

Original Articles

Light Microscope as a Teaching-Learning Tool in Histology Practical in Undergraduate Medical Education in Bangladesh- Students' View

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Abstract

Objectives: This study was aimed to find out the views of students regarding light microscope as a teaching-learning tool in Histology Practical class in undergraduate medical education of Bangladesh.

Methods: A cross sectional study was conducted from a period of one year. Data were collected from 1st year students of 10 medical colleges. A semi-structured survey questionnaire having multiple response answers was used for obtaining information from the students.

Results: A majority of the students figured out 'groups of students sharing one microscope' and 'difficulty to identify specific structures on slides' as their most encountered difficulty with microscopes and glass slides respectively.

Conclusions: Students facing difficulties with use of light microscope in histology practical sessions.

Keywords: Histology practical, light microscope

Introduction

Histology in the broader sense is devoted to the study of the micro anatomical structure of cells, tissues and organ systems. Cells in the body are organized into three dimensional structures called tissues, and tissues are combined in a variety of ways to make up the overall structures of organs and systems.¹ Studying histology with a curious eye and mind will improve the diagnostic and clinical abilities of medical students accordingly. In this regard Fawcett² says that a firm foundation in histology continues to be essential for recognizing and interpreting their changes in disease condition.

Practical and laboratory classes are often regarded as an essential component of science based courses.³ Anatomy courses are laboratory based and the laboratory is an outstanding small group,

faculty/ student interactive opportunity.⁴ Traditionally one of the major areas of laboratory teaching in the medical curriculum has been histology, where the light microscope has been the primary laboratory instructional tool.⁵

During practical session learners view microscopic slides under a light microscope with the guidance of a teacher and practical competence is being acquired by optical microscopy. The cumbersome process and limitations associated with the viewing of traditional microscopes and the problems of archiving, movement, and replacement of glass slides have become a challenge in the teaching of histology and also the assessment of student performance.⁶ In a traditional situation it is difficult to track learner's active participation and progress also. Ackermann⁷ stated that many learners do not attend the practicals and many learners also leave the practicals before the end. Microscopic slides only provides two dimensional information. Moreover, learner often waste a lot of time trying to find structures which may even be absent in a specific slide.

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If the hypothesis that histology is not a popular subject is true, we have to find out whether problem lies within the design or the delivery of teaching instruction. Along with this ways of improving the popularity of the subject should be sought out. The present study was aimed to find out the views of medical students regarding the of use of glass slide and microscope in the teaching- learning of histology practicals in the undergraduate medical education of Bangladesh.

Materials and Methods

A cross sectional descriptive type of study was conducted over a period of one year, January 2014 to December 2014. Data were collected from four government medical colleges and six non-government medical colleges of Bangladesh. Convenient sampling method was used. A total of 824 students of 1st year were enrolled in a survey, 484 from government and 340 from non-government medical colleges. A semi-structured questionnaire was used for data collection. In the questionnaire each variable have multiple response answers. The students were briefed about the questionnaire and necessary

clarification were provided by the researcher. The participants had to select one or more options from the listed answers. Data were processed and analyzed by using the SPSS software version 17. For each variable in the questionnaire, the frequency for each selection was calculated. Necessary permission was taken from the principals of the involved medical colleges. Consent was taken from each participant.

Result

Table I presents distribution of students by their opinion regarding the difficulties they had to face during handling microscopes. 77% students pointed at “groups of students share one microscope” as their main difficulty. 40% indicated “time constraint”, 25.4% mentioned “inhibits effective communication between teachers and students”, 21.8% felt “Inability to master microscopic skill”, 16.8% noticed “malfunction of microscope” as the reasons of difficulties. Only 5.2% have mentioned some other difficulties. These were “inadequacy of microscopes”, “defective microscopes”, “difficulty in focusing” etc.

Table I
Frequency distribution of selection of difficulties faced during handling microscopes by the students participating in the survey (n=824).

Given difficulty	Frequency of selection	
	Absolute	Percentage*
Groups of students sharing one microscope	620	77.1
Inability to master microscopic skills	175	21.8
Time constraint	3224	0
Malfunction of microscopes	135	16.8
Inadequacy of effective communication between teachers & students	204	25.4
Others	42	5.2

n=Number of participants

*The percentage frequencies do not add up to 100% as the respondents were allowed to choose more than one option

Table II
Frequency distribution of selection of difficulties faced during observing microscopic slides by the students participating in the survey (n=824)

Given difficulty	Frequency of selection	
	Absolute	Percentage*
Bad slides	134	16.8
Excessive time consumption	211	26.4
Difficulty in proper visualization	295	36.9
Difficulty to identify specific structures on slides	621	77.6
Slides not having the structure	108	13.5
Fear of breaking the glass slides	256	32.0
Others	50	6.3

n=Number of participants

*The percentage frequencies do not add up to 100% as the respondents were allowed to choose more than one option

Table II presents distribution of students by their perception regarding the difficulties they had to face during observing microscopic slides. 77.6% students figured out “difficulty to identify specific structures on slides” as their mostly faced difficulty, about 40% indicated “difficulty in proper visualization”, 32% indicated “fear of breaking the glass slides” 26.4% felt “excessive time consumption”, 16.8% mentioned “bad slides” as the reasons of difficulties. 6.3% have mentioned some other difficulties. These were “variation of slides”, “inadequate slide”, “less time provided to do the task”, “no similarity with book picture”, “unable to correlate with theory” etc.

Discussion

Most of the students pointed at “groups of students share one microscope” as their main difficulty regarding use of microscope. Large number of students and inadequate number of microscopes is the problem that lies behind. Side by side some felt that this procedure inhibits effective communication between teacher and student. Most of the students figured out “difficulty to identify specific structures on slide” as their mostly encountered difficulty regarding use of microscopic slides. Some respondent felt it was too much time consuming to find out specific structures. Similar

disadvantages were figured out from the study of Ackermann.⁷ Actual microscopy slides receiving a low rating from both tutors and students.⁸

According to Cotter⁹ learning histology in this way, i.e. by direct examination of actual specimens is time consuming and viewed by some as unnecessary. Study findings of Holaday et al¹⁰ demonstrate a strong preference of medical students of University of Michigan for studying histology with electronic rather than traditional learning resources. In a study that was done by Heidger et al¹¹, learner were provided with light microscope, virtual microscope, web based histology images and video disc atlas and CD Rom. It was found that only 8% of learners chose the microscope as their study aid.

Study findings of Anyanwu⁶ showed that > 78% of the participants agreed that they were having problems with the present method of studying histology through traditional microscopy. Such dissatisfaction could arise from reasons such as insufficiency of glass slides, problems associated with moving microscopes around, difficulty of acquiring microscopy skills etc. Comments on course evaluation indicating that the students were hesitant to use microscope slides for fear of breaking them and incurring replacement cost.¹² All those

findings are in accordance with the present study findings.

Analyzing the outcome of the survey interviewing students of medicine and dentistry at the university of Jena found that only about 5% of the students regularly use the microscope for independent study although microscopes are constantly available to them.¹³ That reflects the above described minor significance of the light microscope compared to other learning media showing that students are turning away from classical work with the light microscopes.

Conclusion

The students experience technical and practical difficulties in mastering the use of microscopes and microscopic slides in histology practical class.

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