



EARLY CLINICAL EXPOSURE –A EARLY STEP FROM FIRST YEAR MBBS, TOWARDS A COMPETENT MEDICAL GRADUATE.

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ABSTRACT

Problem- A physician always seeks for the biochemical basis of the disease and accordingly manages the patient; and to be a competent physician, sound knowledge of Biochemistry is crucial. To gain this knowledge students have to study biochemistry interestingly. Students will study more interestingly and interest will be developed if they know the relevance of the subject in the practice. To make aware students about the relevance of the Biochemistry and stimulate their interest in the subject studies we planned to introduce “early clinical exposure” for the selected clinically relevant topics as a teaching tool. **Method** – After the ethical clearance, based on random sampling sixty students from first year MBBS were selected for the study, with written consent. They were divided into 2 groups each with 30 students. Firstly group A is exposed to early clinical exposure for the clinical context of the topic while same topic was taught to group B by didactic lecture. For the next topic group B was exposed to early clinical exposure for the clinical context of the topic while same topic was taught to group A by didactic lecture. **Evaluation Plan** – Effectiveness of the new method was assessed by the post test for both groups for both topics; which indicates the increased ability of the students to solve the questions based on case studies. Acceptance and satisfaction of faculty as well as students was assessed by the feedback questionnaire. **Results** - Performance of the students for the topics learnt by early clinical exposure was significantly higher than those topics learnt by traditional methods of teaching. (For the topic DM $p < 0.007$ and for Jaundice $p < 0.000$) Feedback reveals the acceptance and satisfaction of students and faculty. **Discussion** - Students were exposed to clinical environment where they observed the patient, his/her history, investigation reports, doctor patient relationship, communication skills and visited clinical Biochemistry laboratory. With this student can realize the relevance of biochemistry knowledge in clinical condition. Early clinical exposure allows higher order of thinking, covering higher levels of cognitive domain – application, analysis, synthesis and evaluation. Thus early clinical exposure encourages them to acquire the clinical and soft skills as well as to some extent laboratory skills; consequently help to achieve the goal of competency based medical education.

Take Home Message – Early clinical exposure at the first year level helps to establish a way towards the competent medical graduate.

INTRODUCTION

Problem – Biochemistry is widely applied in all branches of life sciences from physiology to toxicology. Pharmacology and Toxicology involves action of drugs based on biochemical reactions. Now a day's clinical pathology uses biochemical aspects increasingly e.g. processes of inflammation, cell injury, cancer etc.^[1] Molecular diseases, inborn errors of metabolism require perfect knowledge of biochemistry i.e. of normal biochemical pathways and any alteration in it; for diagnosis, treatment and management also. A physician always seeks for the biochemical basis of the disease and accordingly manages the patient, during the practice. Hence to be a competent physician, sound knowledge

of Biochemistry is crucial. To gain this knowledge student must have to study biochemistry interestingly.

But most of the first year students have a phobia for the biochemistry. This may be because of the numerous metabolic pathways, reactions, enzymes and their regulations. Students learn all these things in the classroom through the didactic lectures. Visualization is an integral part of the learning & it has been a profound effect on the learning process. Anatomy can be studied with dissecting the body, Physiology by experiments on animal and human histology by using microscopy. But Biochemistry cannot be studied with visualization. However at least clinical relevance of the subject can be

studied through the visits to wards to see the patients or visualize the clinical manifestations which can be correlated with metabolic alterations. Students will study interestingly if they know the relevance of the subject in the practice. So Medical Council of India (MCI) designed a new curriculum where more time for proper clinical training is allotted^[2] to achieve the goals of competency based medical education.

“Early Clinical Education” calls for a shift in philosophy from “pedagogy” to “andragogy.” It is a teaching and learning methodology which fosters exposure of medical students to patients (actual human contact) as early as the first year of medical college, in a social or clinical context that enhances learning of health, illness or disease, and the role of the health professional.^[3]

With the approach of early clinical exposure, teaching takes place with integration, to interrelate the subject. Exposure to patients is a real understanding of normal metabolism and the altered or abnormal metabolism by the first MBBS students. Early clinical exposure will evolve communication skills depend upon the knowledge of specific disease about which in future student can communicate. History taking and communication with the patient is difficult for students those who were studied by conventional method of learning.^[4]

To make aware students about the relevance of the Biochemistry and stimulate their interest in the subject studies we planned “early clinical exposure” to the students, for the selected clinically relevant topics.

