



Original Article

Comparative Study of Self-Directed Learning and Traditional Classes in Cardiorespiratory Competencies of Physiology of First Year Medical Students of Kokrajhar Medical College

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ABSTRACT

Active and learner centred learning methods specially, self-directed learning is considered to be an important method of blended learning approach of imparting knowledge among under graduate medical students in new curriculum through integrated approach. **The aim of the study** is to analyse the impact and benefits of self-directed learning sessions for understanding cardio- respiratory physiology among phase one MBBS students. Design and Methods: This cross-sectional study was conducted among 100 students of Phase I MBBS for CVS and RS modules. Two groups of students were made Group A (n=50) was administered with self- directed learning sessions, while group B (n=50) was administered with normal didactic lecture session for the same topics. Following each session an objective assessment was conducted for all the topics covered in SDL and lecture sessions and the results were assessed and compared. **Results:** The maximum marks secured in objective assessment by Group A students post self-directed learning sessions for both cardiovascular and respiratory physiology modules were 31.2% and 32.8% ; while moderate marks were secured by 47.2% and 48% .For assessment conducted after lecture sessions for both cardiovascular and respiratory physiology module, maximum marks were obtained by 25.6% and 24% ; while moderate marks were obtained and 23.5% respectively. Significant difference was found in the p values of marks for both modules(. The internal assessment scores showed considerable difference in the maximum marks obtained by students attending SDL sessions (80-89%) as compared to didactic learning sessions (70-79%) with p value, respectively for both modules. **Conclusion:** Self-directed learning method seems to be more effective way of delivering the concept as compared to traditional lecture session.

Keywords: Assessment; didactic; learner; physiology; self-directed learning.

INTRODUCTION

Current medical education in India with implementation of new curriculum requires training in a wide spectrum of domains for medical undergraduates which includes cognitive, psychomotor and affective domains (1-3).

The present curriculum in medical education, which was introduced in 2019, is more of learner centered than the teacher centered. The new curriculum not only demands active involvement of the learner, but also the newer modalities of teaching for increasing the active participation and engagement of a learner (1- 3). Over past few decades, medical education has seen the dominance of lectures as commonly adopted method of teaching for the medical undergraduates adopting teacher cantered approach rather than learner cantered one. But with changing facets of new curriculum, which,demands on active involvement of learner different blended methods of teaching and learning needs to be adopted with active learner involvement. Various active learning methods like self-directed learning, problem-based learning, and are considered to

be effective methods in delivering and explaining core and difficult concepts with increased learning and active involvement of the learner (4). Few modern as well as formal theories related to SDL did come from the progressive education movement and from an educationist John Dewey, who always believed that experience was the cornerstone of education (5). Self-directed learning is a strategic approach, where, the learners are responsible for their own learning process (6). The current context of medical education in accordance with the current curriculum demand proves that traditional didactic lectures in large groups are of less significance, didactic lectures are now increasingly being replaced by active learning methods (7). There are many studies where self-directed learning among pre-clinical subjects like anatomy, physiology, and biochemistry (8,9,11) Self-directed learning can work as a successful active learning method in medical education (7,10,11). SDL can be applicable and can be used by the learners when they are needed to learn by themselves. (1,6,7) Multiple modalities can be used for providing self-directed learning instructions to undergraduate students, for their enthusiastic participation during the sessions (12,13). Self-directed learning modalities become effective if the designed sessions are realistic within the limit of accomplishment, this method help in building communication skills, helps in taking own decisions, building team spirit and self-governance (12,14,20). One such method of self-directed learning is giving a case scenario related to the topic and asking multiple objective questions providing adequate learning resources offline as well as online through learning management system for answering the given questions (7,9,15).

Self-directed learning is considered to be the active form of learning which ensures active participation of the learner using different instructional methods which includes construction of problem for the given topic for small group who will discuss the problem among themselves and can derive the accurate and desired solutions (15,16). In this form of teaching and learning the facilitator is acting as a moderator and supervisor and the approach for solving these case scenarios are theoretical and are generated by the learner (16-18). The individual groups investigate the probable and possible outcomes or solutions of the problems which will be shared in the next or other group session (19,20). This instructional active learning approach develops the communication skills, team spirit with appropriate interaction and appreciation of the views of the other group members and leadership qualities among the learners (21-23). The current curriculum, which expects at least one third of alignment and integration; both horizontal and vertical widely promotes use of self-directed learning which will help the learner to understand the subject or topic in intricate manner, improving knowledge retention, enhancing their critical thinking skills (24). The present research was undertaken to analyse the benefits of Self-directed learning in teaching physiology (21-25).

