

An appraisal of innovation in practical teaching in anatomic pathology - A students' and teachers' perspective

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Abstract: *Background:* Traditional pathology teaching is teacher-centred with an emphasis on acquiring theoretical knowledge. We, at the Department of Pathology, KIMSU introduced a new practical teaching methodology-“active learning” with emphasis on clinico-pathological correlation-for II year M.B.B.S. students to make pathology learning easy, interactive and clinically relevant. *Objective:* To evaluate student and tutor perception of the new practical teaching approach introduced in the Department of Pathology, KIMSU for II year M.B.B.S. students by analyzing responses to Likert-scale based standardized questionnaires. *Methods:* A questionnaire-based survey was undertaken in the Department of Pathology, KIMSU in January 2013 among a sample population of 120 students of II M.B.B.S. (2011 batch) and 08 tutors (Pathology post-graduate residents) who anonymously graded their approval/disapproval for 17 parameters on a structured Likert scale. Data collected was analysed and results recorded. *Conclusion:* The survey indicated that there were both encouraging aspects- namely, use of audio-visual aids and A4-sized photomicrographs of practical slides, pre-practical briefings, formation of smaller groups for practicals-which were appreciated; and others-namely, the materials/equipment used in teaching and time management during practicals - that need more efforts from both teachers and students to achieve the objective of learning pathology.

Keywords: Pathology practical teaching, active learning, clinic-pathological correlation, survey.

Introduction

Pathology is a crucial discipline of undergraduate medical training, where it is taught as a basic science. Traditional pathology teaching is teacher-centred with a heavy emphasis on acquiring factual knowledge. We, at the Department of Pathology, KIMSU introduced a new practical teaching methodology-“active learning” with emphasis on clinico-pathological correlation - for the students of II year M.B.B.S. (Batch of 2011). It is accepted that review of teaching methods by student feedback is an important component of improving learning experience [1-2]. Yet, there are very few studies conducted in India related to feedback from medical undergraduate students on teaching methodologies [3-4]. This appraisal was conducted at the conclusion of the academic year to allow the students to objectively rate the new teaching practices for practical classes.

AIM: To critically evaluate the acceptance of the modifications introduced in practical teaching in pathology for II year M.B.B.S. students in the

Krishna Institute of Medical Sciences University (KIMSU), Karad.

Objective: To evaluate student and tutor perception of the new practical teaching approach introduced in the Department of Pathology, KIMSU, Karad for II year M.B.B.S. students by analyzing student and tutor responses to standardized questionnaires based on a Likert-type scale.

Material and Methods

For the II year M.B.B.S. students (2011 batch) of KIMSU, we introduced a few modifications in teaching practical anatomic pathology. This study constituted a questionnaire-based survey undertaken in the Department of Pathology, Krishna Institute of Medical Sciences University, Karad, Maharashtra, during the month of January 2013, with due permission from the institutional Ethics committee. The sample population was made up of 120 students of II M.B.B.S. (2011 batch) and 08 tutors (Pathology post-graduate residents,

KIMSU), who were voluntary anonymous respondents to a standardized questionnaire based on a Likert-type scale, conducted after the announcement of the final results of the II year university examinations to rule out bias. Two sets of questions were used - one set for the students (Annexure 1) and one set for the tutors (Annexure

2). The respondents graded the strength of their approval/disapproval for 17 pre-determined parameters under three heads (viz. Teaching materials, Teaching methods and Teachers) on a structured five point scale. Data collected was analysed objectively and the results recorded.

ANNEXURE-1

FEEDBACK FORM (For practical teaching - Students)

SEMESTER / TERM / YEAR - II / III MBBS/ 2011 Batch

Students are required to rate the practical teaching programme on the following attributes using the 5 point scale below. Please tick the most applicable grade:

	Attributes	Poor	Fair	Good	Very Good	Excellent
Teaching material	1. Gross specimens					
	2. Microscopic slides					
	3. Microphotographs (A-4 size)					
	4. Equipment in Laboratory					
Teaching methods	1. Usefulness of LCD briefing by senior faculty					
	2. Level of Integration with other subjects					
	3. Interest generated					
	4. Scope for knowledge application during teaching					
	5. Relevance & thoroughness of teaching					
	6. Level of interaction with tutors/teachers					
	7. Use of 12 points guidelines for studying slides/ specimens					
	8. Development of practical skills					
	9. Time Management during practicals					
Teachers	1. Knowledge base					
	2. Communication skills					
	3. Sincerity of purpose & commitment					
	4. Approachability					

Other comments: _____

ANNEXURE 2

FEEDBACK FORM (For practical teaching- Tutors)

