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ORIGINAL RESEARCH

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Evaluation of effectiveness of Integrated clinical case based modules learning when compared to the traditional curriculum with didactic Lectures

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ABSTRACT

Background: Integrated clinical case-based modules (ICCBM) learning is a pedagogical method that uses case studies as active learning tools and allows the medical student to learn the basic medical science subjects in the context of a medical problem. The present study is designed to analyze the perceptions of first-year medical students (Both MD1 and MD2 semester) on the didactic lecture (DL) and ICCBM learning in Basic Medical Science of Doctor of Medicine (MD) program.

Materials and Methods: The present study is a cross-sectional study conducted at Texila American University—College of Medicine after approval from institutional review board. About 90 first-year medical students were administered with a seven-item questionnaire to determine their perceptions on DL and ICCBM learning. Data were analyzed using descriptive analysis on SPSS 16.

Results: As per our study, the majority of the students expressed their satisfaction that ICCBM was a useful learning method in understanding the Basic medical science subjects in the context of a medical problem. Majority felt this method of learning motivated them to critically think in filling the learning gaps and building the concepts. They also had an opinion that this method enhanced their problem-solving skills and promoted reasoning and communication skills.

Conclusion: The ICCBM is a good learning method in the acquisition of knowledge of basic medical science subjects in the context of a medical problem, which can be used alone or in combination with a DL to make the basic medical science subjects more interesting and understandable to medical students.

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Introduction

Current education has focused mainly on teaching students to give a correct answer. In most of the accessions, the teachers ask students to recite, define, describe or list facts. Only in few accessions, they ask students to analyze, infer, synthesize, evaluate, think, and rethink. Students have become familiar with this process of passing knowledge, without inquiring into how this information applies to the real world [1].

We (authors) are medical students, currently pursuing the MD course in Texila American University (TAU), Guyana, South America. The entire course duration lasts for 4 years and the 4 years are divided into eight semesters, each lasting 6 months (MD1–MD8). Students will study the Basic Sciences for the first 2 years, i.e., MD1–MD4 semesters. The subjects covered in MD1 and MD2 semesters include Anatomy, Embryology and Imaging, Physiology, Medical Biochemistry, Histology, Community Medicine, Microbiology, Neuroscience, Behavioral science, Integrated clinical case-based modules (ICCBM), and Research Methodology. All the above courses are taught in traditional method and teacher-centered except ICCBM, which is student-centered and emphasizes the Self-Directed Learning (SDL).

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ICCBM is an innovative and most challenging approach to medical education; innovative because it is a new way of using learning material to help students learn and challenging because it requires the teacher to use facilitating and supporting skills rather than didactic, directive ones [2]. This case-based modules also develop reasoning skills based on clinical case scenarios which allow the medical student to learn the basic medical science subjects in the context of a medical problem. Current trends in medical education have shifted away from didactic teaching and are leaning more towards contextual or case-based learning. Case-based learning is believed to have the potential to prepare students more effectively for future learning and clinical practice [3]. A recent study has shown that, a dramatic increase in academic performance was observed in students after the integration of case-based learning in the curriculums [4].

ICCBM course of TAU—College of Medicine (COM) is a student-centered, instructor-led learning approach and utilizes a small student group setting with faculty as a facilitator emphasizing SDL.

SDL is an important tool to promote lifelong learning skills in medical students. A study conducted among medical students in Germany tested the efficacy of SDL and conventional methods. Results proved that the performance of students who employed SDL methods were significantly higher than traditional methods [5]. In another study conducted in Zambia evaluates the preference of health care workers and medical students with regards to methods of learning. The study evaluated their preference for self-directed e-learning. More than 75% of the respondents preferred the SDL method to the conventional one [6].

The traditional conventional system [didactic lecture (DL)] of teaching is teacher-centered with minimal or no active participation from the students, it has minimal or no integration of subject. Teaching of Basic Medical subjects in this context is an art that transfers knowledge from instructor to student using competent teaching/learning exchange process [7].

Hence, the present study is designed to investigate the effectiveness of ICCBM learning when compared to the traditional DLs learning in the Basic medical sciences curriculum of MD program of TAU-COM.

