

## CASE BASED VERSUS DIDACTIC LECTURE FOR EFFECTIVE LEARNING

### BIOCHEMISTRY IN FIRST MBBS

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#### ABSTRACT

**Background:** There are no effective Teaching-Learning methods for Biochemical basis of disease and Metabolic pathways in first MBBS. Objectives: To compare case method with didactic lecture. To evaluate students performance and satisfaction by case based method. **Methods:** Departmental meeting was conducted to select 3 topics and plan the session. IEC approval was obtained. I MBBS students (117) were first taught on one topic (lipid metabolism) by didactic method and then 2 topics by case based method (CBM). CBM-1 (protein metabolism) was attended by 113 and CBM-2 (Carbohydrate Metabolism) by 126 students. Pre and post test conducted at the end of each session with case based MCQs and short answers. **Results:** An imperative progress ( $Z > 1.95$ ,  $Z > 2.95$ ,  $p < 0.001$ ) was observed among the students performance after the CBM sessions compared with didactic method. A 5 point summative scale questionnaire was administered to the students, to know their perception on usefulness of CBM. Nearly 87.3 % of students felt that the CBM sessions stimulated their interest in Biochemistry subject. Out of the total 239 responses 232 (97.0%) responses liked session, where 7 (3%) did not like the session. **Conclusion:** We conclude that the innovative Case Based learning method superior than didactic method. CBM increased performance and satisfaction of I MBBS students.

**Key words:** Institutional ethics committee (IEC), Case based method (CBM).

#### INTRODUCTION:

The Medical Biochemistry subject in first Professional MBBS is generally considered as evaporating and heavily burden with subject. Due to its huge and ever-advancing nature, the Learning and retention of Biochemistry subject contents becomes difficult interestingly, meaningful and clinical relevant. First year under graduate Medical Students often say difficult to understand strategies of Biochemical pathways

and their interconnections than to memorize each step of disconnected pathways. Many Medical institutes have been tried to bring number of reforms in the undergraduate Biochemistry curriculum, but not been able to thoroughly achieve this objective. Case based learning, also referred case method learning, which is defined in a number of ways depending on the discipline and type of 'case' employed. The first full-time

pathology professor at the University of Edinburgh, James Lorrain Smith, introduced what he called the 'case method of teaching pathology' in 1912. (1) The self-directed metabolic defective pathway teaching is supplemented by case history-based exercises, which have been recognized as effective integrated approach to learning medicine through real and progressive diseases in human beings. The clinical cases orientation was introduced to new curriculum for superior in learning complex material in term of memory retention. (2-3) Clinical case studies promote student centered active learning with a focus on critical thinking and problem solving. (4-5) Kanchan Gupta et al. in 2014 conducted a study to assess satisfaction of students on modified case based learning in Pharmacology undergraduate Medical sciences and found high quality acceptance and identification by students and a high intensity of satisfaction on the part of teachers. (6)

**AIM & OBJECTIVES:** 1. compare case method with traditional teaching method for effective learning of metabolic pathways in Medical Biochemistry curricula to integrate basic medical science concepts in the management of clinical problems.

2. To evaluate students performance and satisfaction for Learning Biochemistry by case based method.

#### **MATERIALS AND METHODS:**

Intuitional Ethics Committee Approval was taken.

Study area: Pacific institute of Medical Sciences, Udaipur. Study population: First year MBBS students. Study design: cross over study/Intervention study. Sample size: 131 first year medical students attended in traditional and case based learning sessions. **METHODS:**

Before each session, Departmental meeting was held to choose the topic and plan the session. In Didactic lecture session of learning (on topic lipid metabolism) 117 medical students attended. In case based method-1(on topic protein metabolism) 113 medical students attended and in case based-2 (on topic carbohydrate metabolism) 126 medical students attended were included in the study and a waiver for written informed consent was taken from IEC. Pre and post test were conducted in each session using structured MCQ S prepared by a teacher not involved in the study. Feedback from the students was filled subsequently using summative scale.

