International Journal of Community Medicine and Public Health
Dhavalshankh AG et al. Int J Community Med Public Health. 2024 Oct;11(10):3917-3922
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20242872

Original Research Article

Assessment of effectivity and adaptability of DOAP as a teaching and learning method by II-MBBS students for intravenous cannulation in simulated environment

Archana Ganesh Dhavalshankh[1]*, Ganesh P. Dhavalshankh[2], Gayatri Ganesh Dhavalshankh[1]

[1]Department of Pharmacology, D. Y. Patil Medical College, Kolhapur, Maharashtra, India
[2]Department of Dermatology, D. Y. Patil Medical College, Kolhapur, Maharashtra, India

Received: 09 July 2024
Revised: 26 August 2024
Accepted: 04 September 2024

***Correspondence:**
Dr. Archana Ganesh Dhavalshankh,
E-mail: archana9595@yahoo.com

ABSTRACT

Background: Before implementing any teaching and learning method in the curriculum, it is required to evaluate its effectivity, feasibility and adaptability. DOAP is one new TL method in CBME help to facilitate self-directed, long-term learning and to cultivate and enhance interest in the study. This study aimed to assess the effectivity and Adaptability of DOAP as a teaching and learning method by II-MBBS students for intravenous cannulation in simulated environment.
Methods: For this cross-sectional, data collected from 150 students from MBBS II phase. Demonstration by a trained facilitator for a group of 10 followed by assistance and then performance by individual student under supervision using mannequin in simulated environment. The effectivity assessed with knowledge domain using pre-test and post-test and skill domain, OSPE checklist validated by subject expert used. Adaptability assessed after feedback from students and teachers. Statistical analysis was done using t test.
Results: There was graded improvement seen after post-test I and II (44.62% and 70.08% respectively). The significant improvement was seen in performance with pre and post OSPE mean score results (11.74, 16.48 and 19.6 respectively) with p value less than 0.001 after both post DOAP OSPE. As per students' and teachers' feedback DOAP is very much effective TL method to impart knowledge, skill and communication domain on IMG.
Conclusions: DOAP is effective TL method to impart knowledge, skill and communication domain on IMG. Pre-requisites like infrastructure, trained facilitators and time constraints has to consider before its implementation.

Keywords: DOAP, I.V. cannulation, MBBS students, Simulation, TL method

INTRODUCTION

Conventional teaching and learning methods may not allow the assurance of achievement of competencies in the Indian Medical Graduate (IMG). New curriculum promoting communication and basic clinical skills are effective and lead to an improved performance in skills.[1] Introduction of structured training methods could offer a reliable method of facilitation of learning and assured skill acquisition. Newer teaching learning methods like DOAP (demonstrate observe assist perform) method can be utilized to facilitate self-directed, long-term learning and to cultivate and enhance interest in the subject study.

DOAP is a practical session that allows the student to observe a demonstration, assist the performer, perform in a simulated environment, perform under supervision or perform independently.[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.

Intravenous cannulation is not a simple but complex and skilful. This skilled technique should be taught in an interesting way and learning needs several times practice for perfection. Intravenous cannulation is important part while managing any clinical case. Medical students have to be skilled in it confidently. Apart from traditional teaching, more effective teaching and learning methods like DOAP method can be used.

It is essential to evaluate the effectiveness of newer techniques before recommending them as a teaching learning method. This study was undertaken to assess the effectivity and adaptability of "DOAP" teaching learning method by II MBBS students for intravenous cannulation. During teaching most commonly teaching faculty observed problem is that even after graduation, MBBS students (IMGs) are lacking skill to perform task of intravenous cannulation effectively, independently, skilfully and with confidence. In context, DOAP session for teaching and learning will allow the student to observe a demonstration, assist the performer, perform in a simulated environment, perform under supervision or independently and thus increase the student's interest and initiative in learning. Rational or impact of this study was student's development to increase interest of IMG in learning as a lifelong learner and correlate and apply Para clinical knowledge in their clinical practice as well as Health Improvement through skill of i.v. cannulation without complications serve society to providing health.

