

THE TOPICS TO BE CHOSEN FOR SELF DIRECTED LEARNING FOR AN UNDERGRADUATE MEDICAL STUDENT

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Abstract

Background: According to the new Competency Based Medical Education, an Indian Medical graduate have to be a lifetime learner. In order to achieve this goal, the student needs to take the initiative in learning. Self-Directed Learning (SDL) is a student-centred teaching learning modality. **Objectives:** The primary objective of this study was to compare the outcome of a topic studied by SDL and lecture. **Methods:** Students were divided into two groups and was assigned different topics to be covered by SDL and were evaluated. These topics were later covered by lectures and were evaluated. Scores of a topic studied by SDL was compared with those covered by lecture and by both SDL and lecture. $P < 0.05$ was taken as statistically significant. **Results:** A total of 90 students in Phase II MBBS enrolled in this study. In general, though the mean scores were slightly higher among topics covered by SDL, they were best on simple interesting topics with direct clinical correlation. Significant increase in marks when more than one teaching learning modality was used were apparent for clinical topics of diagnostic importance and for dry topics where study material focuses mainly on facts, memorizing capabilities, categorization and assimilation of information. **Conclusion:** Not all topics are suitable for SDL. For undergraduate medical students, simple interesting topics with direct clinical correlation should be chosen for SDL. As assessment drives learning, each SDL topic should be scored.

INTRODUCTION

Traditionally, lectures are the most common means of teaching in medical education,^[1] but the complexity of medicine has already progressed beyond the ability of the teachers to teach everything that the students would need to know.^[2] According to the new Competency Based Medical Education (CBME) curriculum, one of the goals to be achieved by a Indian Medical graduate is to be a “lifetime learner” committed to continuous improvement of skills and knowledge.^[3] Therefore, it is required to incorporate among our undergraduate medical students the ability to comprehend certain aspects and topics by themselves. Self-Directed Learning (SDL) is a student-centred teaching learning methodology where the students takes the initiative in learning, in contrast to lectures where they are just being passive listeners.^[4] In the CBME syllabus, It is mandatory to cover 10 hrs of topics in microbiology by SDL. With this background, this study was conducted

among Phase 2 MBBS students, to compare the outcome (scores) of a topic studied by SDL and lecture. In addition, the extent of improvement in scores where more than one teaching learning modality is used was also assessed.

MATERIALS AND METHODS

This interventional study was conducted among Phase 2 MBBS students of a self-financing medical college in Central Travancore, Kerala. Minimum sample size required was calculated from a study based on the mean difference in pre and post evaluation of Lectures and Self-Directed Learning (SDL) groups among undergraduate medical students. The power of the study was calculated as 90% with a confidence interval of 95%.

After obtaining Institutional Ethics Committee clearance (IRB Study Ref. No. 20/2019), general consent was taken from all students. Based on the scores obtained by the student in their 1st sessional examination, they were divided by stratified random

sampling into two groups (A and B), with each group having equal number of academic performers from all strata.

Each group was given three different topics in Medical Virology for Self-Directed Learning. The topics assigned to Group A was Influenza, Viral exanthematous fever and Polio. The topics given to Group B were Rabies, Blood borne hepatitis and Arthropod borne viral infections. A week later their learning outcomes were assessed by a prevalidated question paper. Structured essay of 10 marks was prepared based on previous university question papers.

All these six topics were later covered by interactive lectures for all students. Faculty not below the rank of Assistant Professor were assigned to take these topics. These faculties were neither involved in setting up of question paper nor scoring answer sheets. Learning outcomes following lectures were also assessed using the same prevalidated question paper.

Scores of the students were organized using Microsoft Excel and statistical significance (p-value) was computed by paired and unpaired t test. $P < 0.05$ was taken as statistically significant.

RESULTS

A total of 90 students in Phase II MBBS enrolled in this study. There were 52 female students and 38 male students. All of them were around 20 – 22 years old.

In general, the mean scores of students for topics covered by SDL were slightly higher than in those were the same topics were covered by lecture. The mean marks for various topics covered by SDL and Lecture and their significance is computed in Table 1.

