

RESEARCH ARTICLE

Video demonstration as a teaching-learning method for a core clinical skill among undergraduate medical students: An interventional study

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Received: March 05, 2019; Accepted: March 29, 2019

ABSTRACT

Background: Video demonstration is a method which can address teaching clinical skills to an increased number of students with minimal resources and also provides uniformity in the teaching method. Video-based learning has been shown effective in clinical skills training among medical undergraduates. **Aims and Objective:** The aim of the study was to evaluate the effectiveness of video demonstration as teaching-learning method for clinical skills training for 1st-year undergraduate medical students. **Materials and Methods:** An interventional study was conducted with a control group among 1st-year MBBS students (211). Students were grouped into intervention (105) and control group (106). Clinical demonstration of “Recording of Blood Pressure (BP)” was video recorded and demonstrated to the intervention group in addition to the small group clinical skills training, whereas the control group had the traditional instruction method. The effectiveness was assessed using objective structured practical examination. Feedback was also obtained from the intervention group regarding the innovative teaching using video demonstration. **Results:** Students in the intervention group ($31.8 \pm 6.3^*$) scored significantly higher than the control group (29.7 ± 8.1). OSCE scores were significantly higher among the students with low academic scores in the intervention ($31.5 \pm 5.5^*$) when compared to the control group (27.8 ± 9.1) 95% of students felt that video demonstration was clear, informative, and useful. **Conclusion:** A video-based teaching tool for clinical skill training (BP measurement) for undergraduate students has been prepared to bring uniformity in the teaching of clinical examination skills. This intervention has enhanced the core clinical skill (BP measurement) of the undergraduate students especially the students with low scores.

KEY WORDS: Blood pressure; clinical skill; objective structured practical examination; video demonstration

INTRODUCTION

Acquiring competency in basic clinical skills is the fundamental requirement of undergraduate medical education. “Recording of blood pressure (BP)” is one of the core clinical skills which an undergraduate medical student should get trained, to diagnose and treat the emergency situations during

his internship and in primary health care set up as primary contact physician. Teaching clinical examinations in various organ systems are part of 1st-year physiology curriculum. Promoting precise acquisition of clinical skills during the first medical year is very important for subsequent clinical skill development during the ensuing clinical years.

In the current scenario, there is a growing need to use newer teaching-learning methods to impart clinical skills to the 1st-year medical students, as student intake has increased with the availability of limited resources. Video-based instructional method is advantageous to teach large numbers with uniformity and authenticity. Studies have shown that video-based education helps students to learn and reproduce

Access this article online	
Website: www.njppp.com	Quick Response code
DOI: 10.5455/njppp.2019.9.0310629032019	

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clinical skills better^[1] because video promotes simultaneous processing of both auditory and visual information.^[2] Sequential motion given by video would also motivate them to pay more attention to the information presented and learn the skill effectively.^[3]

The use of computer-assisted learning and multimedia has enriched the teaching in health professional curriculum in a number of ways. The video-based materials have been used as a successful, cost-effective medium with positive benefits of providing active learning experiences,^[4] increased concentration, and motivation during learning leading to higher impact on comprehension and retention.^[3] A structured and systematic clinical skill demonstration using video enables students to acquire not only specific clinical skills and knowledge but also the attitude essential for patient care.^[5] Video demonstrations during the 1st year can promote the development of learning in all domains including affective domain which is very important for patient care in the field of medicine.

Although in literature, video-based education has been used as an effective teaching tool for psychomotor skills development in medical students, there is no clear evidence to show its superiority to increase the level of skill acquisition among learners over traditional methods. This is due to the fact that many of the previous studies used survey questionnaires to assess the reaction and perceptions on acceptance, satisfaction, and usage of such tools among learners.

Hence, the present study was planned with an objective to assess the effectiveness of video demonstration in enhancing skill competence and confidence levels for performing a core clinical skill (BP recording) using objective structured practical examination (OSPE) and students' feedback among 1st-year undergraduate medical students.

