

Sri Lankan Medical Students' preferences for Biochemistry Teaching Methods

FMMT Marikar DSc^{1,2}, KNH Wadige MBBS², SD Lakmuthu MBBS², MYW Priyanthi MBBS², PAJ Perera PhD²

¹ General Sir John Kotelawala Defence University, Ratamalana, Sri Lanka

² Department of Biochemistry, Faculty of Medicine, University of Rajarata, Anuradhapura, Sri Lanka

Abstract

Background and Purpose: Biochemistry is extremely difficult in preclinical medical education because of the monotonous use of lectures, tutorials, practical and end of semester load with end of semester examination. Although several studies have been carried out on learning biochemistry in Europe and America, Asian studies are very few and literature in the Sri Lankan context is lacking. We aimed to assess the best teaching tool for teaching Biochemistry in Medical Faculty is the main objective of this study.

Methods: In this study, 177 second-year medical students of the Faculty of Medicine, University of Rajarata, Sri Lanka were enrolled. Using a self-administrated method, two non-compulsory evaluating questions were given to the candidates when they sat for the Objective Structured Practical Examination (OSPE) in 2nd MBBS.

Results: The students gave high positive ratings to the lectures. The preferred order of the teaching method included lectures followed by student-staff interaction, panel discussion and the least preference was seminar.

Conclusions: The findings of our study highlight the large gap between lectures and seminars in teaching biochemistry. In light of these questions, we discussed and recommended alternative approaches to teach using a hybrid method. Sri Lankan medical faculty will need to make an effort to change this learning attitude by improving proper teaching methods in biochemistry.

Keywords: BIOCHEMISTRY; OBJECTIVE STRUCTURED PRACTICAL EXAMINATION; TEACHING; LECTURER

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Introduction

Medicine is a complex and demanding field of study in Sri Lanka, and Biochemistry knowledge is very important. Biochemistry itself started as a component of Physiology in the Medical Faculty of Colombo, Sri Lanka in the early 1900 and has now evolved as a separate subject. Medical schools worldwide use different teaching methodologies mainly in the form of lectures with laboratory practice and tutorials to reinforce what has

been learnt (1). Teaching medical students is a big investment for institutions and the government and it considered as a personal investment of time and money for an enrolled student (2). In this study, we aimed to evaluate the teaching methods of Biochemistry for medical undergraduates practiced in the newly built medical faculty at University of Rajarata, Sri Lanka. Practical laboratory classes underwent changes to include problem-based learning, and tutorials have been revised to include student seminars. Moreover, panel discussions and direct student-staff interactions have been used as other learning and teaching strategies. Our primary objective was to assess medical students' preferred learning methods as well

*Corresponding author: FMMT Marikar, DSc; Department of Biochemistry, Faculty of Medicine, University of Rajarata, Anuradhapura, Sri Lanka. Email: faiz.marikar@fulbrightmail.org

as find ways and means of improving lectures at the Faculty of Medicine, University of Rajarata, Sri Lanka.

Structure of Biochemistry

The Biochemistry curriculum aims to make students independent and self-directed and encourage them to be lifelong learners. The curriculum consists of General Biochemistry, Clinical Biochemistry and Nutritional Biochemistry. General Biochemistry consists of a module called the "Introduction to the Study of Man." Clinical Biochemistry is taught with system-based modules of the Cardiovascular, Respiratory, and Musculoskeletal, Body Fluids, Gastrointestinal, Urinary, Endocrine, Reproductive and Nervous systems. Nutritional Biochemistry is conducted as a comprehensive course that includes modules of energy, protein, fat, mineral and vitamin metabolism, anthropometry and diet therapy. Learning objectives are made available to the students via the library where they make copies of the photocopying unit. The specific learning objectives provide guidance to the students on the expected goals. They are expected to achieve the learning objectives through lectures, tutorials, small group discussions, practical classes, clinical demonstrations, seminars, text books, and journal articles.