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.

METHODS

This qualitative and quantitative educational research was conducted in department of pharmacology in 2021 to 2022 at D. Y. Patil Medical College, Kolhapur. The study population in this research involved was pharmacology faculty and II phase MBBS students of 2021 batch of the institute. Total 150 students and 10 faculties (15 students per faculty) was sample size. As it's certified skill for II phase MBBS students as per NMC guidelines so every student has to complete this skill to show his/her competency. Phase II MBBS students discussed it beforehand and took an informed consent that study data is used for medical educational research. All together 10 faculties of pharmacology department were involved the study as a facilitator. Any student or teacher those remained absent on that day were planned separately to complete the task. Different study tools used during this study like pre-test (before start of study) and post-test I (after demonstration and observation) and post-test II (after assistance and performance) was taken to evaluate impact on knowledge domain. Objective structured clinical examination (OSCE) checklist validated by subject expert was provided for assessment of effectiveness of IV skill.[3-5] The perception or adaptation by student and Teacher was assessed using a Likert Scale based feedback questionnaire. The students learnt DOAP as a teaching and learning method on mannequin in skill lab as an intervention. Mannequin (hand), i.v. transfusion set, hand gloves, colored saline fluid instruments were used.

RESULTS

Total 150 out of which 79 male and 71 female students were involved in this study. In pre-test of DOAP session to assess the basic knowledge, average score was 50% but after demonstration and observation session, first post-test was conducted and average score of students was 72.32%. The second post-test conducted after assistance and performance session and students' performance score improved to 85.04% (Figure 1). There was graded improvement seen after post-test I and II (44.62% and 70.08% respectively). Skill performance assessed twice at same stations of session through OSCE scale and we found that significant improvement seen in performance with mean score of pre-DOAP OSCE was 11.74, score of post-DOAP OSCE I was 16.48 and mean score of post DOAP OSCE II was 19.6 with p value less than 0.001 after both post DOAP OSCE (Table 1).

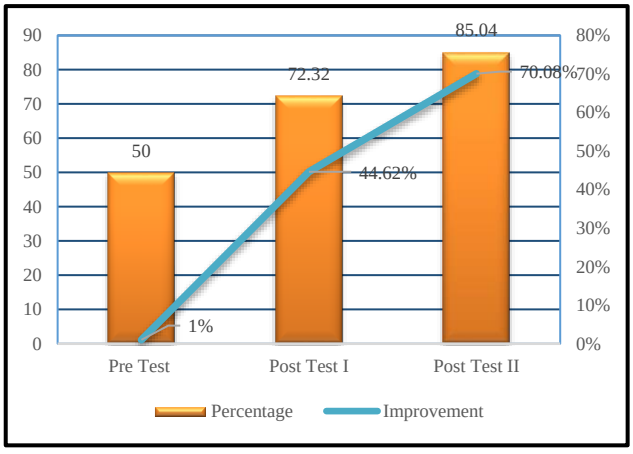

Figure 1: Impact of DOAP on knowledge domain graded response for improvement in knowledge.

Table 1: Impact of DOAP on skill domain comparison of improvement in OSCE assessment.

Test	N	Mean±SD	Average of differences (x̄d)	SD of differences (Sd)	t-value	Normality p value	P value
Pre- DOAP OSCE	150	11.74±1.55					
Post -DOAP OSCE I	150	16.48±2.70	4.7467	3.1392	18.5186	0.1388	p<0.001*
Post -DOAP OSCE II	150	19.60±1.87	7.8667	2.5162	38.291	0.00216	p<0.001**

*There is a significant large difference between before (M=11.7, SD=1.6) and after (M=16.5, SD=2.7), t (149) =18.5, p<0.001.
**There is a significant large difference between before (M=11.7, SD=1.6) and after (M=19.6, SD=1.9), t (149) =38.3, p<0.001.

