



GEORGE AND DOTO'S FIVE-STEP METHOD VERSUS VIDEO ASSISTED TEACHING-LEARNING METHOD FOR ACQUISITION OF BASIC CLINICAL SKILLS.

Medical Education

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ABSTRACT

Introduction: George and Doto's five-step method is based on the principle of andragogy. Video-based instructional method is advantageous to teach large numbers with uniformity and authenticity. **Aims And Objective:** To compare the effectiveness of George and Doto's five-step method versus video-assisted teaching-learning method in the acquisition of basic clinical skills, and to evaluate their perceptions of George and Doto's five-step method, identifying specific benefits and challenges. **Materials And Methods:** 70 students participated in this quasi-experimental study were divided into two equal groups. In the first session, examination of deep tendon reflexes of upper limbs was taught. It was taught by George and Doto's five step method in group A and by prerecorded videos by group B. In the second session the examination of deep tendon reflexes of lower limbs was taught and cross over of methods was done. **Results:** Mean OSCE score was higher with George and Doto's five-steps method by independent T test. Students expressed their positive response towards George and Doto's five-step (Likert scale) method. **Conclusion:** George and Doto's five-step method is found to be more effective than video assisted teaching- learning method. Both methods produce good retention of knowledge.

KEYWORDS

Clinical teaching, clinical skills, medical education, George and Doto's, video assisted teaching- learning method, five-step method, video assisted learning, video demonstration

INTRODUCTION

The undergraduate medical education program is designed with a goal to create an 'Indian Medical Graduate' (IMG) possessing the requisite knowledge, skills, attitudes, values and responsiveness so that she or he may function appropriately and effectively as a physician of the first contact of the community while being globally relevant.¹ For achieving this goal, the IMG needs to have many attributes like clinician, leader, communicator, lifelong learner and professional. This will create Indian medical graduates of global standards which will direct towards achieving the goal 'health for all'.

The fundamental requirement in healthcare training is the acquisition of competency in clinical and procedural skills. The National Medical Commission has introduced a competency- based curriculum from 2019, which emphasize skill development in all phases of medical education. Skill acquisition is considered as the soul of this curriculum.²

The challenge of teaching clinical skills is to teach students in such a manner that they learn effectively. In the traditional method of teaching clinical skills, medical students watch an expert performing the skill, practice themselves and teach their peers. On most occasions, the learning experience is poorly structured and results in poor acquisition and retention of the clinical skill.³

In 2001, John H. George and Frank X. Doto proposed a simple five-step method called as 'George and Doto's Five-Step Method'.⁴ This was based on the principles for teaching psychomotor skills. The potential advantage of this method is that a combination of the different theories of adult learning are embedded in it.³ The first step is conceptualization in which the cognitive aspects of the skill will be explained by the tutor, which include when it is done and why it is done. It will be followed by demonstration of the skill exactly by the tutor, but will not explain the

procedure in this step. Next step is demonstration with commentary in which the tutor repeats the procedure with detailed explanation. The fourth step is verbalization. In this step the student talks through the skill. The final step is practice, in which students perform the skill. The tutor provides feedback or coaching as needed.

As per principles of andragogy, adults learn better if they know why they need to know a skill, and when they are likely to apply it in the delivery of care. In addition, adults learn by observing someone else performing a task.⁵ This emphasizes the importance of introducing George and Doto's five-step method, which follows the principle of adult learning, as a teaching learning method for basic clinical skills.

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 clinical skills better because video promotes simultaneous processing of both auditory and visual information. Sequential motion given by video would also motivate them to pay more attention to the information presented and learn the skill effectively.⁵

New teaching methods has to be introduced to maintain excellence of medical education. The aim of this study was to compare the acquisition of basic clinical skills by the first phase medical students taught by George and Doto's five-step method with those taught by video assisted teaching learning method and to know the perception of students towards George and Doto's five-step method.