MATERIAL AND METHOD

Study Design –An Educational Interventional Study.

Type –Post test only, control group with cross over.

Study Duration – 8 Months

Study subjects – First year M. B .B. S. students.

Sample size – 60 (Calculated by statistical formula)

Mode of selection of sample – Systemic random sampling.

Statistical Analysis – Mean, Standard Deviation (S.D.) and % were calculated.

Post test only - control group with cross over.

	Group	Intervention	Post test
Study Group 1 st Year MBBS students (N=60)	Experimental Group I (N=30)	Yes – Early clinical exposure – Topic X	Yes
	Control Group II (N=30)	No – Conventional teaching method - Topic X	Yes

Statistical analysis was done by Using Standard error of difference between two means, (z test) for the comparison between the post test scores with and without intervention.

METHOD

- 1) After ethical clearance sixty students were selected for the project on the basis of systemic random sampling. They were involved in the project only after receiving their written consent for willingness.
- 2) All the 60 students from 1st MBBS were divided into two groups - group I and group II; each with 30 students.
- 3) Students were introduced about early clinical exposure and observation cards, before their visit to ward. The observation cards were to note down the observations during early clinical exposure. These cards were prepared as per guidelines and after focus group discussion with departmental faculty and faculty from Medicine.
- 4) After completion of the basic chemistry and metabolism of the topic ‘X’, clinical application of the topic ‘X’ was taught by Early Clinical Exposure to group I. Students from Group I were visited hospital with faculty. They observed the patient, patient – faculty interaction; and collected the information through this (ECE)’and noted down the observations in the observation card.
- 5) The clinical application of the same topic “X” was taught by conventional didactic lecture, to the group II.
- 6) The process was repeated as, clinical application of the topic ‘Y’ to group I was taught by the conventional didactic lectures and group II by an early clinical exposure.
- 7) MCQ test was conducted on the topics ‘X’ and ‘Y’ for both groups for both topics.
- 8) The test was in the form of MCQ questionnaire which includes questions based on clinical cases as well as based on factual recalls.
- 9) The students’ and faculty perception were obtained with the help of feedback.

Topic ‘X’ – Chemistry and metabolism of Carbohydrate - Clinical context-Diabetes Mellitus.

Topic “Y” - Chemistry and metabolism of Hemoglobin and liver function test Clinical Context – Jaundice.

	Group	Intervention	Post test
Study Group 1 st Year MBBS students (N=60)	Experimental	Yes – Early clinical exposure - Topic Y	Yes
	Group II (N=30)		
	Control	No – Conventional teaching method - Topic Y	Yes
	Group I (N=30)		

Evaluation Plan

- Test scores of both groups, learning by conventional teaching method and new method with ECE were compared to find out the effectiveness if any. This was assessed by increase in the ability of students to solve the case based questions.
- Analysis of feedback for student's perception was to know their changed attitudes and acceptance to this early clinical exposure.
- Analysis of feedback for faculty perception was to know their acceptance to this early clinical exposure to find out their motivation, to use this concept for their teachings. The questionnaires for the

assessment of performance, as well as for the feedback to know perception (faculty & students both) were prepared after focus group discussion with departmental faculty and faculty from Medicine.

RESULTS

Performance of the students for the topics learnt by early clinical exposure were significantly higher than those topics learnt by traditional methods of teaching. (For the topic DM – $p < 0.007$ and for Jaundice $p < 0.000$, Table no. 1 & 2).