Tutors are required to rate the practical teaching programme on the following attributes using the 5 point scale below. Please tick the most applicable grade:

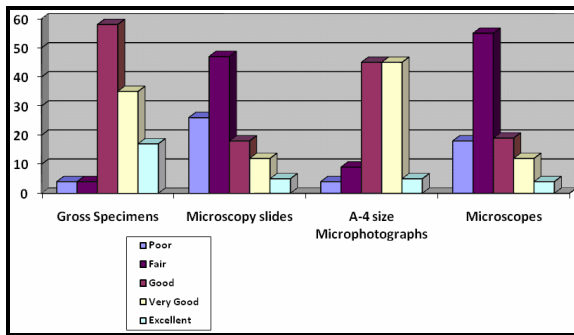
	Attributes	Poor	Fair	Good	Very Good	Excellent
Teaching material	1. Gross specimens					
	2. Microscopic slides					
	3. Microphotographs (A-4 size)					
	4. Equipment in Laboratory					
Teaching methods	1. Usefulness of LCD briefing by senior faculty					
	2. Interest generated					
	3. Scope for knowledge application during teaching					
	4. Relevance of teaching					
	5. Level of interaction with students					
	6. Use of 12 points guidelines for teaching slides/ specimens					
	7. Time Management during practicals					
Teachers	1. Knowledge base					
	2. Communication skills					
	3. Sincerity of purpose & commitment					
	4. Approachability					
	5. Usefulness of pre-practical briefing					

Other comments: _____

Results

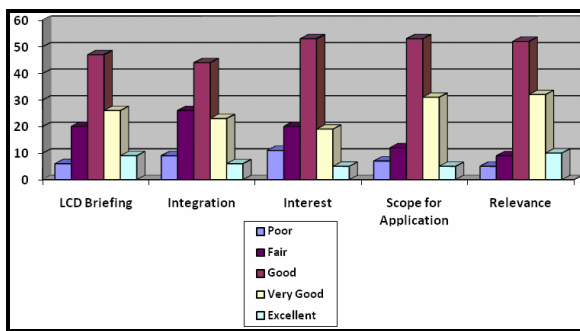
A total of 108 students out of a batch of 120 (response rate - 90%) and all eight tutors participated in the study (116/128 = 90.63%). The students' responses rating various attributes of the practical teaching programme are depicted in the tables following. [Table1, Table 2(a), Table 2(b), Table 3]

Table-1: Students' rating of the teaching materials used during practicals.



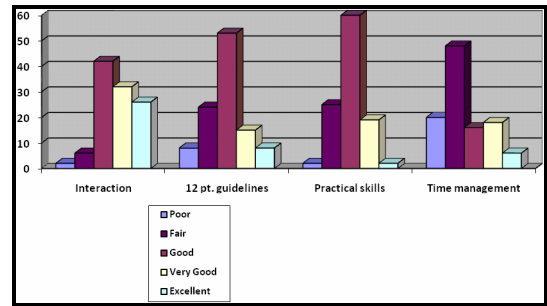
The gross specimens and microphotographs used in teaching were both rated as good to very good by more than 83% of those polled, while the microscopy slides and laboratory microscopes were each rated as poor to fair by more than 67% of the students.

Table-2(a): Students' rating of the practical teaching methods used.



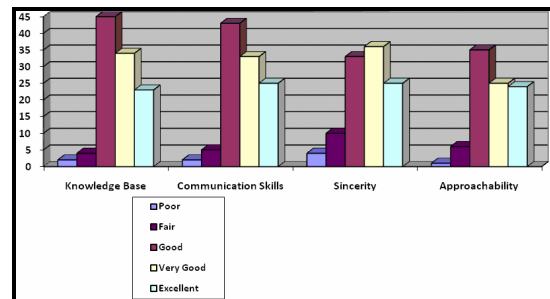
The level of integration with other subjects and interest generated during teaching were both rated as fair to good by more than 62% of the students, while more than 71% of the students rated similarly the use of 12-point guidelines and development of practical skills. Time-management during practicals was rated as poor to fair by 62.96 % of the students polled.

Table-2(b): Students' rating of the practical teaching methods used.



The usefulness of the LCD-aided briefing by senior teachers, scope for knowledge application during practicals, relevance and thoroughness of teaching were rated as good to very good by more than 67% of the respondents. A sizeable number of the students rated the student-tutor interaction as very good to excellent.

Table-3: Students' rating of the pathology practical teachers.



The teachers' abilities including knowledge base, communication skills and approachability were rated between good to very good by more than 70% of the students, while their sincerity of purpose and commitment was rated the same by 63.89% of the respondents.