#### **RESULTS:**

The results from the three sessions held in 2016 were pooled together for the purpose of analysis. We had evaluated performance of students from mean marks, Standard deviation obtained in pre and post test conducted in all three sessions. The post test scores in both conventional methods found significantly increased compared with Didactic lecturer session shown figure-1 and figure-2. Performance of students shows how much students retain content of subject. The better performance of students noted in both case based sessions (case based method-1 and case based method-2) compared to Didactic lecturer sessions ( $Z > 1.96$ ) which rejects null hypothesis shown in table-1. In Majority of students 89.4% found the sessions to be better than didactic lecture. Nearly 87.3 % of students felt that the sessions stimulated their interest in the subject and reinforced the clinical aspects of the topics discussed shown in figure-3 and figure-4. Out of the total 239 responses 232 (97.0%) responses liked session shown in table-2, where few students 7 (3%) felt intervention of teacher with each and every student is not possible in large group class this hampered learning. The students

also requested to give some suggestions for further improvement of the sessions. These suggestions included; increase in duration and frequency of such sessions (18.5% students), handout of case scenario to be provided to the all students for better understanding (54.5% students). The majority of the students 78.2% felt that the ideal sequence is lecture followed by tutorial and then case discussion.

## **DISCUSSIONS:**

horizontal and vertically integrated method of undergraduate teaching is effective. As per the vision 2015 document of Medical Council of India (MCI), emphasis should be on the introduction of case scenarios for classroom discussion/case-based learning.(7) A number of methods and new techniques have been tried by various academicians elsewhere. Problem solving with interactive clinical seminars was introduced for undergraduate medical students to make the learning process more effective.(8)

There is no widely accepted technique for teaching and learning Basic Medical sciences, each method is associated with its own benefits and flaws. Didactic lecturer is used for passive way learning and fails to induce the students to learn more. In active learning process, teachers facilitate student's learning. Case based learning is an interactive student centered instructor led learning approach. (9) Several authors compared Case Based Learning with didactic form of teaching. (10-12) Clinical case based learning has also been overwhelmingly preferred by medical students when compared to other forms of instruction. (13)

In Biochemistry curriculum the clinical case studies are presented to help the students for long term retention and to pay more attention by bringing relevance facts faced. The learning issues presented to the students requires them to

reformulate biochemical concepts in their own words and integrate diverse principles and decide what information and what was superfluous. Clinical case studies enable the students to learn a wider scope of material than could be presented in the Didactic lecture, and learning in the context of specific cases facilitates cognitive flexibility and improves the student's higher order reasoning skills.(14) The students have also given encouraging comments regarding these sessions in the feedback form. Case based learning led to better learning and retention of basic principles of treatment have further reinforced the usefulness of these sessions.

As with other teaching methodology, this method is also not flawless. This method requires a lot of planning, coordination and organization in advance, not only at the departmental, but also inter-departmental level. Hence CBL is feasible to conduct at any medical college. Furthermore, it is inculcated with all the aspects of the metabolic pathways and diagnosis, but not interactive each and every students in large groups sessions. Another limitation it is not wise to cover the entire syllabus in the form of case scenarios as it is not exam oriented activity. Another limitation, case based method is time consuming for three sessions in a sequence on a particular topic. The important topics can be included initially and later on, if found suitable by the departmental faculty, either of Didactic lecture or tutorial for a particular topic may be replaced by a case discussion. Hence, the aspect of time consumption is manageable to a great extent.

Another aspect is that we are looking only at short-term impact of the intervention. To look-term effects, i.e., whether this knowledge translates into better prescribing skills up on clinical Biochemistry investigations, we need to take another need to take another feedback when

these students become interns. However, the positive aspect is that such an exercise can be introduced in any institution without any administrative hassles. On the basis our experience, we can say that case based learning has good acceptance and recognition by students and high level satisfaction on the part of teachers.