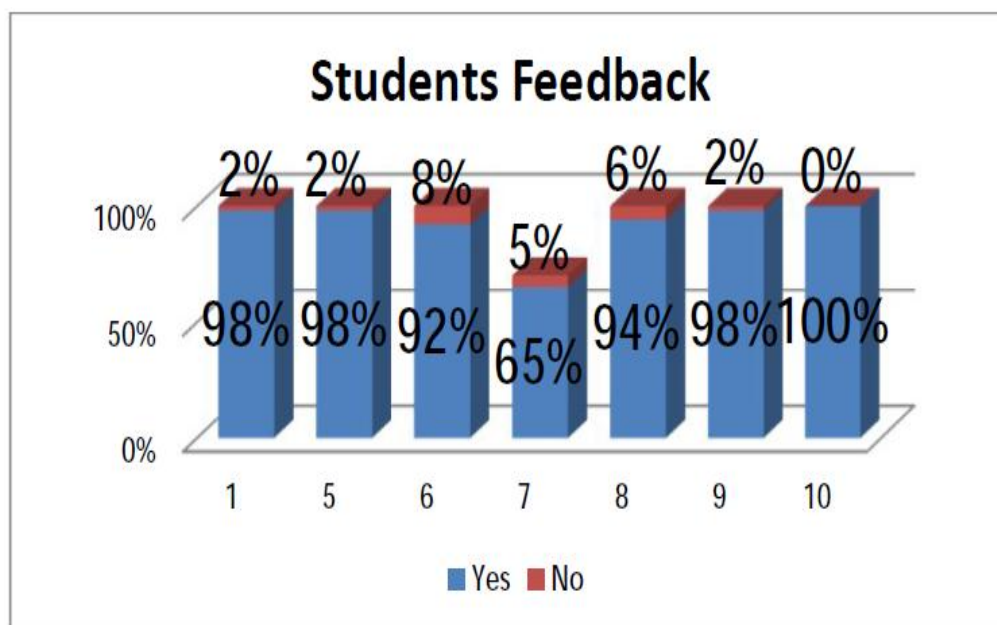
RESULTS

Observation Table NO.1 – Performance of students for the topic Diabetes Mellitus.

Teaching Method	No. of Subjects	Score -Mean $\pm$ S.D.	Significance. P value
Didactic Lecture	30	10 $\pm$ 3.259	0.007
ECE	30	11.93 $\pm$ 1.874	

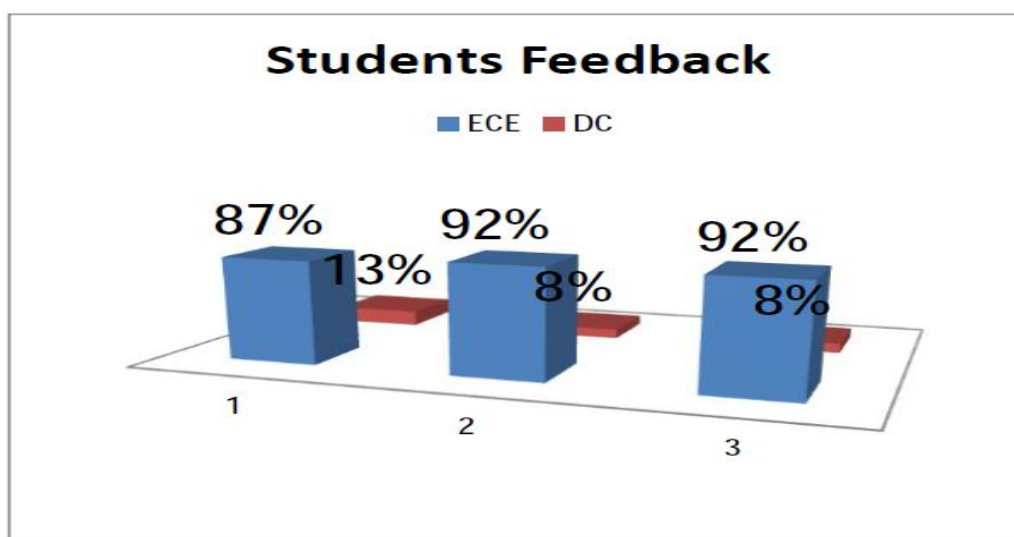
Observation Table NO.2 – Performance of students for the topic Jaundice.

