

Students' Perception of Present Teaching Method of Histology –A Study from Eastern Part of India

Sudipa Biswas*, Suranjali Sharma**, Soumya Chakraborty***

* Associate Professor. ** Assistant professor. ***Professor, Department of Anatomy, ESI-PGIMS and ESIC Medical College, Joka, Kolkata. West Bengal,, India

Abstracts: Background & Objectives: The purpose of this study was to get an idea about students' perceptions on present method of teaching histology. Methods: A cross sectional study was done with the help of both open and close ended questionnaire to get their view on the teaching method, its problems and the possible remedies. Results and interpretation: Most of the students responded (93.06%), and showed their eagerness towards studying basic histology in detail. They supported the idea of relevant theory classes before practical hours (95.7%) and use of pointers (85.1%). But some students (37.1%) have accepted difficulty in identifying slides due to different reasons like- insufficient time for revision, bad quality of slides etc. They suggested a few remedies like-more time for revision, revision assisted by digital technique, photograph of the slides, better quality of slides etc. Students, even after proper motivation, eagerness to study and with all available modalities as per present curriculum, were unable to identify slides well. Conclusion: This study provided useful information for the need of change in traditional methodology in teaching histology to more student friendly, time saving, and modern way of teaching learning histology. [Sudipa B NJIRM 2017; 8(5):61-66]

Key Words: Digital techniques, Histology, Students' perception, Traditional teaching method, Virtual slides and microscope,

Author for correspondence: Sudipa Biswas, Genexx Valley, Tower - 33, Flat -14 G, Diamond Harbour Road, Joka, Kolkata, WestBengal-700104, India. E-Mail:sudipa_biswas2003@yahoo.com M: 9836011390

Introduction: Medical histology is a basic science course during first year medical curriculum worldwide. Marie Fracois Xavier Bichat¹, now considered as the father of modern histology, was the pioneer in study of details of tissues as early as 1700 AD. Since then there have been lot of improvements particularly, during 20th century in histological techniques and slide preparation. These are developments in light microscopes and photo microscopy, which help in histology demonstration.

Since the last 25 years many universities have started using computer-based techniques such as virtual slides and 3 D microscope of moving cells with less use of traditional method of teaching by light microscopes². Virtual microscopy has become a widely used technology in medical education of pathology and histology worldwide³.

In India, most of the medical colleges still use traditional methods for teaching histology i.e., through lectures followed by practical demonstration of histology slides under light microscope (traditional Lecture-Laboratory-Review sequence) with a very few example of addition of modern technologies like using photomicrographs, digitization of slides or computer based techniques.

Basic knowledge of histology is needed for understanding not only the anatomy of a cell or tissue but also for further clinical applications. During the first year of medical education, histology is presented to the students in an easy form so as to make them identify the basic microstructures. Detailed knowledge of microanatomy is needed for undergraduate students though there is some limitation of time. Therefore the problem that arises with most of the students is difficulty in identification of slides and correlation of theoretical and practical knowledge. At times different measures are tried by teachers to solve the problems like, theory classes preceded by practical classes, use of pointers, LCD projection of same slide image in practical class rooms as shown under microscope, repeated slide demonstration, practice of drawing and periodic assessments etc. All these measures have some form of limitations and the students find it difficult to identify histology slides, even after acquiring good theoretical knowledge.

The question that therefore arises in mind is, whether studying histological slides by light microscope in traditional method is enough?

There are a few problems related to light microscopy and use of glass slides also like,

1. Maintenance of a large number of microscopes and slides for teaching purposes are quite expensive for the institution.
2. Variable quality of glass slides.
3. The slides made from human tissues are difficult to replace.

To overcome these issues many centers are using virtual microscopy in both histology and pathology training courses abroad. Although there is a general awareness about the problems in certain parts in histology for students, no in depth assessment has been done so far from eastern part of India to the best of our knowledge.

The present study aims at identifying the problems faced by students in histology practical classes and probable remedies.

Objectives:

1. To assess students' perception of learning histology by present teaching method.
2. To identify students' problems and their suggestions for improving learning of histology.

Methods: 101 undergraduate MBBS students of ESI PGI-MSR and ESIC Medical college, Joka, Kolkata, were included in the study. Study was conducted at the end of second semester examination in the year 2016. Ethical approval for this study had been obtained. The study involved pretested, self-designed, both open and close ended questionnaire which includes identification of problems in histology, reasons for problems and possible solutions for the problems. Students were given the questionnaire after briefing about it. Identities of the students were not asked to be revealed. They were informed that the information shared by them will be kept confidential and used for the purpose of research. Inclusion criteria were, students who were enrolled in 2015-2016 batch and who completed the questionnaire. The unsuccessful students from previous years were excluded from the study. Finally an anonymous perception survey was undertaken.

