	Excellent for teaching psychomotor clinical skills.
	Bridges gap between theory and practice effectively.
	Allows timely identification and addressing of student difficulties.
	Widespread adoption could improve competency and confidence in clinical procedures.

Discussion: This study aimed to evaluate the effectiveness of the Structured DOAP (Demonstration, Observation, Assistance, and Performance) method in enhancing skill retention and self-reported confidence among Phase II MBBS students in performing intravenous (IV) cannulation.[6] The findings demonstrate that DOAP significantly improves both the procedural competence and the confidence levels of undergraduate medical students, aligning with prior literature supporting structured skill-based teaching.

The stepwise nature of the DOAP method offers a logical and learner-centered approach, which was well-received by students. Most participants reported that observing a live demonstration, followed by guided assistance and supervised performance, reinforced their understanding of the skill and provided a safe environment to practice.[7] overall, the structured DOAP method appears to be an effective and student-friendly approach for teaching clinical skills such as IV cannulation. It enhances both confidence and skill retention, supports active learning, and addresses several shortcomings of passive learning strategies. With appropriate resource planning, faculty training, and reinforcement strategies, the DOAP method can be successfully integrated into undergraduate medical curricula for core procedural skills training.

Conclusion: The structured DOAP method significantly enhances skill retention and boosts confidence in IV cannulation among Phase II MBBS students. Its hands-on, stepwise approach proves more effective than traditional teaching methods for clinical skill acquisition.

Limitations:

• Confidence levels increased notably after structured, hands-on training with supervision.
• DOAP was well-received by both students and faculty for its stepwise, interactive approach.

• Self-reported confidence may not accurately represent true clinical competence.
• Study was observational with limited randomization, which may introduce bias.

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