Lectures are conducted by the Head of the Department, probationary lecturers and temporary lecturers. The time allocated for lectures is 50–55 minutes; whilst for the tutorials and practical classes it is 2 hours per class. Students must attend more than 80% of the tutorials, seminars and practical teachings to be eligible to sit for the 2nd MBBS examination. Seminars are conducted in the 3rd semester. The whole course consists of 3 semesters that consist of 15 weeks, with 2 vacations in between. There are 3 mid-semester formative examinations conducted in semester I, II and III and two summative examinations conducted at the end of the first and the second semesters. The 2nd MBBS examination, which is a bar examination is held 4 weeks after the end of the 3rd semester.

Performance in Biochemistry is evaluated in terms of distinction, pass and failure. A prize is offered for the best student in Biochemistry based on the results obtained at the 2nd MBBS examination.

As a concluding remark in the section of introduction, pre-clinical biochemistry is intended to provide a basis for understanding the procedures of diagnosis and treatment taught during the subsequent clinical part of the medical curriculum. However, when encountered in the pre-clinical years, this subject has been strongly criticized by students for its teaching nature (Richardson, 1983). To solve this issue the blended teaching method and the problem-oriented technique have frequently been used to overcome this negative attitude (3-5). Evaluation on the basis of student ratings supports the claim that problem-oriented teaching produces a more positive attitude to pre-clinical biochemistry, than might otherwise be expected (6, 7).

Methods

The sample of this study consists of 177 second-year students (96 men and 81 women) of the Faculty of Medicine and Allied Sciences, University of Rajarata, Sri Lanka, which is located in Saliyapura, Anuradhapura, Sri Lanka. All were enrolled in the medical education course. The faculty is a socially and economically diverse community in the Northern Province of the country. It is the only medical faculty in that province, which was built in 2006. The students had followed Biochemistry and sat for the selection examination (an examination conducted by the Faculty for 2nd MBBS) after completing their two-year courses to qualify for the final examination conducted by the Faculty. Two noncompulsory evaluating questions were administered to each of the candidates when they were sitting for the 2nd MBBS Objective Structured Practical Examination (OSPE) in Biochemistry at the Medical Faculty, University of Rajarata. The OSPE was a walk around type examination

comprising of 40 questions; 3 minutes were given to answer each. The answer to the evaluating questions was deposited by the candidates maintaining anonymity in the 2 boxes kept at specific places. The first question was a fixed response question whilst the second was a free response question. Care was taken to avoid any exchange of information or ideas among students. To address the research questions Likert scale questions were used. We analyzed our data as percentage of application. For statistical analysis, all data were transformed using the basic statistical analysis package.

Question 1: State the order of preference of the following teaching methods.

Use numbers 1 to 6 when stating preferences (1 being the highest and 6 being the lowest)

Question 2: What recommendations would you make to improve learning from lectures in Biochemistry?

Results

As shown in table 1, the preferred order of teaching methods were 1) lecture, 2) tutorials, 3) student-staff interaction, 4) panel discussion and the least preference was seminar (Table 1). Of the 177 candidates, 93 answered question one. In spite of the deficiencies attributed to passive learning, students appear to like lectures more. This probably reflects the difficulties they may have encountered when gathering information from text books written in English. This may perhaps emphasize the importance of learning English in the Medical Faculty. Tutorials are conducted in groups of 30 and moderated by the lecturers. Questions, mainly data interpretation and problem-solving type are made available to the students a few days before the date of the tutorials. Students read

the answers which are then subjected to discussion and correction. This activity enables students to gain experience in writing answers and also gain knowledge on different approaches. A likely reason for choosing it as the 2nd preference may be related to its help in making students pass the examination (Table 1).

Practical's include tests to be carried out manually and problem base learning. The latter appears to gain the interest and curiosity of the students as there is a lot of discussion which is continued even after the class ends. They are carried out as small group activities of 5-6 students per group. Student-staff interaction is a one to one type learning. This facility is not much used, expect to clarify doubts. When students do come, mostly girls, they come in groups of 2-3. This may indicate lack of student confidence to meet their tutors, individually. This may perhaps be related to weakness in using English expressions (Table 1).