Among the tutors polled, 62.5% (5/8) rated the sincerity of purpose and commitment of the teachers as excellent, while a similar number rated the usefulness of the pre-practical briefing of the tutors as very good to excellent. Also, 87.5% (7/8) of the tutors stated that the A-4 size microphotographs were very good to excellent and the LCD briefing by senior faculty and the relevance of teaching were good to very good. All the

tutors (8/8) agreed that the quality of the gross specimens used in teaching was good to very good; 75% (6/8) said that the scope for knowledge application during the practicals was good to very good and a similar number stated that the knowledge base of the senior teachers was good. The level of student-teacher interaction was rated as very good by 62.5% (5/8) of the tutors, and a similar percentage stated that the communication skills and approachability of senior faculty and the interest generated during teaching were good. A majority (87.50% - 7/8) of the tutors rated the microscopy slides, laboratory equipment and time management during practicals between fair to good. The use of 12-point guidelines for practical teaching elicited an interesting response - 37.5% (3/8) of the tutors gave it was a poor to fair rating while 50% (4/8) rated it as very good.

Discussion

The purpose of learning pathology is to understand the basis of the disease process, so that the medical student understands better the clinical manifestations and hence, the treatment of a condition. While learning pathology, a majority of time and energy is invested in understanding microscopic alterations in tissue morphology in a particular disease. Often, the average student fails to make the correlation between the cellular pathology he sees under a microscope and the gross lesions on mounted specimens in the museum. Only a handful actually make a connection between "pathology" they study and the resultant disease they see in the wards. We, in the Department of Pathology, decided to address this divide.

For the II year M.B.B.S. students (2011 batch) of KIMSU, a new approach to practical pathology teaching was designed and implemented so as to bridge the gap between the basic sciences taught at the beginning of medical school and the clinical subjects studied later. The process of "active learning" was encouraged. We aimed to make pathology, as a subject, interesting, easy to understand, interactive to learn and clinically relevant for study. Some of the prominent modifications introduced included –

- *Pre-Practical briefing* - Well in advance of each scheduled practical class, all the tutors were extensively trained using the same materials, including the 12-point guidelines, to simulate the actual practical. This probably accounts for the consistently high ratings the tutors received from their batches for their knowledge base and communication skills. The tutors themselves thought highly of the briefings as the teachers ensured that their understanding of the subject matter was in-depth and thorough.
- *Audio-visual aids* (LCD projectors, clinical photographs, photographs of gross specimens, topical power-point presentations etc.) - At the start of each practical session, the senior faculty-in-charge gave a LCD Powerpoint presentation-aided brief summation of the day's topic illustrated by digital images of the actual specimens and slides used in teaching and laid out the goals of the practical. These audio-visual aids increased interest and heightened perception among students, who later asked for more such usage during teaching, which explains the popularity of the LCD briefings by senior faculty among students and tutors alike in our survey. This differed from the findings of a similar study by Vamshi KT et al which concluded that technology-intensive instructional innovations like Microsoft PowerPoint did not cause increased student engagement in under-graduate classes and traditional pedagogy served this purpose more effectively [5]. PowerPoint presentations have been shown to be more acceptable to students than simple chalk and board lectures in some other studies [6-7].
- *Smaller groups*- A previous study has identified a non-threatening atmosphere and encouragement of independent thinking and problem solving as the most important characteristics of effective small groups [8]. Accordingly, the undergraduate students were divided into smaller groups and tutors were assigned to guide and help each group of students through the activities. As a result, the students in our survey almost unanimously reported better

approachability, increased communication and more fruitful interactions with their tutors.