Research Question

Is George Doto's five-step method more effective than video assisted teaching-learning method for acquisition of basic clinical skills?

Hypothesis

George Doto's five-step method is more effective than video assisted teaching-learning method for acquisition of basic clinical skills.

Objectives

1. To compare the effectiveness of George and Doto's five-step method versus video- assisted teaching-learning method in the acquisition of basic clinical skills by first-phase medical students.
2. To evaluate first-phase medical students' perceptions of George and Doto's five-step method, identifying specific benefits and challenges

Review Of Literature

Effective teaching requires flexibility, energy, and commitment. Successful medical teaching also requires that teachers are able to address learners' needs and understand the variations in learners' styles and approaches. Teachers can accomplish these requirements while creating an optimal teaching-learning environment by utilizing a variety of teaching methods and teaching styles.⁶

'Skill' has been defined as the ability to perform a task leading to a specific predefined outcome in several domains.³ Skill development forms the soul of this competency-driven curriculum. Acquisition of procedural skills is an important element in health education.

Traditionally procedures are taught using a "see one - do one" approach. This means that a teacher demonstrates and describes a procedure and afterwards the students are asked to practice the procedure. The drawback of the traditional approach is that it will not adhere to recent principles of adult learning such as active learner involvement. Furthermore, it was reported that patient safety might be at risk because complex procedures cannot be acquired after a single observation and practice trial.⁷

A four-step teaching approach for the acquisition of procedural skills was presented by Walker & Peyton in 1998.⁷ Peyton's teaching approach is found to be effective when small groups with few students per teacher are used. Similar stepwise teaching approach was published by George & Doto in 2001.⁴ Originally, it was developed as an educational technique to support the American College of Surgeon's Advanced Trauma Life Support course. In contrast to Peyton's teaching approach, George and Doto used five steps. Within Peyton's teaching approach, two of the five steps are collated into a single step. George and Doto based their teaching approach on Simpson's taxonomy of the psychomotor domain.⁷ Study done by Paralikar S et al showed that George and Doto's five-step method is more effective to teach basic clinical skills compared to the traditional approach.³ Students perceived a positive learning experience with this approach.

Clinical skill training, using video demonstration was found to be useful in developing basic clinical skill among 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.⁸

MATERIALS AND METHODS

The current study was conducted at Department of Physiology, GMC Kozhikode after getting permission from Institutional Ethics Committee. 70 first year MBBS students participated in this quasi-experimental study. Prior informed written consent was obtained from the participants after explaining the procedure and purpose of study.

Sample Size: 70

Inclusion Criteria: First year MBBS students from GMC Kozhikode

Exclusion Criteria: The students not willing to participate in the study were excluded from the study.

Study population was divided into two groups (A and B) of 35 each.

Skill Teaching Sessions

Examination of deep tendon reflexes was identified as the skill. A brief introduction was given to all students before dividing into groups.

George And Doto's Five-step Method: It include the five classical

steps- Explaining why to do and when to do, Demonstration, Demonstration with commentary, verbalization by the learner and performance by the learner. Students were divided into subgroups of 7 members and separate time allotted to each subgroup. For making uniformity this session was completely handled by the principal investigator. Appropriate time required for one skill session was 60 minutes.

Video assisted teaching-learning method: Videos of eliciting the clinical skills in subjects were recorded in the Department of Physiology following the standard procedures. The videos were verified before showing to the students by a Senior Professor in the Department of Physiology. In this session skill training was done with the help of recorded videos projected in the classroom. Appropriate time required for one skill session was 60 minutes.

On the first session, examination of deep tendon reflexes of upper limbs was taught, which include biceps, triceps and supinator jerks. In group A it was taught by George and Doto's five step method. In group B prerecorded video was projected in class room as the teaching learning method. On the second session the examination of deep tendon reflexes of lower limbs were taught and cross over of methods was done. The examination was taught via George and Doto's method in group B and via prerecorded video in group A. (Table 1)

Skill Assessment

Skill acquisition was tested by OSCE using pre validated checklists on Day 2 and Day 60, in both sessions. The pre validation of checklists was done by a senior physiology faculty from another college. OSCE was repeated after two months to assess the retention of knowledge by the two methods.