Statistical analysis:

- All statistical analyses were performed with the help of SPSS (Statistical Package for Social Sciences) version 20.0 (SPSS Inc., Chicago, IL)
- A measure used to assess the reliability, or internal consistency, of a set of scale or test items.

In other words, the reliability of any given measurement refers to the extent to which it is a consistent measure of a concept, and Cronbach's alpha is one way of measuring the strength of that consistency. Cronbach's alpha (α) value is 0.857; which is reliable. ($\alpha \geq 0.9$ Excellent, $0.7 \leq \alpha < 0.9$ Good, $0.6 \leq \alpha < 0.7$ Acceptable, $0.5 \leq \alpha < 0.6$ Poor, $\alpha < 0.5$ Unacceptable).

- Pearson's chi-square test was used to assess differences between frequencies observed in relation to the responses for a particular question
- Differences between an observation made in present study and related observations from previous studies were analysed with the help of Student's t test
- A p value < 0.05 was considered as statistically significant

Result: 94 among 101 students responded (93.06%) to all questions. 45.7% students agreed that histological slides help in understanding gross anatomy. Basic parts of microscope, basic preparation of slides and basic slide demonstration classes, were supported by 80.9% , 45.7% and 75.5% students respectively. All these values are statistically significant (p value=0.001). Therefore, it can be assumed that students are aware of the necessity of the basic knowledge of histology teaching.

Table-I: Assessment of basic knowledge of the participants regarding histology teaching

Questions in short	Response (%)
Histology helps in understanding gross anatomy	Yes- 43(45.7%), No- 22(23.4%), May be- 29(30.9%)
Study o basic parts of microscope	May be- 18(19.1%), Must be- 76(80.9%)
Study of basic preparation of slides and staining procedures	May be- 32(34%), Must be- 43(45.7%), May not be- 19(20.2%)
Basic slide demonstration classes	Must be- 71(75.5%), not needed- 2(2.1%), may be needed- 21(22.3%)
Demonstration of all the systems	Not needed- 6(6.4%), may be needed- 24(25.5%), needed- 64(68.1%)

55.3% students agreed that enough number of slides were there in curriculum but 29.8% were in favour of more slides. Regarding low power view and H & E

staining students' opinion was positive significantly (p value =0.001). They were even in favour of slides other than H & E staining (51.1%).

Table -II: Student's eagerness towards acquiring more/detail knowledge.

Questions in short	Response (%)
Number of slides	Not enough- 28(29.8%), enough- 52(55.3%), more than enough 14(14.9%)
Low power view	Not enough- 42(44.7%), enough- 32(34%), undecided- 20(21.3%)
Staining other than H & E	May be- 48(51.1%), must be- 27(28.7%), not needed- 19(20.2%)

Diagram 1: Revision Classes.

97.9% students supported revision classes

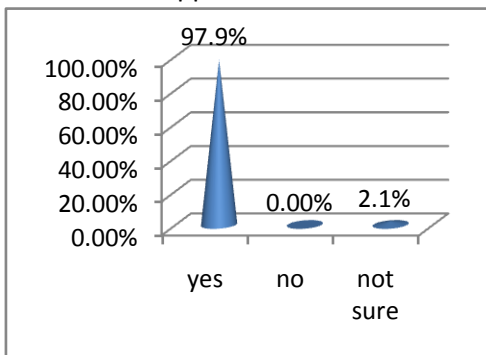


Table III: Student's idea of different measures

Questions	Response (%)
Theory classes before practical	Undecided- 4(4.3%), useful-90(95.7%)
Histology slides with pointers	Undecided- 14(14.9%), useful- 80(85.1%)
Drawing in practical copy	May be- 27(28.7%), must be- 49(52.1%), may not be- 18(19.1%)

Theory classes before practical demonstration have been supported by 95.7% students. Students welcomed the idea of using pointers (85.1%) and drawing in practical copy (52.1%). Values are statistically significant in all the cases (P-value-0.001) 81.9% students were in favour of assistance by teachers, during each and every slide identification.