Materials and Methods

The present study is designed to compare the effectiveness of ICCBM learning *versus* the traditional DLs learning in the Basic medical sciences curriculum of MD program of TAU-COM. All the basic science courses are teacher-centered and taught in the traditional method. However, ICCBM, a new innovative integrated course introduced in 2018 in the basic science curriculum of TAU-COM MD program, which emphasizes SDL and student-centered. In this course, the students are divided into small groups and a case study is composed of an engaging and/or controversial story, usually a dilemma that requires a basic understanding of scientific principles was given to students (Table 1). The given case also has specific learning objectives related to both basic science and a clinical science subject. The student will involve in a group discussion and prepare a PowerPoint presentation based on given learning objectives. The subsequent week student presentations are evaluated based on the performance during a presentation by using a standard rubric. Thus, this course facilitates the integration of basic science subjects with clinical subjects and develops key skills needed for upcoming clerkships, including data-acquisition, clinical decision making, and team-building/professionalism

To evaluate the effectiveness of ICCBM learning when compared to the traditional DLs learning, 90 first-year MD students (both MD1 and MD2 semesters) studying in the TAU-COM, Georgetown, Guyana, South America were included after the proper informed and consent. The study protocol was approved by the institutional review board. A 7-item multiple choice feedback questionnaires were designed and finalized after a discussion with the Medical Education Department of TAU-COM.

All the students were explained about the nature and purpose of the study (n = 90) and requested to fill up the questionnaire. The study was conducted at the end of their semester. A 7-item multiple choice feedback questionnaire (Table 2) with a 5-point Likert scale (4-Totally Agree; 3-Agree; 2-No response; 1-Disagree; 0-Totally Disagree) was used to explore the student's opinion on the effectiveness of the DL and ICCBM learning. The validity of the questionnaire was calculated using Cronbach's alpha. Response data were entered and descriptive statistics was done by using the Statistical Package for Social Sciences (SPSS version 16).

Table 1. One of the unstructured case given to students in the ICCBM course.

ICCBM
A 62-year-old man is referred by his General Practitioner (GP) to a respiratory outpatient clinic, with a history of a cough, sputum production, and breathlessness. He has had a persistent cough for the past 12 years and produces mucopurulent phlegm on a daily basis. The breathlessness started 10 years previously and has progressively worsened, such that he is now breathless on climbing 12 stairs at a normal pace. He has no nocturnal chest symptoms and has received one course of antibiotics from his GP in the last year. His only past medical history is hypertension. His current therapy is atenolol 50 mg once daily. He is a current smoker and has a 44-pack year history. He used to work in the demolition industry but took voluntary redundancy and retired at the age of 55. The patient is breathless on exertion but there is no cyanosis. He has obvious finger clubbing. Respiratory rate is 22 breaths/minute, blood pressure is 160/90 mmHg, heart rate is regular at 96 beats/minute, and oxygen saturations are 94% breathing room air. His jugular venous pulse is not elevated. Chest expansion and percussion are normal but there are mid-to-late fine inspiratory crackles on chest auscultation. Both heart sounds are normal and there is no peripheral edema. An echocardiogram confirms left ventricular hypertrophy, with normal left ventricular function. More detailed lung function tests reveal that total lung capacity is reduced to 53% of predicted. Gas transfer for carbon monoxide is reduced to 50% of predicted. A high-resolution computed tomogram of the chest interlobular and interlobular septal thickening with honeycombing, particularly in the lower lobes.
Specific Learning Objectives:
1. Explain the gross features of the Lungs. Mention its blood supply.
2. Enumerate various parts of the bronchial tree and explain the bronchogram.
3. Explain the microscopic features and organization of the respiratory membrane.
4. Identify the different cellular composition in the lung tissues and briefly explain their functions.
5. Compare the microscopic features of normal and lung affected with restrictive lung disease.
6. Describe the concept in Ventilation–Perfusion ratio.
7. Differentiate between Vital capacity and Times Vital Capacity.
8. Discuss the mechanism of gaseous exchange.
9. Explain the pathophysiology of restrictive lung disease.
10. Discuss the clinical manifestations of restrictive lung disease.
11. Understand how to make a diagnosis of restrictive lung disease.
12. List the different etiologies of restrictive lung disease.
13. Describe the Pharmacotherapy of Bronchopneumonia.

Table 2. Multiple choice feedback questionnaire used in the study.