Data Analysis

Mean and standard deviation of the OSCE score obtained by the methods were calculated, and compared by independent t test.

Paired t test was used to assess the retention of skills in each method by comparing OSCE score obtained on Day 2 and Day 60.

The perception of students towards George and Doto's five-step method comparing the other method was assessed via feedback questionnaire using Likert Scale.

After the study, crossover of the methods will be done for the same sessions to avoid ethical issues.

Table 1

Sessions	Study groups	Skill teaching methods	Timings of skill assessment (OSCE)	
Session 1	Group A	George and Doto's five-steps method	Day 2	Day 60
	Group B	Video assisted teaching-learning methods		
Session 2	Group A	Video assisted teaching-learning methods		
	Group B	George and Doto's five-steps method		

RESULTS

Mean score of OSCE conducted on Day 2 of skill training by George and Doto's five-step method and video assisted teaching-learning method were compared by independent t test in both sessions. (Table 2). This showed that George and Doto's five-step method is superior to video- assisted teaching learning method for acquisition of clinical skills in both sessions.

Retention of knowledge was checked in each group for each teaching methods separately by comparing OSCE scores of Day 2 and Day 60 (Tables 3 & 4). No statistically significant decline was found in OSCE scores of Day 60 comparing the scores of Day 2 in both teaching methods in both groups. This shows that both George and Doto's five-step and Video assisted teaching learning methods produce significant retention of knowledge.

The perception of the students regarding George and Doto's five-step method was also done. Perception of students were collected on a Likert scale. Ratings 1 and 2 on the Likert scale were combined to represent disagreement, 4 and 5 as agreement, and 3 as neutral (Figure 1)

All statistical analysis were done with SPSS version 23. A p value of <0.05 was considered as statically significant.

Comparison of Day 2 OSCE scores after each teaching methods- Independent t test

Table 2

Sessions	Groups	Teaching methods	Mean	Standard deviation	p value
Session 1	A	George & Doto's five-step method	7.429	0.9405	0.0001
	B	Video assisted teaching-learning method	6.134	0.9968	
Session 2	A	Video assisted teaching-learning method	6.471	0.9996	0.0001
	B	George & Doto's five-step method	7.243	0.5863	

Comparison of Day 2 and Day 60 OSCE scores- Paired t test

Table 3

Group A		Mean	Standard deviation	p value
Session 1 - UL DTR George and Doto's five-step method	OSCE score – Day 2	7.429	0.9405	0.508
	OSCE score – Day 60	7.357	0.7819	
Session 2 - LL DTR Video assisted teaching-learning method	OSCE score – Day 2	6.471	0.9996	1.000
	OSCE score – Day 60	6.471	0.6960	

Table 4

Group B		Mean	Standard deviation	p value
Session 1 - UL DTR Video assisted teaching-learning method	OSCE score – Day 2	6.143	0.9968	0.172
	OSCE score – Day 60	6.314	0.7484	
Session 2 - LL DTR George and Doto's five-step method	OSCE score – Day 2	7.243	0.5863	0.485
	OSCE score – Day 60	7.143	0.7233	