Teaching Method	No. of Subjects	Score -Mean $\pm$ S.D.	Significance P value
Didactic Lecture	30	8.43 $\pm$ 2.991	0.000
ECE	30	13.1 $\pm$ 2.964	



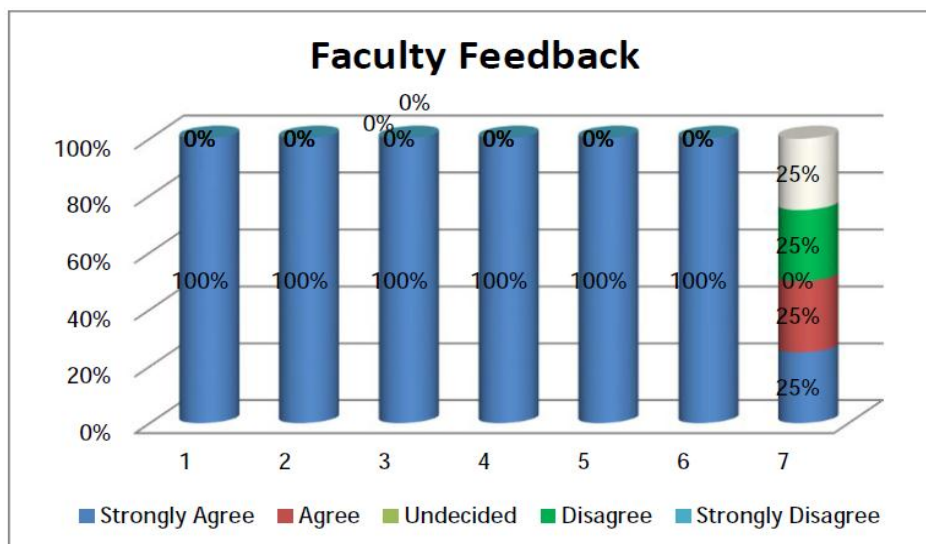
Graph 1

Sr. No.	Question
1	Did ECE help you to develop your ability of application of basic Biochemistry knowledge in clinical condition?
5	Does ECE increases awareness, sincerity & interest in the studies?
6	Will application of ECE to all topics with clinical relevance be better?
7	During ECE while interacting with other students, interaction proved helpful for learning & studies.
8	What you have learnt in this experience by ECE, will you try to relate it to your studies in other subjects also?
9	Did ECE helped you to sensitize about doctor patient relationship, as well as about the responsibilities of this profession at the earliest?
10	Did ECE experience influence your values & views about society in which you live?



Graph 2

2	Which of the following methods is useful teaching – learning method for topics with clinical relevance?
3	Which of the following teaching methods is helpful to remember, analyze, interpret and recall the knowledge acquired?
4	Which of the following teaching method is involved you actively for learning?



Graph 3

Sr. No.	Question
1	The ECE is more useful for students as a trigger for recalling or memorizing the topic than conventional didactic lectures.
2	The ECE will be more useful for students as an inducer of awareness for the studies than the didactic lectures
3	Can we use the ECE for every context specific learning in Biochemistry and other basic sciences?
4	ECE stimulate learning with interest
5	Experiencing ECE influence student's values & views about society in which he/she lives
6	Do you feel that ECE help student to sensitize about doctor – patient relationship as well as about the responsibilities of the profession at the earliest
7	Though effective ECE is time consuming, teaching method

Sample quotes from students' reflection

1	It's my first experience to see how doctor treat the patient. Good experience of everything learnt about the disease from the early clinical exposure
2	Doctor patient interaction is a perfect visualisation and understanding of the disease. This evokes a sense of involvement and inquisitiveness in a "to be doctor" mind. This procedure of teaching is the best as we can explore every realm of becoming a doctor.
3	Students can experience in reality what the surrounding of doctor implies, to adapt to the environment and develop eagerness and interest in the depths of the subject.
4	Understanding the patient's condition by observing him/her rather than reading about it makes a huge difference in our approach towards the topic.
5	It helped us to understand and especially remember the topic well. Direct contact with patient has a better influence.

DISCUSSION

Didactic lecture is a teacher centered, unidirectional and less interactive. By this teaching method students get large amount of information only through passive transmission of knowledge. They are not actively engaged in the learning process.