## CONCLUSION:

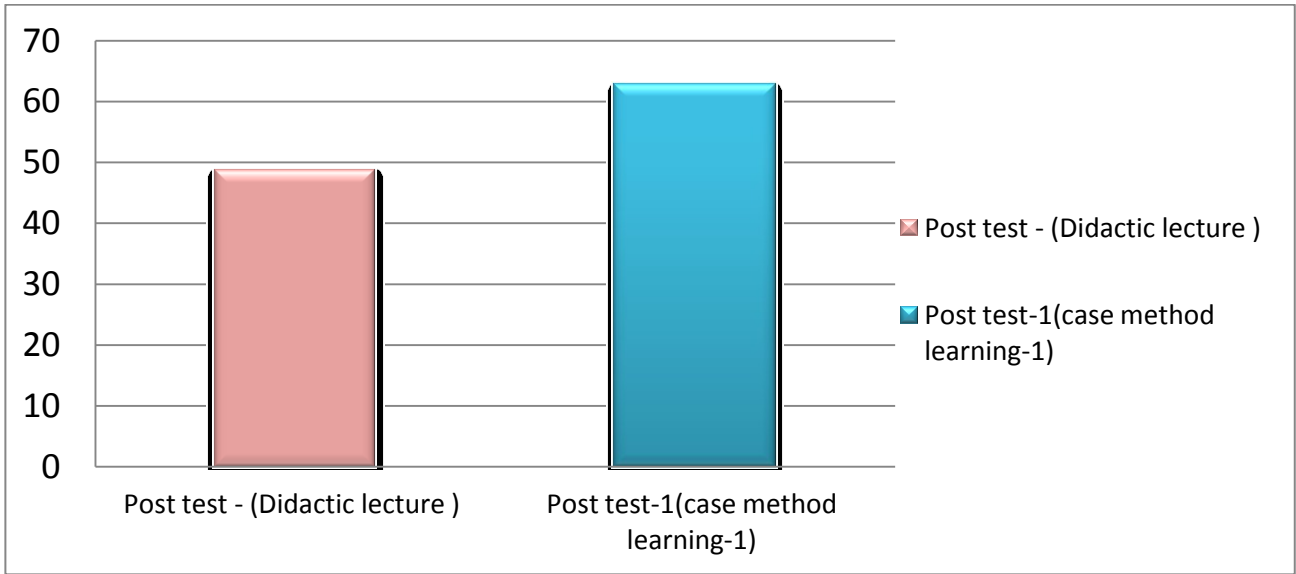
We conclude that the innovative Case Based Learning paradigm appears to be an effective, superior and student centered alternative to the Didactic lecture format. Clinical case studies are most important addition to the traditional lecture technique, text book reading and laboratory for teaching biochemistry. More significantly clinical case studies helps students to recall what they are learning has relevance in the real world and assist to motivate Medical students to pay more attention to the numerous facts faced in Biochemistry.