Perception of students towards George and Doto's five-step method – Likert scale

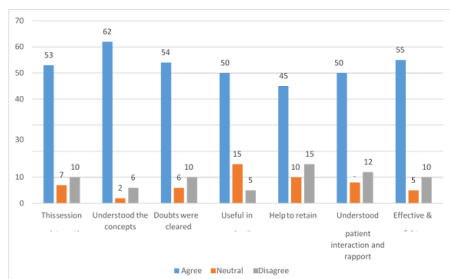


Figure 1

DISCUSSION

A skill is defined as the ability to perform a task through application of knowledge and experience. Skills necessary for encountering with patients are called as clinical skills.⁹ The ultimate goal of medical education is to prepare students to become clinically competent doctors. During their years in medical school and the hospital, under graduate medical students begin the gradual transition from novice to expert.¹⁰ This is a process that is by no means an easy one and skill assessment has a major role in it as it is a known fact that students will study a skill only if it assessed. The objective structured clinical examination (OSCE) is a method in which students are assessed for clinical skills. The OSCE has been found to better assess clinical and cognitive skills of graduate medical students comparing the traditional evaluation methods like oral viva, written assignment, multiple choice questions, and clinical observational reports.¹¹ In the competency based medical curriculum OSCEs have been used widely in different

settings to assess the “shows how” level of competency.¹²

The present study showed that George and Doto's five-steps method is superior to video assisted teaching-learning method for acquisition of basic clinical skills. Both these methods showcased good retention of the acquired knowledge. The majority students agreed that George and Doto's five-steps method teaching sessions were interesting. They perceived that this method of skill training was very helpful for understanding concepts, for clearing doubts, for getting good score in examinations of clinical skill, for the retention of memory, and to understand patient interaction and rapport.

Similar results obtained for other researchers too. Study done by Parlikar et al showed George and Doto' method is the more effective method for clinical skill acquisition that traditional method of teaching.³ Students also perceived a positive learning experience with this approach in this study. Study done by Viridi MS et al among dental students advised that this simple five-steps method can be devised for teaching clinical skills for achieving high success rates in clinical procedures requiring multiple steps.¹³

The combination of the different learning theories for adults are embedded in the George and Doto's five-steps method.³ The first step involves teaching the cognitive aspect of the skill explaining why they need to learn the skill and when it is to be applied. This step follows the principles of adult learning. By the second step, the real time demonstration, the learner will be able to create a mental model of the skill by focusing its motor aspect without noise. The third step, demonstration with commentary, is an amalgamation of seminal and contemporary skill teaching literature. The fourth step, verbalization by the student helps him to create a 'motor map' of the skill. In the final step the learner performs the skill which is necessary for transferring it to long term memory. All these steps make this method superior for skill acquisition and retention

Study done by Nongmeikapam et al showed both didactic and video-assisted lectures were effective in terms of knowledge gained and students' feedback. Students' feedback says that videos gave better clarity, was informative, and gave more room for interaction.¹⁴ Study done by Shirley Kurian et al showed that video assisted teaching-learning method causes enhanced retention, and reproducibility in learners for a core clinical skill-obstetric palpation.⁸ Video based learning impact engagement of students and promote active learning.¹⁵ This will result long term retention of the concepts and skills learned.

One of the most important principles in education is adopting a teaching method in concordance with objectives, contents, and learners.¹⁶ Teaching and learning clinical skills are challenging aspects of education in the field of medicine and the allied health professions. George and Doto's five-step method can be introduced to as an important method for teaching clinical skills as it follows many principles of adult learning. Video assisted teaching method has many advantages of uniformity and flexibility, and it proved to be enhancing the retention of knowledge. So, it can be used an adjunctive method for skill training.

Limitation Of The Study: If sample size was more, more representative data might have been obtained. This study had been conducted in first phase medical students, who are novice in clinical skills. It would have been better if this study conducted with a larger sample size covering medical students of different phases.

CONCLUSION

The fundamental requirement in healthcare training is the acquisition of competency in clinical and procedural skills. George and Doto's five-steps method is based on the principles for teaching psychomotor skills and a combination of the different theories of adult learning are embedded in it. Video-based instructional method is advantageous to teach large numbers with uniformity and authenticity George and Doto's first step method is found to be more effective than video assisted teaching method because it's andragogical approach. Both teaching methods provide good retention of knowledge. Different methods have to be integrated together to maintain excellence of medical education.

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