Diagram 2: Assistance by teachers during each and every slide identification

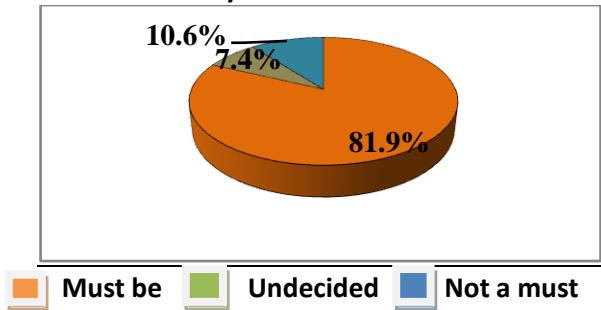
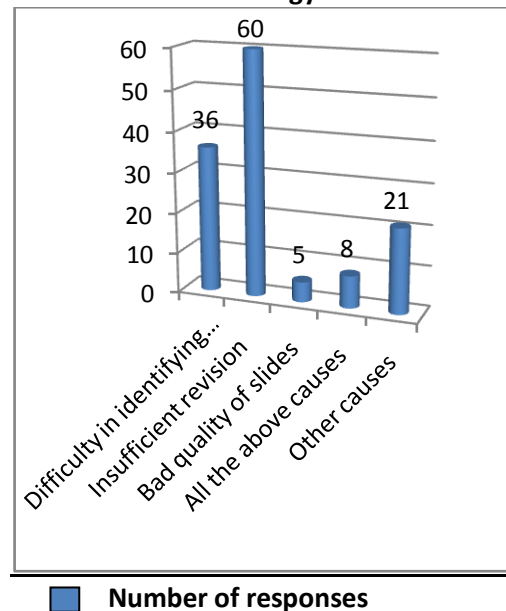
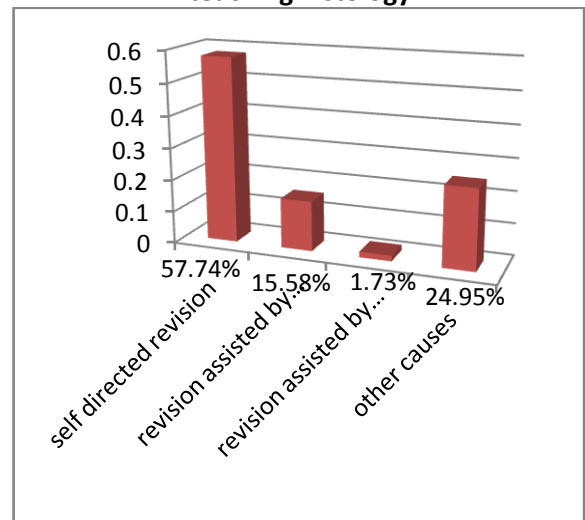


Diagram 3: Students' perception of problems in histology



Students enlisted a number of problems in histology like, difficulty in identifying tissue or cells-36(37.11%), insufficient time for revision-60(61.85%), bad quality of slides-5(5.15%) etc. e.g. (Diagram-3).

Diagram 4: Students' perception of improvement in teaching histology



Revision classes were very much in demand by altogether 75.05% students, which is much higher than all other causes (24.95%). {75.05=57.74% self directed revision + 15.58% revision assisted by teacher + 1.73% digital assisted revision} .e.g.(Diagram-4). They have suggested a few unique ideas also like, use of photographs of the same slides, use of day light, to allow them to take photographs etc.

Discussion: Number of respondents were quite high (93.06%) in our study as compared to the previous studies like study by Dr. Amar Jayanthi⁴, (93.2%) but in the study by B. Kramers et al in 2002⁵, only 34% responded. In other surveys the rates were on higher side like, 70.5%⁶, 88.7⁷ and in medical students 74%⁸.

Students were aware of knowing the importance of basic knowledge of histology which is important for understanding not only anatomy but also the next level of study in medical curriculum .e.g. (Table I).

As per Table II, 29.8 % students opined the number of slides shown in regular classes were not enough as compared to 3% in a study by Soley J T 2001⁶. 44.7% said low power view of slides was not sufficient and 51.1% opined H & E staining might not be enough. Most of the students are therefore, willing to study histology in depth and in detail but detailed knowledge of histology is beyond the scope of first year histology course due to shortage of time.

Students agreed that practical classes preceded by relevant theory topics were useful (95.7%) in our report. In comparison to this, reports from study by Kramer. B 2002⁵, only 9 % students demand for restructured lecture and 13.5% for more lectures. Similarly, in a more recent study by Rashmi Jaishwal, (2015)⁹, the same was 5.42% and 12.45%. It seems like theory classes are more or less already allotted sufficiently in our curriculum but there may still be a scope for restructuring them.