MATERIALS AND METHODS

This interventional study was conducted in the Department of Physiology, SRMC and RI, Porur, India. 211 medical students in 1st-year MBBS, in the age group of 18–20 years, belonging to both the genders, were recruited for the study. The study was approved by the Institutional Ethics Committee of Sri Ramachandra Institute of Higher Education and Research (SRIHER). A simple grouping of the subjects into the intervention group (106) and control group (105) based on their role numbers was done. Video module for a core clinical skill, the "Recording of BP" was developed by the faculties of the Physiology Department of our University. The content of video module included the essential steps in BP recording such as getting informed consent before the procedure, precautions taken while recording BP, the steps involved in indirect methods of BP recording, palpatory method, auscultatory method, and a brief discussion on physiological and pathological variations in BP. The video module was

peer reviewed and validated by internal and external content experts. Piloting was also done.

Video demonstration of BP recording was shown to the intervention group and traditional practical instruction using power point was given to the control group simultaneously on the same day. On the day of the video demonstration, a pre- and post-test was conducted to assess the knowledge of the students. After a week of practice in small groups, OSPE was conducted to assess the performance of the clinical skill, "Recording of BP." During the practice sessions, the intervention group referred the video to reinforce essential steps in BP measurement. A feedback questionnaire was also administered to get the perceptions on video-based clinical skills training in the intervention group. After the data collection, the control group also received the video.

Statistical analysis was performed using R software. Data are expressed in mean $\pm$ standard deviation and percentages (perception parameters). Paired *t*-test was used to compare pre- and post-test scores, OSPE scores were analyzed using independent *t*-test and one-way ANOVA. $P < 0.05$ was considered a statistically significant.

RESULTS

This study included 211 1st-year medical students in the age group of 18–20 years. They were divided into control ($n = 105$) and intervention ($n = 106$) groups. Table 1 shows the comparison of pre-test and post-test scores between the control and intervention group. In both the groups, the post-test scores were significantly higher ($P < 0.05$) than the pretest scores, but there was no significant difference ($P < 0.05$) in post-test scores between control and intervention group. Table 2 compares the OSPE scores of the control and intervention group. OSPE

Table 1: Comparison of pre-test and post-test scores between the control and intervention group

Parameters	Control group ($n=105$)	Intervention group ($n=106$)
Pre-test	3.10 $\pm$ 1.45	2.64 $\pm$ 1.44
Post-test	6.68 $\pm$ 1.58*	6.78 $\pm$ 1.57*

* $P < 0.05$, paired *t*-test was used. Post-test scores were significantly higher than the pretest scores in both the groups. Data represented as mean $\pm$ SD. SD: Standard deviation

Table 2: Comparison of objective structured practical examination scores between control and intervention group

Parameters	Control ($n=105$)	Intervention ($n=106$)	<i>P</i>
OSPE score	29.7 $\pm$ 8.1	31.8 $\pm$ 6.3*	0.038

Data are expressed in mean $\pm$ SD. * $P < 0.05$, independent *t*-test was used. SD: Standard deviation, OSPE: Objective structured practical examination

scores of the intervention group was significantly higher (0.038) compared to the control group. Table 3 compares OSPE scores of low achievers, medium achievers, and high achievers among the control and intervention group. The study participants were grouped based on their internal assessment marks into Low Internal Assessment marks group (<40%), Good Internal Assessment marks group (41%–69%), and High Internal Assessment marks group (>70%). One-way ANOVA was used to compare the OSPE scores of three groups between the control and intervention group. Independent “*t*”-test was used to compare the subgroups. OSPE scores were significantly higher in students with low and high internal assessment marks of the intervention group when compared to the students with low and high internal assessment marks of the control group. Student feedback on this validated new teaching tool showed that 92% felt the quality of the video was good. 96% opined that the content was tailor-made to suit 1st-year learning and was easy to comprehend and informative. 96% felt it suited their learning style and provoked their interest to learn. 96% agreed that it is an effective teaching tool and expressed a keen interest to have video-based demonstrations for other clinical skills too.