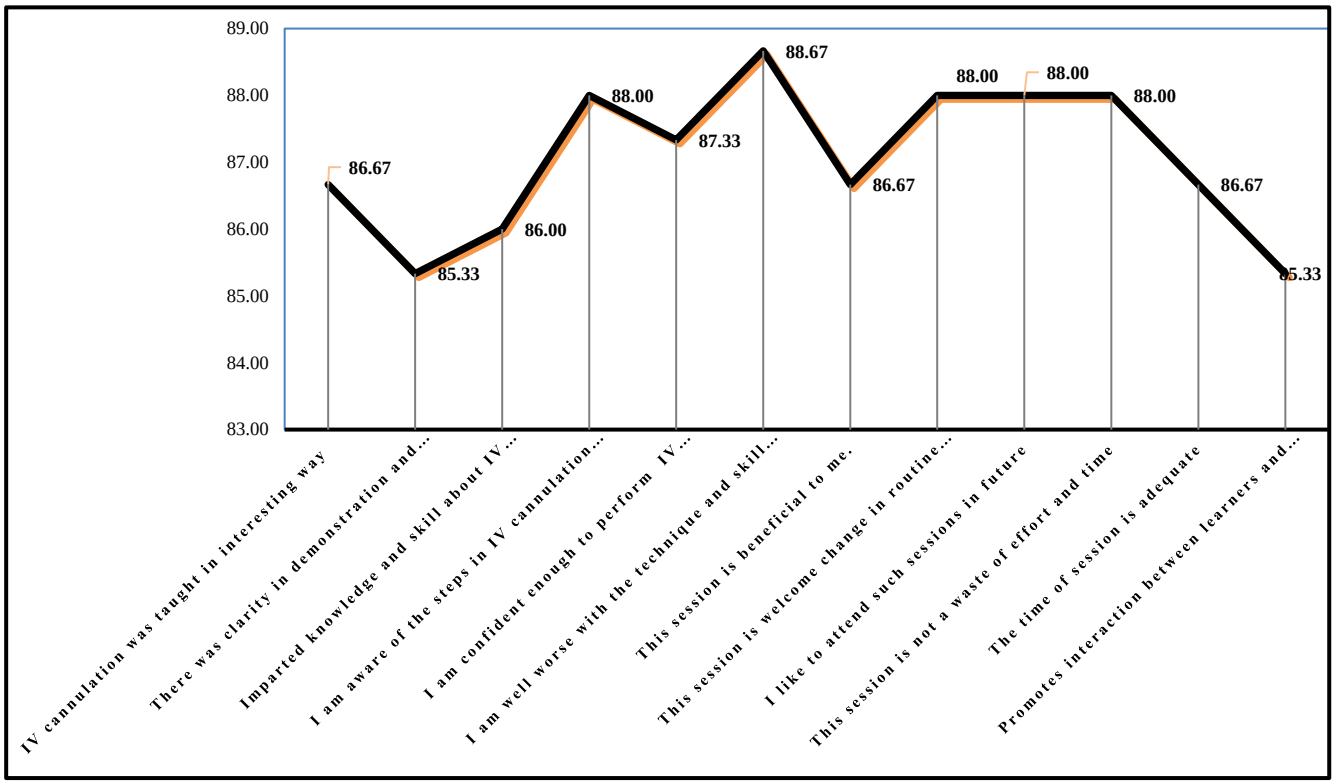

Figure 2: Students' feedback: perception of students.