- *Photomicrographs of slides* - Most undergraduate students get only a short period of time to actually view microscopy slides. Also, explaining microscopic pathology to a group is difficult with only a microscope to aid the teacher. To counter this, photomicrographs of the slides used in practicals were taken at scanner, low and high power views, enlarged (to A-4 size), laminated and made available to the students. This made microscopy both interesting and easy to review - leading to more confident 'reading' of the slides by the students, as evident in the good rating given to the use of the microphotographs by both the tutors and students. Also, in light of the old laboratory microscopes and the actual microscopy slides receiving a low rating from both tutors and students, the A4-sized microphotographs proved very helpful indeed.
- *Clinico-Pathological correlation* - During teaching, the correlation between normal anatomy and pathological alterations were emphasised and explained. Microscopic findings and the alteration in normal histology during pathological processes were delineated. The direct link between the microscopic changes that led to the gross lesion and consequent signs and symptoms was elucidated. The students were encouraged to build a clinical picture from their knowledge of the disease gained and both the tutors and students were encouraged to refer to relevant textbooks of the basic sciences and clinical medicine. The students' good rating of the scope for application of knowledge during practicals and relevance of teaching helped bolster our views. Yet, a large proportion of the students said that the integration with other subjects, the interest generated in the subject and the development of practical skills were only fair to good. We conclude that these areas probably required more work, planning of content and focused teaching on the tutors' part to get through to their wards.
- *Twelve point guidelines for studying specimens and slides* - We owe the idea of the '12-point guidelines' (Annexure 3) to the generosity of Dr. Shivayogi Bhusnurmath and Dr. Bharti Bhusnurmath, who have pioneered and lovingly honed the concept at their Department of Pathology, St. George's University, School of Medicine, St. George's, Grenada, West Indies and allowed us to use a modification of the same for our students. At the end of each teaching session, the undergraduates, as a group, prepared answers to a 12-point question set, a copy of which was given to each student at the beginning of the academic year and which covered all the aspects of the topic for the day - for eg. etio-pathogenesis, morphology of both the normal organ and the pathologic specimen, normal histology and the deviations during the disease process, the clinico-pathological correlation, investigations done to aid diagnosis, complications expected, list of differential diagnoses and preparation of a clinical vignette. Some of the students and the tutors rated the use of 12-point guidelines as a below average idea. Here, we must take into consideration that using the 12 points meant a lot of extra work for the tutors during preparation and the students during the practical hours. If a small sincere portion of the student/tutor population were excluded, the rest were naturally resistant to any activity that involved extra study and effort. Hence, probably the rating.

ANNEXURE-3

12-point Guidelines for studying specimens and slides in the Pathology Laboratory

1. Try and **Identify** the organ/tissue based on your knowledge of anatomy/histology. Explain the basis of your identification.
2. Discuss how the **structural features (Morphology)** are different from that of normal.
3. Based on the altered structure, make a **diagnosis of the pathologic (Disease) process**.

4. Discuss the main **Etiology**.
5. Discuss the **Pathogenetic mechanism** involved.
6. Discuss the other **Structural changes (gross and microscopic)** that are seen in this pathology/ disease.
7. Are there any **other sites** of involvement in the body?
8. Are there any **other diseases** where similar changes can be seen?
9. What ought to be the main **clinical features (Symptoms, Signs)** based on these structural changes? (List 2-3 features for each image.)
10. Can any **laboratory tests (Investigations)** be used to confirm the diagnosis or gauge the extent of damage? Are there any other diseases you have studied where such tests can be positive? (It is enough to mention 1 -3 common investigations that are useful.)
11. What is the **course** of this disease process? Are there any **complications**? How do you monitor for them? What is the usual outcome?
12. Develop a **clinical vignette** for the image.

Note: Answers to question nos. 1,2,3 are to be written in the journals. Answers to the rest of the questions are to be written on separate sheet, which are to be filed together.

We aimed to make the study process more fun and dynamic. However, this being a new concept, adjustment took a lot of time for both the students and tutors and the resultant time wastage during the limited practical hours caused a significant number of the respondents to rate time management during the practicals as fair to good.

Our study has some limitations. The small number of students involved makes it difficult to generalize our results. Furthermore, few students, having not taken the exercise seriously, may have desisted from expressing their frank opinions or criticizing their teachers and may not have answered the questionnaire objectively. Suggestions to improve teaching were asked for in the questionnaire but this section went largely unanswered. We did not include a question about the students' opinion regarding their grades in Pathology pre and post the teaching changes. The anonymity of the respondents was maintained and though the students' academic calibre may have influenced their responses, we could not explore an association between the opinions expressed and their current academic performance. This can be explored in future studies. We could not find studies assessing student attitudes to practical pathology in literature and so could not compare our findings to other studies.

Conclusions

In this study, we found that use of audio-visual aids, pre-practical briefings and formation of smaller groups for practicals were appreciated by the students. The A4-sized photomicrographs of the microscopy slides were particularly well-received. The exercises of clinico-pathological correlation and use of 12-point guidelines for study had a mixed response. The equipment used in teaching was plainly regarded as inferior, which is a lacuna that needs to be addressed. Also, time management during the practicals was rated below par. This system of practical teaching being new and therefore unfamiliar, the survey pointed out the need for more efficient temporal planning.

Thus, the new practical teaching approach has both encouraging aspects and others that need redoubled efforts both from the teachers' and the students' ends to achieve the objective of learning pathology. We plan to use this feedback to formulate improved practical teaching strategies for succeeding batches. Similar studies in other departments and medical colleges will provide a larger sample size and will be helpful in making recommendations for modifying the process of pathology practical teaching.

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