DISCUSSION

This interventional study evaluated the effectiveness of the video demonstration as a teaching method for a core clinical skill, “BP recording” among 1st-year undergraduate medical students. Findings of our study show that students of traditional and video-based instruction groups performed equally well in the theoretical questions as evidenced by pre- and post-test scores. There is no significant difference in knowledge component, but the intervention was effective in increasing the psychomotor skills of students as evidenced by increased OSPE scores in the intervention group. Results also showed a significant increase in psychomotor skills (OSPE scores) among slow learners of the intervention group. Hence, this effective teaching-learning tool can be used for regular clinical skills training and also for remedial sessions.

Video demonstration can be a valuable tool for teaching procedural skills for undergraduate medical students as it provides an engaging learning experience, enhanced retention, and reproducibility in learners. Similar to our findings, increased clinical skills outcome and satisfaction has been shown with video-based teaching by the following studies. Hansen *et al.* have shown that video-based education

helped students to learn and reproduce clinical skills better because of simultaneous processing of both auditory and visual information during video demonstrations.^[1] A study by Subhash *et al.* demonstrated that multimedia enhanced teaching activity using animated PPTs for physiology practical skills training was effective in increasing the knowledge and psychomotor skills among the learners.^[6] Another study by Choi and Johnson demonstrated that a significant difference in learners’ attention span, motivation, and concentration levels during the video-based instruction than traditional text-based instruction in an online course.^[3] Jang and Kim. proved the positive impact of online OSCE videos in learning clinical skills among medical students, as participants felt that the video clips were rich learning resources.^[7] Hibbert *et al.* demonstrated a significant improvement in clinical endocrinology skill performance among 2nd-year medical students as online clinical demonstrations provided real-life experience of physical signs in endocrinological disorders.^[8] However, a study by Kapoor *et al.* on dental students showed that hands-on demonstrations were superior over video-based teaching for a dentistry module, due to the fact that students were of first clinical year and motivated to learn clinical skills on live patients.^[9] Hilal *et al.* also provide supportive data for effective clinical skill teaching using hands-on demonstrations over video-based training for “vacuum extraction on a pelvic model” in medical students.^[10]

The strength of our study is that the outcome of clinical skill performance was assessed using a standard expert validated OSPE assessment score as most of the previous studies had only looked at perceptions of learners over video-based teaching. Limitation of our study is the lack of data on faculty feedback on the new teaching tool and its effectiveness on students’ performance.

Thus, it can be deduced that there is a need to use innovative multimedia for clinical skills training to the 1st-year medical students to address to an increased number of students with minimal resources. Such teaching methods will also bring uniformity in the teaching process of clinical examination skills. In addition to teaching, it can also be used to revise the skills before formative and summative practical assessments. Video-based preparation of clinical skill demonstration for undergraduate students can be an effective teaching tool which can be archived and used regularly.

Table 3: Comparison of objective structured practical examination scores between slow learners, good performers, and excellent performers among the control and intervention group

Parameters	Control (n=105)			Intervention (n=106)		
	Low IA marks (<40%) (n=15)	Good IA marks (41%–60%) (n=68)	High IA marks (>70%) (n=22)	Low IA marks (<40%) (n=16)	Good IA marks (41%–70%) (n=71)	High IA marks (>70%) (n=19)
OSPE score (marks)	27.8±9.1	30.7±7.3	29.4±8.7	31.5±5.5*	30.9±6.9	34.7±6.1*

OSPE: Objective structured practical examination

CONCLUSION

Clinical skill training, using video demonstration was found to be effective in developing basic clinical skill among 1st-year medical undergraduates. Standard video-based materials for clinical skill demonstrations can help in teaching as well as during revision practices before examinations. This will ensure consistency, uniformity, and standardized approach to develop physical examination skills among undergraduate students.

Acknowledgment

This project was conducted as a part of the Advanced course in Medical Education in SRMC and RI, MCI Nodal center. Authors would like to thank the management of SRIHER, Medical Education Unit, 1st-year MBBS students and Professor A. S. Subhashini, Faculty, Department of Physiology, SRMC and RI for their valuable support during the project.

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How to cite this article: Padmavathi R, Omprakash A, Kumar AP. Video demonstration as a teaching-learning method for a core clinical skill among undergraduate medical students: An interventional study. *Natl J Physiol Pharm Pharmacol* 2019;9(6):547-550.

Source of Support: Nil, **Conflict of Interest:** None declared.