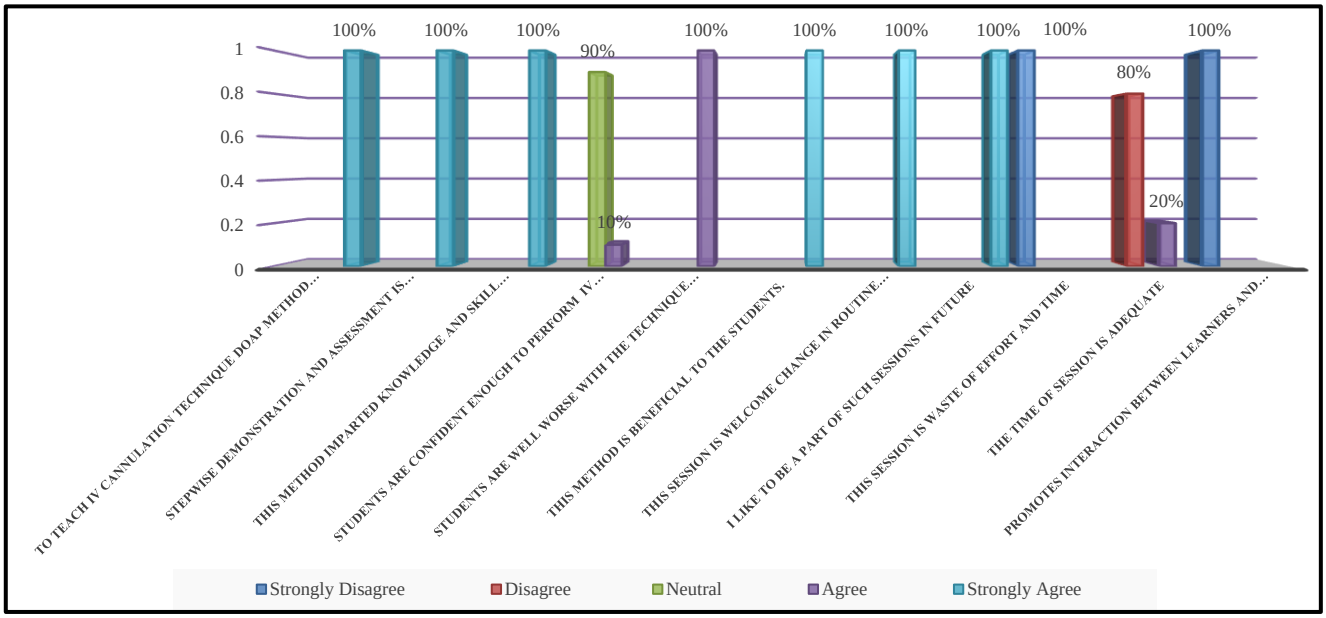

Figure 3: Teachers' feedback: DOAP as A TL method.

To assess the perception and acceptability, feedback is taken from students as well teachers. The students' positive feedback admitted that i.v. cannulation was taught in interesting way (86.67%). 85.33% students said that there was clarity in demonstration and performing each step in i.v. cannulation during teaching. 86% students agreed that imparted knowledge and skill about i.v. cannulation safely. 88% students admitted that in II phase of MBBS students aware about i.v. cannulation process. Now 87.33% students were confident enough to perform i.v. cannulation on mannequin independently and 88.67% students were well worse with the technique and skill to perform i.v. cannulation on patients in future. 86.67% students accepted that session is beneficial. 88% welcomed this change in routine curriculum, ready to attend such sessions in future and not thinking that it's a waste of time and effort. 86.67% approval about time adequacy. 85.33% students approved that DOAP session promotes interaction between learners and facilitator (Figure 2).

As seen in Figure 3 teacher approved DOAP method positively. All teachers opined that to teach i.v. cannulation technique DOAP method is an interesting and captivating method. Stepwise demonstration and assessment is possible for facilitator and evaluator. This method imparted knowledge and skill about i.v. cannulation in IMG. 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. All teachers welcomed this change in routine curriculum. All teachers like to be a part of such sessions in future. Only 10% teachers thought that it's waste of effort and time. All agree with the allotted time of session is adequate. Everyone agreed that DOAP promotes interaction between learners and facilitator.