In a study by Dr.Amar Jayanthi ⁴, 93.2% participants suggested that discussion with faculty gives better understanding when nearing exams as compared to 81.9 % students in the present report. e.g. (Diagram 2) In our study 52.1% students (e.g.Table III) favoured drawing in histology classes on the contrary 38 out of 40 students in study by Dr. Amar ⁴, perceived

histology classes being filled with drawing lessons is of no use.

Use of pointers has been supported by 85.1% students in present study (e.g.Table:III) but 52% success rate of using pointers have been found by a study in JIPMER¹⁰.

As per diagram 3, as many as 37.11% students indicated difficulty in identifying structures on slides in present report which is quite high than previous study by B.Kramer,2002 ⁵ 8% . But in a different study in 2015⁹ the same was on higher side (77.51%). Therefore identification of structures on slides is still a problem in students.

Insufficient time for revision has been pointed out as one of the cause of failure by 61.85% students in the present report. In similar studies done previously students always marked insufficient time as one of the cause ^{6,9}. Time constraint is therefore a problem in which may be taken into consideration for better out come.

5.15% students said that bad quality of slides was the cause of their poor performance and in a similar study only 3% students demanded for better slides⁶. Therefore quality of slides is not a major problem but at the same time it is not very easy to maintain and also a costly issue.

Ideas for improving as cited by students were revision just before the exam ,revision with teachers guidance ,incorporation of digital techniques, audio visual aids etc. Apart from these, pointing out differences between identical looking slides, good quality of slides, more theory classes, use of photographs etc were suggested by students.

More time per slides was suggested by 10.39% student as compared to 13.5 % in previous study⁵.

Revision assisted by digital technique was suggested only by1.73% students in this study as compared to 11.5%⁶, in a different study and visual aids including models particularly 3-D were suggested by 48.06%⁹ in another study.

Some unique ideas suggested by students were use of day light, use of photographs of slides in classes and to allow them to take photograph of slides.

A variety of problems related to traditional histology teaching was therefore revealed but the main concern was to understand three dimensional structure and to manage time even after properly structured lectures, timely revision, using pointers, practicing drawing slides, using good quality slides etc.

To overcome these problems the concept of teaching histology is changing from traditional to modern techniques as already adopted by many centers abroad.

Harris et al, 2001¹¹, at the University of Iowa tested Virtual Microscopy to replace use of microscopes and the traditional laboratory sessions.

Cotter et al 2001¹², at the University of Buffalo used both computer applications and microscope exercises. Michelle McLean 2000¹³, evaluated students by using computer-aided instruction (CAI) in to traditional course with some success.

Tarig B et al 2011¹⁴, used live digital imaging (LDI) of microscopic slides on a SMART board to enhance Histology laboratory teaching. He showed increase in student's grade from 76 to 92%.

'The use of virtual microscopy is now an accepted and often integral part of teaching histology'- as said by Donnelly AD 2012³, and similar results in many more studies of same credibility^{14,15}

In a very recent study in 2015, by Berecca et al¹⁶, it has been concluded that combined use of optical microscopy and digital system leads to better performance as compared to digital system alone.

Innovative teaching methods and use of audio visual techniques are often suggested by teachers and academicians but the suitable strategies and the limitation of the curriculum of the particular topic along with the time management are not in use in all the centers in India.

In a study undertaken in JIPMER, Pondicherry¹⁰ digital images from slides were used in lecture classes as well as for subsequent student assessment. They have shown the new method as superior to older methods of teaching histology.

Conclusion: The present study conducted in ESI PGI-MSR and ESIC Medical college, Joka, Kolkata, West Bengal, India, identifies a wide range of problems experienced by students in traditional histology curriculum. They have successfully pointed out the problems as difficulty in conceptualizing 3-D structures of histology even after acquiring proper theoretical knowledge. Therefore the study lays a foundation for change in present system of teaching histology.

According to Vision 2020 by Medical Council of India, some modifications in existing curriculum have been proposed. In the same view, Dr. Vishram Singh¹⁷ and also Dr S k Nagar advised¹⁸, appropriate approach in teaching learning method by fulfilling students need also. Students' feedback has been always taken as an important criterion for maintaining teaching learning quality and professional development¹⁹.

Therefore, now may be the time for including modern technologies in the form of virtual slides, virtual microscopes, advanced audio-visual technologies, Computer based learning tools, use of a histology podcast or digitization of slides etc in traditional curriculum.

The new curriculum should be student oriented, time saving, self directed (as there is lack of teaching faculties), financially feasible (lack of fund).

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