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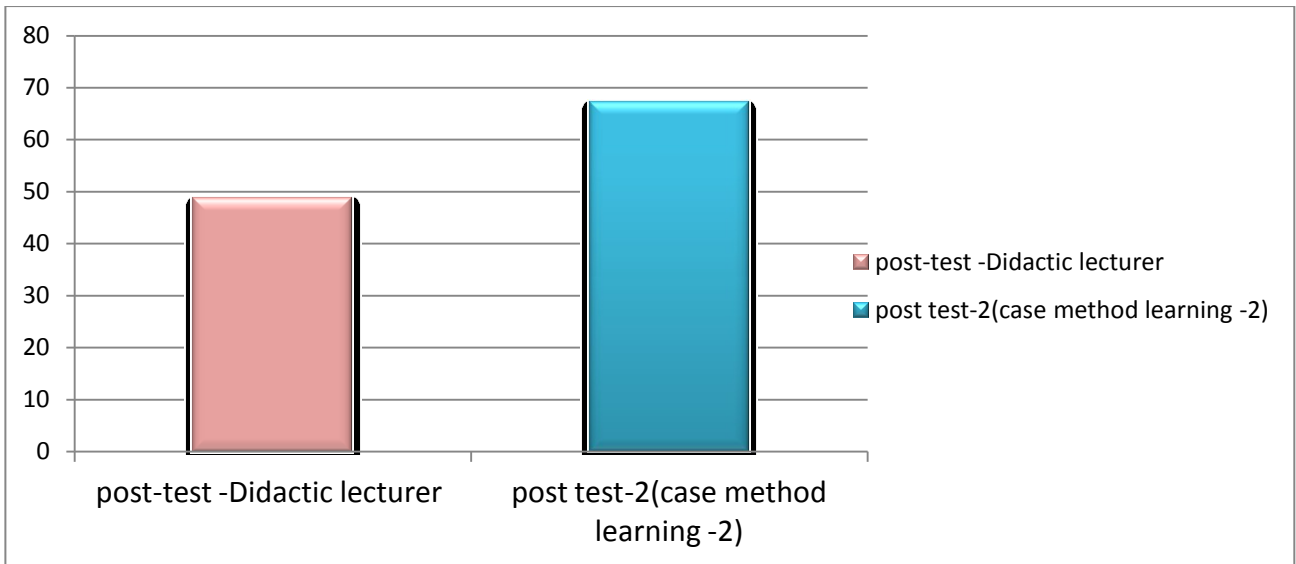
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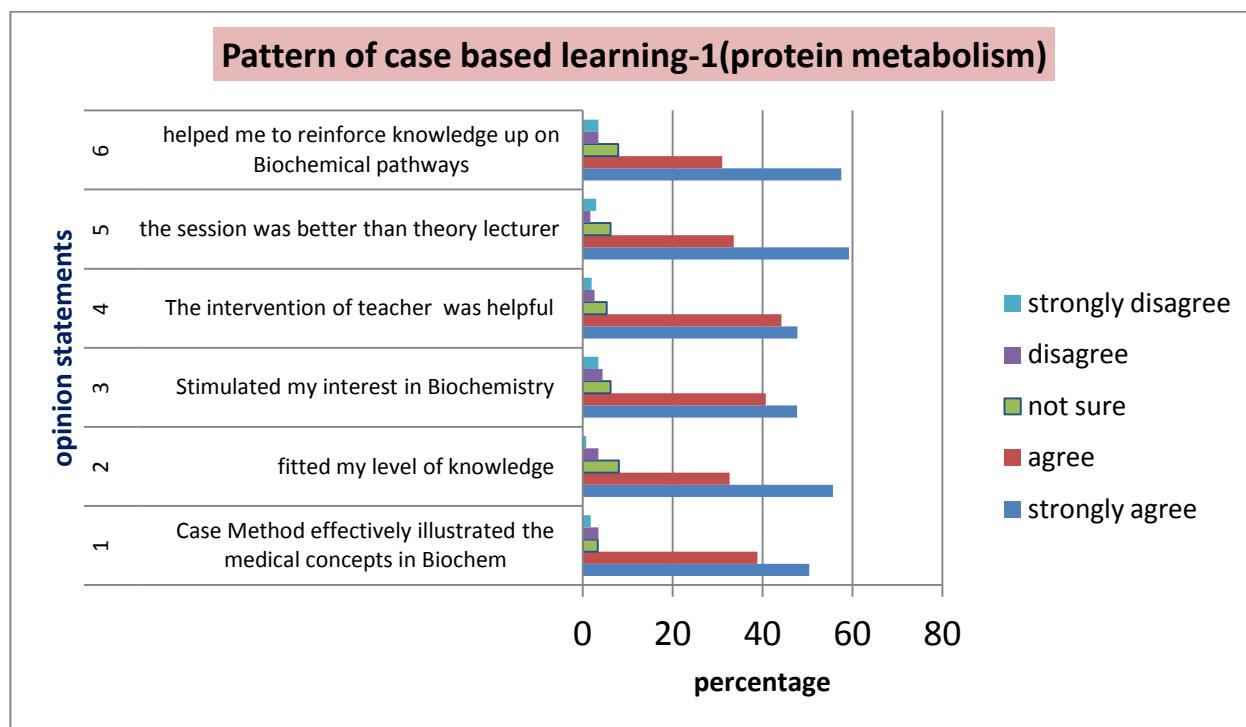
**Figure-1 Comparison of Didactic lecture versus case based learning -1.**