S. no	Questionnaire
1	In understanding a particular topic, DLs are very useful than ICCBM.
2	The ICCBM method of learning promotes problem-solving skills than DLs.
3	In ICCBM sessions, valuable exchange of ideas took place in group discussions.
4	By virtue of the ICCBM sessions, understanding of particular topic was better than DLs.
5	The ICCBM approach is very much helpful in facilitating active learning than DLs.
6	The ICCBM course promotes student reasoning and communication skills when compared to the DLs.
7	Diadactic lectures are more useful in gaining basic science knowledge in clinical context than ICCBM.

Results

Ninety students of the first year (MD1 and MD2 semester) have participated and responded to the questionnaire in the present study. Based on the questionnaire, more students, i.e. 75.23% preferred [Totally agreed (TA) and agreed (A)] DLs in understanding particular topics than compared to ICCBM (Fig. 1). The majority (74.82%) of students felt (TA and A) that the ICCBM method of learning promoted SDL (Fig. 1). Among the learning methods, 86.78% of students favored (TA and A) that ICCBM promoted the group dynamics (Fig. 1) and significantly improved their communication skills (Fig. 1). The majority of students felt that the ICCBM learning method motivated critical thinking and enhanced their problem-solving skills (Fig. 1).

Discussion

Feedback is defined as a response within a system that influences continuous activity or productivity of that system. In the present study on educational context, it would mean response from the learner about the teaching, learning process, and methods. Feedback is essential to find out the effectiveness of the process, the need to change it, as well as to evolve a strategy for its improvement.

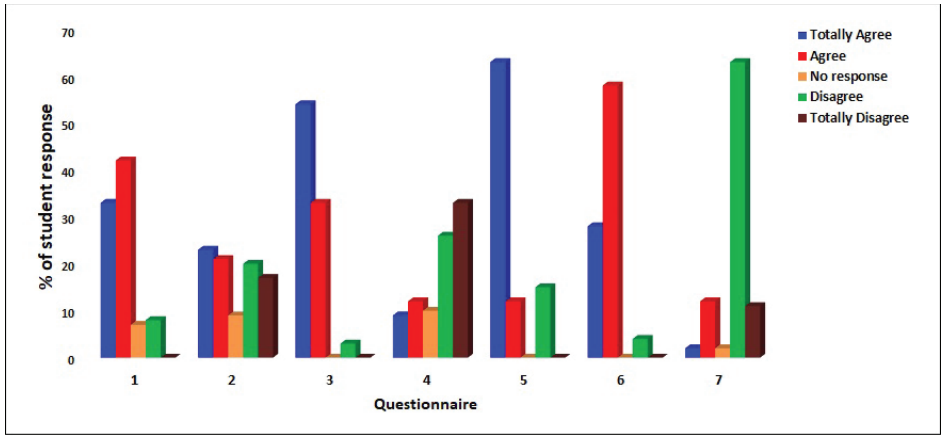

Figure 1. Showing the results of students' perception on DL learning and ICCBM learning in percentage (%) for questions 1–7.

The present study was designed to get feedback on the effectiveness of ICCBM learning over traditional DL-based learning from 90 first year medical students. A seven-item multiple choice questionnaire was designed to obtain feedback from students. The questions were framed in such a way that, as to allow the students to analyze and give their opinion on every aspect of ICCBM and DLs. The questions allow them to express their views on which method was more useful in understanding the topics and concepts which there in MD curriculum by promoting problem-solving skills, facilitating active learning via group discussions to improve collaborative skills, gaining basic science knowledge, and improving their reasoning, analytical and communication skills. An observation done by Williams says that case-based learning was enjoyable not only by students but also by tutors/lecturers [8].

Sutyak et al. [9] stated that the integrated clinical case-based learning model has played a significant role in the continuing health education and he observed that, in the case-based learning process, students are focused on unstructured cases which improves their diagnostic and practicing skill during the clerkship rotations. Learning through the means of integrated clinical case modules helps students to build on prior knowledge, integrate basic science knowledge to clinical subjects, and consider application to future situations. Case-based learning is widely used throughout the world and so many students are actively learning by this program, but there it is difficult to know the exact number of students participated in this way of learning [10]. Studies have also found that the introduction of the innovative curriculum with case-based learning coincided with the improved academic performance of the students because by this method student is able to get concepts and can able to answer the questions on their regular basis. There is a combination of both didactic and case-based learning curriculum together is going on in some places which is successfully accepted by first-year medical undergraduates [11].

The present study findings are consistent with many previous cross-sectional studies like case-based learning observed by Rehman [12] and also prefer case-based learning then traditional type for learning pharmacology observed by Tayem [13], those studies are proved that in case-based learning, majority of medical students were able to understand core content of basic medical sciences in clinical context.