Table 1: Difference in mean between Self Directed Learning (SDL) and Lecture among various topics in Medical Virology

	SDL (mean)	Lecture (mean)	Unpaired t test (p value)
Influenza	6.4 ± 1.4 (A)	5.7 ± 2 (B)	0.39
Viral exanthematous fever	5.8 ± 1.6 (A)	5 ± 1.4 (B)	0.33
Polio	6.5 ± 1.6 (A)	5.2 ± 2.1 (B)	0.03
Rabies	6.6 ± 1.5 (B)	5.2 ± 2 (A)	0.06
Blood borne hepatitis	4.2 ± 1.5 (B)	3.1 ± 1.5 (A)	0.03
Arthropod borne viral infections	5.4 ± 1.1 (B)	3 ± 1.7 (A)	0.00005

For each student, the topics they studied by SDL were reinforced by lecture. The mean marks of these students in various topics before and after lecture augmentation and their significance is computed in Table 2.

Table 2: Difference in mean after lecture augmentation among those exposed to SDL for various topics in Medical Virology

	SDL (mean)	SDL + Lecture (mean)	Paired t test (p value)
Influenza (A)	6.4 ± 1.4	7.3 ± 1.2	0.06
Viral exanthematous fever (A)	5.8 ± 1.6	6.5 ± 1.7	0.003
Polio (A)	6.5 ± 1.6	7.4 ± 1.2	0.31
Rabies (B)	6.6 ± 1.5	7.4 ± 1.3	0.04
Blood borne hepatitis (B)	4.2 ± 1.5	5.3 ± 2	0.002
Arthropod borne viral infections (B)	5.4 ± 1.1	5.6 ± 1.3	0.65

To assess the significance of utilizing more than one teaching learning method, the means scores of topics among students covered by lecture alone was compared with the scores of students who were sensitized by SDL (Table 3)

Table 3: Difference in mean after lecture among students sensitized to a particular topic in Medical virology vs those with no prior sensitization.

	Lecture (mean)	SDL + Lecture (mean)	Unpaired t test (p value)
Influenza	5.7 ± 2 (B)	7.3 ± 1.2 (A)	0.04
Viral exanthematous fever	5 ± 1.4 (B)	6.5 ± 1.7 (A)	0.02
Polio	5.2 ± 2.1 (B)	7.4 ± 1.2 (A)	0.01
Rabies	5.2 ± 2 (A)	7.4 ± 1.3 (B)	0.01
Blood borne hepatitis	3.1 ± 1.5 (A)	5.3 ± 2 (B)	0.0002
Arthropod borne viral infections	3 ± 1.7 (A)	5.6 ± 1.3 (B)	0.0001

DISCUSSION

The field of medicine is evolving day by day. The concepts, diagnostic techniques, treatment guidelines of diseases are all changing over the

decades and it is important for physicians to cope up with the increasing flow of medical information. In a study conducted in Norway, 31.5% of physicians were not able to obtain sufficient information to keep them updated in their daily work.^[1] As what we need to know and do as doctors is changing from

what we studied from medical school, the American Board of Internal Medicine has changed their requirements for obtaining the credentials more continuous by requiring evidence of ongoing engagement in learning and practice improvement.^[2] One of the goal of competency based training programme of an Indian Medical Graduate is to enable them to be a lifelong learner committed to continuous improvement of skills and knowledge.^[3] Attending continuing Medical education conferences and reading medical literature for more than 2 hours per week were important measures to cope up with the ever evolving medical field.^[1]

The learning styles adopted and preferred by an individual differs in various situation. There are various instructional methodologies which can be used for information delivery. The efficacy and acceptancy of these methodologies depends on how much information can be retained by each of these educational approaches.^[4]

SDL vs Lecture

In our study, we found that our students were capable of Self-Directed Learning (SDL), though their relative performance varied with the topics concerned. The mean score of students were best on interesting simple topics with direct clinical correlation like Influenza, Rabies and Polio (6.5/10). For complex topics involving more than one causative agent, the scores were comparatively low. We found that in those clinical conditions (like Blood borne hepatitis) where the learning objectives were focused more on the diagnostic aspects like appropriate choice of investigations and interpretation of laboratory tests, the average score was below the set standard of 50% (4.2/10).