METHODS:

The study was conducted in the department of physiology of Kokrajhar Medical College study was planned for two modules, cardiovascular and respiratory module, involving 100 students from phase I MBBS. The students were divided in two groups. Group A (n=50) was administered with self-directed learning sessions, while didactic lecture sessions were scheduled for group B (n=50) for the same topics.

Ethics approval and consent to participate

This study was exempted for the ethical review as per the decision of the institute ethical committee of Kokrajhar Medical College, Assam. Prior informed consent was taken from all the study participants.

Preparation of learning material

Case based scenario sessions were prepared for various topics from both cardiovascular and respiratory system.

The topics covered in cardiovascular and respiratory system were;

1. Myocardial infarction
2. Cardiac failure
3. Shock
4. Hypertension
5. Syncope
6. Acute respiratory distress syndrome (ARDS)
7. Pulmonary tuberculosis
8. COPD (chronic obstructive pulmonary diseases)
9. Hypoxia
10. Respiratory failure.

RESULTS AND OBSERVATIONS:

The content and objectives were similar for both SDL and lecture sessions. Sessions of self-directed learning were designed based on the hypothesis as well as the rare chances of the discussion of the topic which cannot be addressed in other form of teaching and learning method. Session planning for SDL Short case scenarios were prepared with desired learning outcomes. Recommended books were suggested. The reading material including the case scenario was uploaded on learning management system, a day prior. These sessions were planned during the afternoon hours on alternate days during the scheduled slots of SDL and lecture sessions for physiology. Attendance was mandatory for all the students. After reading the case scenarios; students discussed the leaning objectives with the facilitator who advised and directed them for

using the required resources. These students were again divided in small ten groups each group was monitored by a facilitator the students studied the case wrote their findings and discussed it with their facilitator. After this session the next day before beginning of the new session, the moderator of the module reviewed the scenarios separately and evaluation was done which was based on 10 objective type questions. Example of self-directed learning session 48-year-old male was brought to the emergency unit as he fainted after dizziness. The patient had altered 139 Suchitra and Sachin: Comparative study of self-directed learning among medical undergraduates DOI: <https://doi.org/10.51248/v42i1.662> Biomedicine- Vol. 42 No. 1: 2022 sensorium with blood pressure, 60/50 mmHg with heart rate of 150 beats per minute, with no pulse felt in upper as well as lower limb. Analysis of ECG showed sinus tachycardia with heart rate of 140 beats per minute, PR interval 110 milliseconds, and QRS duration of 70 milliseconds. Identify the cause and management of the given case scenario. Learning objectives for self-directed learning session 1. Define shock? 2. Mention the types of shock? 3. Briefly explain the pathophysiology and compensatory mechanism of shocks 4. Describe briefly the methods in basic and advanced life support. Example of assessment question 1. Shock (mean BP less than 60 mmHg) can be caused by 2. Low intravascular volume 3. Low cardiac output 4. Pleural effusion 5. Decreased peripheral vascular resistance Session planning for didactic lecture This session was planned for B group (n=125) students, during this session all group B students were made to sit together in a single class. The learning objectives the case design and assessment questions were same as planned for group B; this session was followed by an objective s

Table 1: Number and percentage of marks of each group who underwent lectures and SDL sessions for both CVS and RS module.

Module	Tool	High, n (%)	Moderate, n (%)	Low, n (%)	Very low, n (%)	t-test
Cardiovascular system	D	25.6%	21.6% (27)	36.0%	6.8% (21)	0.00931* *
	L	(32)	47.2% (59)	(45)	6.4% (08)	
	M	31.2%		15.2% (19)		
	S	(39)				
	D L					
Respiratory system	D	24.0%	23.5% (29)	32.0%	22.4% (28)	0.00812* *
	L	(30)	48.0% (60)	(40)	4.8%	
	M	32.8%		14.4%	(06)	
	S	(41)		(18)		
	D L					

** *P-value* using *t*-test. DLM- Didactic lecture method; SDL-self-directed learning.

Table 2: Distribution of students based on SDL grades and POL total score in cardiovascular module

Score	Tool	High	Moderate	Low	Very low	p-value using independent t-test
≥90	DL	5	3	2	2	0.4069
	M	7	4	2	2	
	SDL					
80–89	D	6	7	9	5	0.0196*
	L	29	13	7	8	
	M					
	S					
	D L					
70–79	DL	6	10	29	17	0.01184*
	M	8	19	6	2	
	SDL					
60–69	D	2	4	9	7	0.3219
	L	6	5	4	4	
	M					
	S					
	D L					
<60	DL	3	1	6	2	0.4037
	M	4	3	1	1	
	SDL					