DISCUSSION

This study assessed the level of knowledge and skill of II phase MBBS students regarding intravenous cannulation procedure and determined the effectiveness of DOAP as a teaching learning method. The pre-test findings showed that most of the students had average knowledge regarding intravenous cannulation. The pre DOAP OSCE findings showed that most of the students had poor skill regarding intravenous cannulation method. The findings of the present study concluded that the DOAP is very effective, feasible method to teach and learn intravenous cannulation. It was effective in increasing the knowledge as well as skill level with significant difference ($p<0.001$) in pre and post-test and OSCE results. Singh et al in 2021 conducted a study for quality improvement initiative to reduce intravenous line-related infiltration and phlebitis incidence in pediatric emergency room and concluded with there was a significant decrease in the incidence of infiltration and phlebitis from 82.9 and 96.1% to 45 and 55%, respectively, post implementation of all PDSA cycles.[6] One descriptive cross-sectional study was carried out by Osti et al to determine the knowledge and practice of nurses towards care and maintenance of i.v. cannula and to find out the obstacles encountered in caring and maintaining i.v cannula.[7] This study finding revealed that 84.72% respondents were doing correct practices despite the fact that only 82.47% respondents had proper knowledge. Most nurses have good knowledge of caring and maintaining peripheral intravenous cannulation but there were some without proper knowledge and practice. This study concluded that lack of proper knowledge and skill could be a potential risk factor for patient safety.

The results of the above study were supported by a study conducted by George and Muninarayananappa in 2013 in Mangalore, Karnataka among staff nurses about knowledge on prevention of intravenous cannula complications.[8] In the above-mentioned study, the mean difference between pre-test and post-test scores was 8.4. The calculated' value (9.978) was more than table value 2.02, hence $p<0.005$. These study findings concluded that for prevention of intravenous cannula complications, one structured teaching program was very effective in improving the knowledge level of staff nurses.

Our study findings are similar to the findings obtained by many others where a teaching program was found to be effective. In various studies it was found that initially nurses were lacking in adequate knowledge about insertion and management of peripheral intravenous cannula but following the administration of a training workshop, there was improvement in the knowledge. Lyon and Kasker in 2012 conducted a study about continuing education program on the i.v. catheter insertion, maintenance and infection prevention and this study resulted in improvement in the knowledge of experienced nurses immediately after the course.[9] Altun in 2012 undertook a study with the aim to determine the knowledge and practice of nurses for management of i.v. cannulation and to assess the effect of the training given on this subject.[10] During this study, a lecture-based workshop was administered and it resulted in improvement in the level of knowledge. Prabhu et al in the study compared traditional versus video-based teaching on neurological assessment among undergraduate nursing students but found no statistically significant difference between two groups.[11] Hence, concluded that both the teaching methods were found to be equally effective in improving the knowledge and skill of undergraduate nursing students on neurological assessment.

This study was conducted on II MBBS students under CBME curriculum in formatted schedule but some students may need more time or revision to learn this skill and to become competent enough. Effectiveness of the

teaching learning method was assessed after a period of two terms of II MBBS only. To have competent IMG (Indian Medical Graduate) long term retention of this knowledge is better with a DOAP session and that needs continuation as well as assessment in next academic years. This study will strengthen the thought that traditional methods are not enough and competency oriented, real life situation-based teaching and learning methods are more effective for clinical skill development such as DOAP sessions for skill learning and development.

CONCLUSION

This skill training could and help the students to regain knowledge and impart and improve skill. MBBS student can apply the knowledge and skill in clinical cases to better understand subject and method. Training in II phase of MBBS will show improvement, perfection and application of skill in phase III and phase IV studies. IMG can apply the knowledge and skill in clinical practice to treat the patient. DOAP sessions facilitate institutions and faculty to develop and implement other skills in development of curriculum. As per students' and teachers' feedback DOAP is very much effective TL method to impart knowledge, skill and communication domain on IMG. Only pre-requisites and time constraints are two things are very important to implement it for any skill.