To compare SDL and Lectures as two modalities of Teaching Learning method, we found that the students who studied a particular topic by SDL scored 0.7 – 2.4 decimals more than the students who were exposed to Lecture alone. These findings are consistent with results from a study conducted by Abraham et al., where the exam scores of lecture method were significantly lower than SDL exam scores⁵. Various other studies have also shown higher performance scores in SDL when compared with conventional learning methods.^[6,7] But there are also studies where there was no significant difference in knowledge acquisition in SDL and traditional lecture.^[8]

Traditionally in medical education system, lecture classes are the standard method used for teaching. Here, both the students and teachers are present in the same venue and the teacher imparts knowledge by providing verbalization of the information to the student. This is a teacher- centred model, where the teacher is the content expert, while the students are passive learners.^[4] Lecture based learning focuses mainly on the delivery, robotic memorization and regurgitation of information, that the teacher deems important. The preparation required at the student level is very minimal for a lecture class, so if prior knowledge needed to understand the presented

content is not there, the students may have trouble understanding as well as taking in so much information rapidly.^[9] Moreover, rather than for gaining knowledge, numerous students feel pushed to attend lecture for attaining 80% attendance which is a requirement for appearing for exams. In our study we found that Lecture was not a good teaching learning method for dry topics (like arboviruses) and for topics were investigations are given more weightage (like Blood borne hepatitis).

SDL vs Lecture augmented by SDL

Self-directed learning (SDL) is a teaching learning method where students work individually according to their special needs at their own pace. They can gain information using textbooks and hand out notes or lectures prepared by the teachers. When teaching learning modalities are student-centred, the learner play an active role and is responsible for his own learning, whereas the teacher plays the role of a facilitator. As students are active learners here, the topic is better understood, their doubts can be cleared with the facilitator making the concepts clearer. This leads to them performing better in examination.^[4]

In our study, the mean scores of students were higher after a particular topic was covered by lecture augmented by SDL when compared to SDL alone. But this increase in marks was not statistically significant for straight forward topics like Influenza and Polio which does not require much correlation clinically or diagnostically. Even for topics which required a lot of memorization, categorization and assimilation of information (like arthropod borne viral infections), the improvement in marks was not statistically significant. According to the new Competency based medical education curriculum, students in phase II MBBS are supposed to cover at least 10 hours of topics in Microbiology by SDL. Hence these types of clinically interesting topics and topics requiring memorizing capabilities are ideal to be set apart for SDL.

One important factor that can drive any learning process is assessment.^[10] The outcome of any teaching learning method can be assessed by the knowledge, skills, attitudes or performance attained at the end of an instructional methodology such as a class.^[9] These assessments can help in establishing a baseline of performance from which student growth or learning gain can be gauged. It can be used as a guide for teachers to give more effective instructions and attain higher levels of student learning.^[11] Testing not only lets us know how much our students have learned, but it also provides a chance for more learning to take place, by reinforcing the questions or by requiring students to use or think about what they have learned in a new way.^[12] This teaching method has been shown to increase the retaining power of the students on new information. Even failing these tests can lead to stronger memory for that information than spending the same amount of time studying.^[13] Evaluation of a SDL requires more effort from the teacher, but the reward in terms

of student learning and intellectual development will prepare students for productive roles in the modern world.^[9] A well-crafted questionnaire can be a helpful tool for teachers in their efforts to have all students learn well¹¹.

Lecture vs Lecture augmented by SDL

It's a well-known fact that learning before lecture classes can augment the learning process.^[14] This has been emphasized on students since long. But on a voluntary basis this is not followed. In our study also lecture classes after SDL assessment had definitely augmented the learning process in all topics with a minimum increase in marks by 1.5 decimals. This surge in scores was clearly evident for dry topics like arthropod borne viral infections, where the study material focused mainly on facts, memorizing capabilities, categorization and assimilation of information, where attending lectures after assessment of SDL helped in increasing the marks of these students on an average by 2.6 decimals. This improvement in marks was also apparent for clinical topics of diagnostic importance like blood borne hepatitis where the marks after augmented lecture increased on an average by 2.2 decimals. Even in a study conducted by Srivastava et al., Phase 2 MBBS students who were exposed to more than one teaching learning method (SDL and Lecture) fared better than the students who were exposed to only one form of learning.^[15]

As medicine is evolving day by day, it is important for physicians to be updated with the current trends and concepts.^[16] One of the basic function of a doctor is being a lifelong learner committed to continuous improvement of skills and knowledge.^[17] The complexity of medicine has progressed beyond the ability of the teachers to teach everything that students would need to know.^[10] In most of the professional courses, students are dependent on teachers for acquiring information. The problem that can arise here is, whether a dependent learner be able to take up the role of an independent decision maker⁹. In a systematic review on the effectiveness of SDL among health care professionals, the author stated that SDL is a potential teaching learning methodology that can initiate life-long learning.^[18] So the skill of SDL needs to be incorporated early during the MBBS training period.

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