Early clinical exposure activity implemented by us is a combination of horizontal and vertical integration which makes entry of first MBBS students into contextual learning. Direct contact with patient in ward satisfies their eagerness. They can visualize the sign, symptoms, history, investigation reports of patients and consequently related treatment strategy. This gave a unique and better learning experience to the students, which was different from didactic lecture.^[5]

Early clinical exposure is the method which follows the andragogical approaches of learning. Students were exposed to clinical environment where they observed the patient, his/her history, investigation reports, doctor patient relationship, and communication skills. Every observation was noted down on the observation card. The observation is a core approach to clinical teaching in medical education. It is an active, purposeful task that stimulates meaningful and deep learning. So to achieve competency observation card is always selective, needs chosen object, a definite task, an interest, a pointing of view, a problem.^[6] With this student can realize the relevance of biochemistry knowledge in clinical condition. Early clinical exposure allows higher order of thinking, covering higher levels of cognitive domain –

application, analysis, synthesis and evaluation.^[7]

This kind of learning enable student to interpret clinical findings on the basis of basic concept of clinical Biochemistry. Hence students can correlate the previous knowledge with the patient's history, laboratory reports and learn actively about the disease. Students' confidence gets boosted with this, and with raised confidence they were motivated for self directed learning. All these factors result into their increased interest in the studies, consequently problem solving ability enhanced. This may be the reason for the increased score of the tests for which the students were exposed to early clinical exposure for learning than that of the students learnt by didactic lectures.

Our results are in agreement with the findings of Sandip Baheti and Darpan Maheshgauri^[4], who observed early clinical exposure, provides dynamic learning process. Our findings are also in line with Sedigheh Ebrahimi^[8] and co researchers, as well as Suresh Chari, Madhur Gupta and Shubhada Gade.^[9]

Competency based medical education is a framework for designing and implementing education that focuses on the desired performance characteristic of health care professionals. In this method of education (ECE), learning objectives focus on what the learner should be able to do where as in traditional method learning objectives often focus on what the learner should 'know'.^[10]

After early clinical exposure there was a discussion with students about the basic knowledge of Biochemistry related to Diabetes Mellitus and Jaundice; to strengthen their concepts. The students during their visit to ward were also brought to clinical Biochemistry Laboratory to show them how the patient's samples were analyzed and reports dispatched. This helped them once again to realize the importance of Biochemistry in clinical studies. Visit to ward and laboratory along with the post visit discussions helped them to achieve the skills of 1) Using instruments to perform the biochemical analysis relevant to clinical screening and diagnosis. 2) Analyzing and interpretation of data.^[11] This is according to the objectives of MCI for the Biochemistry Curriculum. Thus early clinical exposure encourages them to acquire the clinical and soft skills as well as to some extent laboratory skills and all together fulfills the goal of competency based medical education.

Student's feedback result

Graph 1 & 2 – More than 98% students accepted that early clinical exposure helped them to develop their ability to apply the biochemistry knowledge in clinical condition; as well as to increase the awareness, sincerity and interest in the studies. 92% students opined that early clinical exposure can be applied to all clinically relevant topics. 94% students thought that they can relate what they learnt by early clinical exposure, to other subjects. In other words they can learn the disease at the level of integration of all basic sciences. 92% students accepted that early clinical exposure is helpful to remember, analyze and interpret the knowledge acquired. 92% students agreed that they were actively involved in the learning process.

There was positive feedback about the communication skills also. 98% students accepted that early clinical exposure sensitized them about the responsibilities of the profession. All the students experienced that early clinical exposure influenced their values and views about society in which they live. 75% students felt that early clinical exposure though effective it is time consuming.

Thus with the early clinical exposure helped students not only to acquire the knowledge but may also to develop the desired performance characteristic of health care professionals.

Faculty feedback

All the faculties from biochemistry and from Medicine agreed that early clinical exposure is useful as a trigger for memorizing the subject than learning by didactic lectures. Early clinical exposure can be used for all context specific topics. It can make students aware about the social values, moral responsibilities of the profession they choose.

CONCLUSION

Comparison of both teaching methods i.e. didactic and

early clinical exposure revealed that the performance of students was improved by learning with early clinical exposure. All students accepted this as a method for active learning. Their overwhelming response laid us to conclude that the early clinical exposure must be used as a supplementary teaching method for all clinically relevant topics along with the traditional didactic lectures. Proper framing of this method considering the time constraint of the first MBBS schedule, this will not only help them to motivate or improve the studies but also to develop basic skills and also to pave the way to the first step towards the competency from the beginning of the medical education.

Take Home Message

Early clinical exposure at the first year level helps to establish a way towards the competent medical graduate.

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