Panel discussion was a newly introduced concept in which a panel of lecturers discuss questions posted around 180 students. This is usually done at the end of a semester and at the end of a programme. The students bring questions, usually from past examinations and tutorials for clarification and open discussion. Students are hesitant to ask questions directly, but they submit questions anonymously. This may be because they have a high level of apprehension. Seminars are conducted by groups of 35 students on "hot topics" that are of local, global and medical importance. This activity, enhances leadership training, team work, IT application and enables them to look at health problems in a holistic way. The work carried out by students is not duplicated in the teaching programme and is tested in the 2nd MBBS examination conducted at the end of the programme. The rating given by the

Teaching Method	Lecture	Tutorial	Practical	Seminar	Panel Discussion	Direct Student-Staff Interaction
Preference Order						

Table 1. Students' Responses on Teaching Learning Methods

Teaching- Learning Method	Preference Order (%) ^a					
	1	2	3	4	5	6
Lecture	38	16	14	8	10	5
Tutorial	28	40	13	5	4	1
Practical	13	23	37	11	7	2
Seminar	3	1	0	11	13	63
Panel Discussion	4	8	17	25	33	3
Direct student-staff Interactions	7	4	8	31	23	17

^aIt was taken as the percentage of students who have not answered (10% in the population)

students was the lowest. This is understandable as they are keen on learning activities that could make them pass the 2nd MBBS examination, which is considered as a barrier (Table 1).

The second question was answered only by 41 students. This question was focused on the type of lectures and the preferred form of learning according to the survey. The objective was to find ways of improving learning from lectures. The suggestions offered by students are listed in Table 2.

Discussion

The conceptions and definitions of teaching and learning were substantially more different between students and teachers than expected, although we presumed that some differences would emerge. Teachers' conceptions seemed to arise from the Biochemistry of science. They see teaching and learning in the context of science and define them from that perspective. Teachers seemed to have answered the questions from the perspective of an expert in. The variation in the conceptions of learning curve was displayed by the teachers were at the higher end in Blooms taxonomy in which learning is seen as changing one's view of phenomena (8, 9). Medicine is considered to be the longest and most stressful undergraduate course (10). We

found that still a high percentage of students prefer the old-fashioned lecture-centered method. There are various types of publications during the same period describing the increased interest in medical research on teaching (11). Giving lecture notes is a debatable question. Objectives of the different course modules are made available in the library. It is possible for students to gather information on these prior to attending lectures. However, since students might not understand the new terminology they may find it difficult. It may be possible for the Department to give the references in a more specific manner, such as books, chapters, and page numbering, etc., after each objective. This could be implemented to a limited extent. Another possible alternative could be to get the other lecturers of the Department to attend lectures of the professor and see how they could improve their style of teaching. This could be done at the end of the lecture. But due to time limits of a lecture (50 minutes) this could be done only as an MCQ type question and answer. It is worthwhile applying this; but because of time limitation it is difficult to carry this out. An alternative approach would be to allow the student to write the question they wish to ask, if possible along with their e-mail address, on a white board in the Department or to put it in a drop box to be displayed outside the Department entrance. Slowing down lectures

Table 2. Recommendations to Improve Teaching-Learning Methods on Biochemistry

Comments	number
1. Give lecture notes prior to the lecture	26
2. Increase the number of lectures by professors	5
3. Discuss questions to ask questions at the end of the lecture	5
4. Give a chance to ask questions at the end of the lecture	3
5. Reduce the speed of lectures	1
6. Increase the use of local expressions words during lectures	1

could mean more lecture hours. This is limited by the number of lecture hours available. But this could be done with the new curriculum. Moreover, whatever is done beyond the lecturing time could be given as a reading assignment. It was the request of only one student; but this could be a concern of the silent majority. Improving common language usage in lectures may be helpful in student point of view. It should be noted that there are Tamil medium students who may also need assistance. The only way this issue could be dealt with is by having close student-staff interactions, especially in the self-study time allowed in the time table. There are several limitations in the present study. Although teaching methods in the Department of Biochemistry have been evaluated in this study, this could be a potential area of future research to uplift the quality of teaching Biochemistry in this country.

Conclusion

There are an increasing number of teaching methods for medical students. Medical schools and staff should strive to enhance the quality and quantity of medical education by selecting the best teaching methods. Therefore, we would like to encourage medical schools to ensure that proper information is given and to conduct teaching according to the tailor-made system that matches the students' needs.

Conflict of Interest

The author declares no conflict of interest.

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