Implications

With this study, we expect short term outcomes like increase in students' interest in subject, let the students to identify the gaps in their knowledge and skill, to explore students' satisfaction about DOAP as a new method of skill learning, to improve involvement of students in this interactive and peer teaching session, to improve assessment outcome with structured skill training and improve in students' performance in formative assessment. Intermediate outcomes are like application of this knowledge and skill in clinical subjects, better retention and refine skill and knowledge during clinical posting due to repetition, teachers (facilitators) can improve themselves with new teaching and learning method, teachers can update themselves with i.v. cannulation and teachers can learn how to validate and design structured assessment tool (OSCE). Long term outcome could be IMG will be able to perform task independently, skillfully and confidentially and efficiently while treating patient without complications, we can compare effectivity and adaptability of DOAP method with other leaching and learning method. DOAP sessions can become model to for to develop and implement other TL methods in curriculum. I.V. cannulation by DOAP method as a one of the electives.

ACKNOWLEDGEMENTS

My sincere thanks and gratitude to non-teaching, technical and clerical staff of pharmacology department, technical staff from simulation lab, teaching staff from pharmacology department, MET unit from D. Y. Patil Medical College, Kolhapur, Dean, D. Y. Patil Medical College, Kolhapur, Students (Batch 2019-2020) and Medical Education Unit of GSMC- KEMH Nodal Centre.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Jünger J, Schäfer S, Roth C, Schellberg D, Friedman Ben-David M, Nikendei C. Effects of basic clinical skills training on objective structured clinical examination performance. Med Educ. 2005;39(10):1015-20.
2. Medical Council of India. Skills Training Module for Undergraduate Medical Education program. 2019. Available from: https://nmc.org.in/MCIRest/open/getDocument?path=/Documents/Public/Portal/LatestNews/Skill%20!Module_23.12.2019%20(1).pdf. Accessed on 1 June 2024.
3. Stein MR, Parish SJ, Arnsten JH. The OSCE as a formative evaluation tool for substance abuse teaching. Med Educ. 2005;39(5):529-30.
4. Turner JL, Dankoski ME. Objective structured clinical exams: a critical review. Fam Med. 2008;40(8):574-8.
5. Duerson MC, Romrell LJ, Stevens CB. Impacting faculty teaching and student performance: nine years' experience with the objective structured clinical examination. Teach Learn Med. 2000;12(4):176-82.
6. Singh N, Kalyan G, Kaur S, Jayashree M, Ghai S. Quality improvement initiative to reduce intravenous line-related infiltration and phlebitis incidence in pediatric emergency room. Indian J Crit Care Med. 2021;25(5):557-65.
7. Osti C, Khadka M, Wosti D, Gurung G, Zhao Q. Knowledge and practice towards care and maintenance of peripheral intravenous cannula among nurses in Chitwan Medical College Teaching Hospital, Nepal. Nurs Open. 2019;6(3):1006-12.
8. George K, Muninarayananappa B. Effectiveness of structured teaching program on knowledge and practice of staff nurses on prevention of intravenous complications. Arch Med Health Sci. 2012;1(2):115-9.
9. Lyons M, Kasker J. Outcomes of continuing education course on intravenous catheter insertion for experienced registered nurses. J Cont Educ Nurs. 2012;43(4):177-81.

10. Altun I. Management of intravenous cannulation: the efficacy of an educational intervention on nurses' knowledge. HealthMED. 2012;6(4):1190-8.
11. Prabhu S. Comparison of traditional versus video-based teaching on neurological assessment among undergraduate nursing students. NUJHS. 2013;3(2):29.

Cite this article as: Dhavalshankh AG, Dhavalshankh GP, Dhavalshankh GG. Assessment of effectivity and adaptability of DOAP as a teaching and learning method by II-MBBS students for intravenous cannulation in simulated environment. Int J Community Med Public Health 2024;11:3917-22.