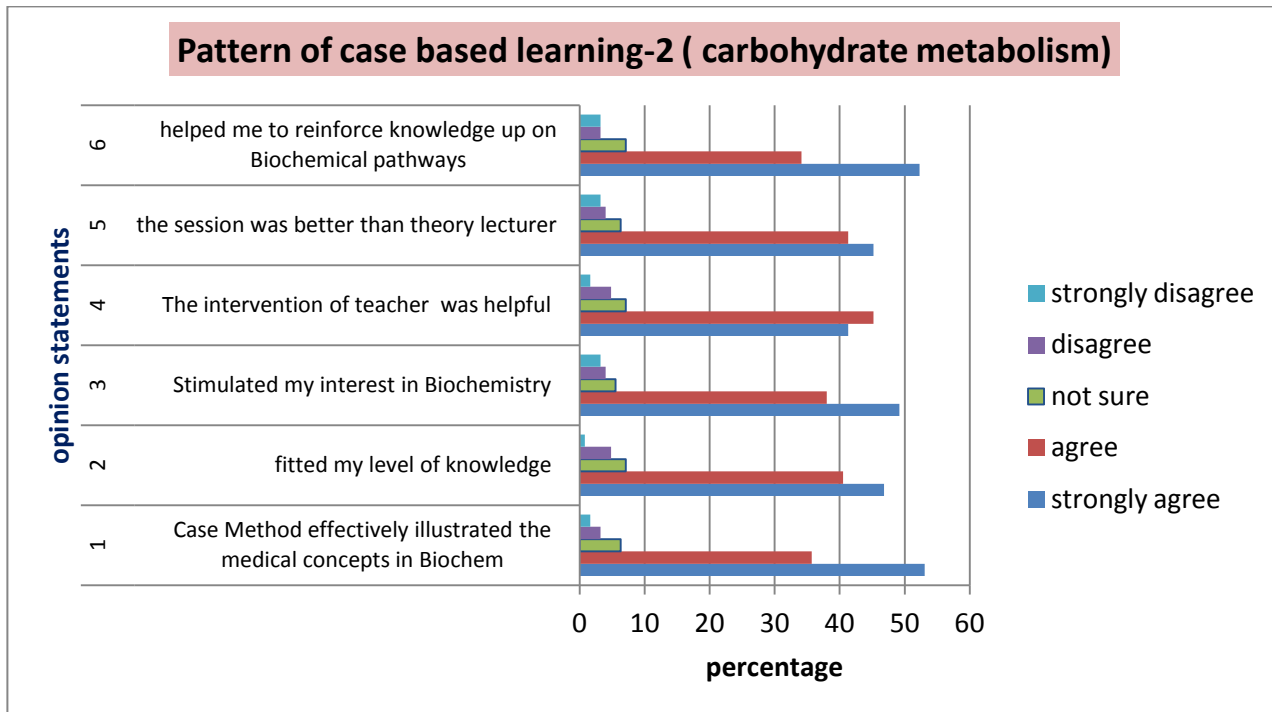
**Figure-2 (comparison of Didactic lecture versus case based learning -2)**

**Table-1: comparison of Didactic lecture versus case based method-1 and case based method-2.**

Teaching methods	Didactic lecture method(lipid metabolism )		Case Method-1 (protein metabolism)		Case method-2 (Carbohydrate Metabolism)	
test	Pre test (n117)	Post test (n117)	Pre-test-1 (n113)	Post-test 1 (n113)	Pre-test-2 (n126)	Post-test-2 (n126)
Mean	1.58	4.87	1.62	6.28	2.11	6.71
SD	0.48	1.12	0.71	1.72	0.78	1.83
Paired t-test			Z=10.84		Z=14.15	
P value			As z bigger than both 1.96 and 2.54 , rejects null hypothesis p<0.001		As z bigger than both 1.96 and 2.54 ,rejects null hypothesis p<0.001	



**Fig 3: pattern of student’s response in case based learning-1(on protein metabolism).**



**Fig 4: pattern of student response in case based learning -2(on carbohydrate metabolism)**

**Table 2: responses of undergraduates in Case based sessions**

	Opinion statements	strongly agree %	Agree %	not sure %	Disagree%	strongly disagree %	Number responders
1	Case Method effectively illustrated the medical concepts in Biochemistry	122(51.8)	88(37.2)	14(6.1)	8(3.3)	4(1.6)	236
2	fitted my level of knowledge	119(50)	87 (36.8)	18(7.5)	10(4.1)	4(1.6)	238
3	Stimulated my interest in Biochemistry	114(48.3)	92(39)	13(5.4)	10(4.1)	8(3.2)	235
4	The intervention of teacher was helpful	105 (44.0)	107(44.7)	14(6.0)	9(3.7)	4(1.6)	239
5	the session was better than Didactic lecture	123(51.8)	90(37.6)	12(5.2)	7(2.9)	6(2.5)	238
6	helped me to reinforce knowledge up on Biochemical pathways	130(54.8)	77(32.6)	16 (6.5)	7(3.0)	7(3.1)	237