DLM- Didactic lecture method; SDL, self-directed learning.* significant (*p-value* <0.05)

Table 3: Distribution of students according to their grades in SDL and DLM based on their total score in respiratory module

Score	Tool	High	Moderate	Low	Very low	p-value using independent t-test
≥90	DLMSDL	4 9	4 3	1 2	3 2	0.4073
80–89	DLMSDL	5 31	8 11	10 10	4 5	0.0190*
70–79	DLMSDL	10 10	12 20	30 4	13 1	0.01179*
60–69	DLMSDL	3 4	6 7	8 6	5 2	0.3213
<60	DLMSDL	1 5	4 1	3 2	4 1	0.4034

* significant (p -value <0.05) DLM- Didactic lecture method; SDL, self-directed learning.

DISCUSSION:

The Indian undergraduate medical education program is particularly designed to create an “Indian Medical Graduate” who is having a quest of knowledge, skills, attitudes, values, and responsiveness (1). The new Competency based undergraduate medical curriculum which was introduced in 2019 mostly focuses on the learning experience of the learner which will be helpful in facing the real-life situations(2).

Based on these guidelines and amendments of the governing authority’s the weightage given for didactic lectures which must not exceed beyond one third of the entire curriculum schedule for each subject; while two third of the teaching must be in the form of interactive sessions, practical’s, clinical or/and group discussions (1-3). There is a specific mention that more focus must be on the learning process that includes clinical experiences with bedside teaching, problem-oriented approach considering the burden of the health issues, case studies, or scenario-based teaching, and community health care activities (4,5). In undergraduate medical curriculum, physiology subject which is taught during the phase I curriculum deals with acquiring the facts of understanding the underlying the basic physiological mechanisms and can also form a connecting bridge between the basic science knowledge and also its application in understanding the process and progression of the disease, to correlate the underlying physiological cause for the signs and symptoms, to suggest the possible ways of treatment and also help enhancing critical thinking skills by problem solving (8-10).

Our study showed that taking didactic lectures is still the popular and effective method of delivering core concepts when compared with self- directed learning. Self- directed learning is one of the adult instructional modalities which is widely used in health profession education, which not only helps in understanding the core concept of the subject but also enhances the learning experience (22,23).

Murphy et al., in their study reported that SDL is not considered an appropriated method for understanding and learning Anatomy, as on feedback students admitted that the recall knowledge was due to the didactic lectures and not due to active learning methods (20). A study conducted by Pai et al., showed that there was no difference in the way the topic was learnt by SDL or by combining it with the didactic lectures; the assessment results were same in both the group of learners (21). The result of the present study based on the assessment results shows the importance of SDL sessions in integrated curriculum. These results are in accordance to the previous literature showing important role of problem-solving exercises in enhancing learning experience (22-24). when compared with the high scoring groups 10 students had low to very low scores in the lecture sessions, which raises the question on the efficacy of didactic lectures in recall of

knowledge. In his study, Blumberg showed that PBL sessions helped the students in utilization of SDL skills (22). A few studies have also recommended that the facilitator need to encourage and promote the students for their active participation in SDL (21,23). These authors also concluded that such exercises help in acquiring and improving clinical skills. Researchers also found that SDL can be effectively inculcated in the current curriculum if it is properly framed with desired outcomes at each stage or phase of the curriculum(24). The new curriculum demands implementation of SDL sessions but there has to be a clarification in framing the learning objectives, facilitator driven discussions with the learner, by dividing the students in smaller groups encouraging the group discussions by identifying the learning styles of the student. which need to be implemented in order to get the better results (25).

Limitations of the study

Implementation of such techniques needs lot of groundwork and proper training of the facilitators for each session. The facilitators must be trained in order utilized time given time more effectively. There should be absolute interdepartmental coordination for obtaining the desired learning outcomes. The learning material should be provided to the learner well in advance for ensuring the active involvement. Clickers and flash cards can be used for improving the responsiveness among the students

CONCLUSION

Self- directed learning is a need of a time and the new curriculum which mainly focuses on synchronization and integration of the subjects with learner centred approach, this will enhance the learning experience helping the learner in understanding the core concepts of the subject. Based on our finding we can suggest that with proper planning and improving the instructional methods SDL sessions will be more beneficial than didactic lecture sessions for subject knowledge and understanding.

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Conflict Of Interest

The authors declare that they have no competing interests

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