SDL is a type of individual or group activity of students that they have studied, discussed and learned in the classroom and do their extracurricular activities at home without the direct participation of the teacher [14]. SDL is an important educational principle in medical education that has been widely promoted by various medical education institutions due to its value in developing professionals to become lifelong learners [15]. In the present study, most of the students agreed that ICCBM learning method enhanced the SDL, and helps them in the achievement of learning objectives, integration of topic, better interaction with instructors, and application of basic sciences to clinical reasoning.

In TAU-COM, the ICCBM have given the students a thought-provoking knowledge not only to grasp the topic but also to enhance the student's performance in their academics. ICCBM has now become one of the traditional practices in medical institutions in

order to progress their thinking, cultivate innovative and creative ideas. It is also an active tool drives the students to read, rethink, review and retain concepts and helps to acquire different clinical cases knowledge.

From the above study, it has concluded that ICCBM can be used as an adjunct to the lectures to strengthen traditional teaching and learning methods. It stimulates the desire to learn, develop clinical reasoning, build confidence among learners. Team-based approach can enhance the interest of the student in the Basic medical science subjects. It promotes problem-solving skills and abilities, communication skills, and self-learning among students.

References

[1] Tayyeb R. Effectiveness of problem based learning as an instructional tool for acquisition of content knowledge and promotion of critical thinking among medical students. J Coll Physicians Surg Pak 2013; 23:42–6.

[2] Pein A, Kabino K, Spreckelsen C. Self-directed learning can outperform direct instruction in the course of a modern German medical curriculum-results of a mixed methods trial. BMC Med Educ 2016; 16:158.

[3] Barteit S, Jahn A, Bowa A, Lüders S, Malunga G, Marimo C, et al. How self-directed e-learning contributes to training for medical licentiate practitioners in zambia: evaluation of the pilot phase of a mixed-methods study. JMIR Med Educ 2018; 4:e10222.

[4] Singh S, Savita S, Gautam S. Teaching styles and approaches: medical students' perceptions of animation-based lectures as a pedagogical innovation. Pak J Physiol 2009; 5:16–9.

[5] Thistlethwaite JE, Davies D, Ekeocha S, Kidd JM, MacDougall C, Matthews P, et al. The effectiveness of case based learning in health professional education. A BEME systematic review: BEME Guide No 23. Med Teach 2012; 34(6): e421–44.

[6] Setia S, Bobby Z, Ananthanarayanan P, Radhika M, Kavitha M, Prashanth T. Case based learning versus problem based learning: a direct comparison from first year medical students perspective. Webmed Central Med Edu 2011; 2(6):WMC001976.

[7] Patil VP, Patil VS, Kulkarni SP, Trivedi DJ, Axita VC, et al. Case-based learning in biochemistry: an innovative criterion-based assessment module for effective learning among MBBS phase 1 students in India. Indian J Med Biochem 2017; 21(1):62–8.

[8] McLean SF. Case-based learning and its application in medical and health-care fields: a review of worldwide literature. J Med Educ Curric Dev 2016; 3:JMECDS20377; doi:10.4137/JMECD.S20377

[9] Sutyak JP, Lebeau RB, O'Donnell AM. Unstructured cases in case-based learning benefit students with primary care career preferences. Am J Surg 1998; 175(6):503–7.

[10] McLean SF. Case-based learning and its application in medical and health-care fields: a review of worldwide literature. J Med Educ Curric Dev 2016; 3:JMECDS20377.

[11] Gosh S. Combination of didactic lectures and case-oriented problem-solving tutorials toward better learning: perceptions of students from a conventional medical curriculum. Adv Physiol Educ 2007; 31(2):193–7.

[12] Rehman R. Clinically oriented teaching of physiology through case based lecturing. Pak J Physiol 2014; 10(1–2):15–7.

[13] Tayem YI. The impact of small group case-based learning on traditional pharmacology teaching. Sultan Qaboos Univ Med J 2013; 13(1):115–20.

[14] Kovalenko NA, Smirnova AY. Self-directed learning through creative activity of students. Proc Soc Behav Sci 2015; 166:393–8.

[15] Premkumar K, Pahwa P, Banerjee A, Baptiste K, Bhatt H, Lim HJ. Does medical training promote or deter self-directed learning? A longitudinal mixed-methods study. Acad Med 2013; 88:1754–64.