



THE COMPARISON OF DIFFERENT ASSESSMENT TECHNIQUES USED IN PHYSIOLOGY PRACTICAL ASSESSMENT

Physiology

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ABSTRACT

Background: A new competency-based medical undergraduate curriculum has been made by the National Medical Commission (NMC) initiating in 2019. Practical exercises which are application-oriented are recommended in this new curriculum among the Pre- and Para clinical subjects. In an attempt to improve the physiology practical assessment in our institution, and following the new competency-based medical curriculum, the spotting and clinical-based question assessment methods were introduced along with the other conventional assessment procedures like Hematology Practical, Graph and charts, and Clinical Examination in the first year of the medical curriculum. **Aims and Objectives:** The purpose of the present study was to see the relationship between the scores obtained by medical students in different methods during various evaluations in the first year of medical college and to explore gender differences in student scores among the varied assessment program used in Physiology practical assessment. **Materials and Methods:** A cross-sectional study was conducted on 125 undergraduate medical students at the Department of Physiology, Regional Institute of Medical Sciences, Imphal during the period between December 2021 to January 2022. Five different practical physiology assessment methods namely Hematology practical, Clinical examination, Graphs, and charts, spotting, and lastly clinical-based question assessment methods were used to determine the mean student scores. **Statistical Analysis:** The data collected were entered into IBM SPSS 26.0 version (IBM Inc. Armonk, NY, USA) and analysed using descriptive statistics. Statistical significance was set at p -value < 0.05. **Results:** 125 students (male 72, female 53) in the age range of 18 – 23 years participated in the study. The mean score of Graphs and Charts marks was the highest while students (12.26) scored lowest in the Clinical based question assessment method (9.31). The female students scored significantly higher marks in spotting and clinical-based questions. **Conclusion:** There was a significant variation in the marks obtained in different assessment techniques. The gender differences in the average scores were not significant at conventional methods like haematology practical, graphs and charts, and clinical examination

KEYWORDS

Physiology, practical examination, undergraduate curriculum

INTRODUCTION:

A uniform and reliable practical evaluation of medical students is always desirable. The examination should be effective to assess knowledge comprehension, skills, motivation, and feedback.¹ Assessment has the potential to motivate students and hence influence their learning in a number of ways. Successful completion of an assessment may be rewarding for some students, while having some control over the process of assessment may be motivating for others.² The aim of the present study was to see the relationship between the scores obtained by medical students in different methods during various evaluations in the first year of medical college. This study was meant to give us an idea to explore gender differences in student scores among the varied assessment program used in Physiology practical assessment.

MATERIALS AND METHODS:

A cross-sectional study was conducted on 125 undergraduate medical students at the Department of Physiology, Regional Institute of Medical Sciences, Imphal during the month from December 2021 to January 2022.

The assessment techniques included hematology practical (HP), clinical examination (CE), graphs and charts (GC), spotting (S), and clinical-based questions (CBQ). In HP, the students were asked to perform a small laboratory exercise using a blood sample, like counting blood cells or staining smears. This is not necessarily done in front of the examiner and was followed by an oral question-answer session (viva voce). In CE the students were asked to clinically examine and elicit signs in a given subject. The idea was to test the techniques of doing a clinical examination of various systems. The examiner evaluated the psychomotor skills and asked relevant questions. In GCs, some diagrams, charts, and graphs were given to the student to explain. The Spotting or Spot examination constitutes a series of stations exhibiting microscopic slides, images, instruments used in practical examination with arrows and tags pointing to specific structures (popularly referred to as "spotters"). At each station, specific questions are then asked about where the pin is placed so as to identify a structure; and a question related to that structure e.g., types of the action potential, structure of plasma membrane, etc. A typical spot examination comprises 10 stations each lasting 1 minute and each with

an A and B part. In CBQ, questions based on clinical cases are given to the students, and students are asked to either give the probable diagnosis or explain the physiological basis of the symptoms of given cases. A total of twenty marks were allocated to each type of assessment procedure.

Statistical analysis:

The data collected were entered into IBM SPSS 26.0 version (IBM Inc. Armonk, NY, USA) and analysed using descriptive statistics. The mean and standard deviation of marks obtained in all exercises were calculated. Tukey's test of multiple comparisons at 5% interval based on observed means was done to individually compare the result of the different methods of assessment (Table 1). The comparison was done between any two groups at a 95% confidence level (p < 0.05 is significant). An independent sample t-test was used to compare the gender differences in the scores obtained.

RESULTS:

125 students (male 72, female 53) in the age range of 18 – 23 years participated in the study. The mean of marks obtained in different assessments is shown in figure 1. The mean score of Graphs and Charts marks were the highest while students scored lowest in the Clinical based question assessment method.

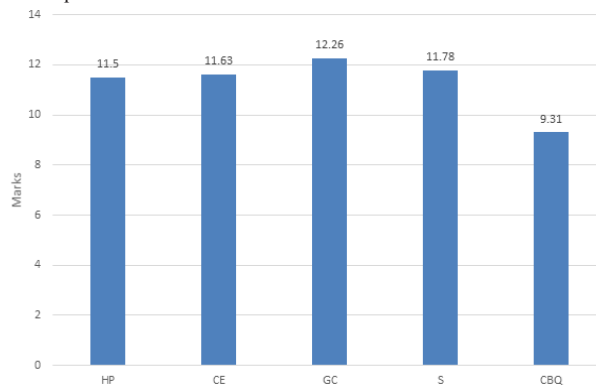


Figure 1. Marks of Different Assessment Methods

(# HP, CE, GC, S, and CBQ represent marks of hematology practical, clinical examination, graph and chart, spotting, and clinical-based assessment methods. Maximum marks =20)

Table 1. Comparison between different assessment methods.

	GC	CE	S	CBQ
HP	0.583	0.004*	0.003*	0.216
GC		0.002*	0.871	0.686
CE			0.314	0.965
S				0.000*

The p-value of the difference between the observed means of various assessment methods. * p<0.05 is significant. HP, CE, GC, S, and CBQ represent marks of hematology practical, clinical examination, graph and chart, spotting, and clinical-based assessment methods

Comparison of hematology practical with graph and charts and other assessment methods

The similarity of marks was seen between HP with GC and HP with CBQ scores. All other comparisons showed differences. (Table 1)

Comparison of graphs and charts with clinical examination, spotting, and clinical based question assessment method

The GC marks were different from corresponding CE marks. However, the similarity was seen between marks of GC with spotting and clinical-based question.

Comparison of clinical examination with spotting, and clinical based question assessment method

CE marks were similar to marks from S and CBQ.

Gender differences in different assessment methods

The average scores of hematology practical, clinical examination, graph, and charts marks were similar in both sexes. However, female students scored significantly higher marks in spotting and clinical-based questions as shown in table 2 below.

Table 2. Gender differences in different assessment methods

Assessment methods	Male (n= 72) Mean ± SD marks	Female (n= 53) Mean ± SD marks	P-value
HP	11.24 ± 2.47	11.86 ± 2.15	0.560
CE	11.49 ± 2.59	11.81 ± 2.83	0.759
GC	12.44 ± 1.32	12.01 ± 1.26	0.280
S	11.39 ± 6.03	12.32 ± 4.92	0.055*
CBQ	8.71 ± 5.41	10.13 ± 4.51	0.027*

HP, CE, GC, S, and CBQ represent marks of hematology practical, clinical examination, graph and chart, spotting, and clinical-based assessment methods. * p<0.05 is significant.

DISCUSSION

In an attempt to improve the physiology practical assessment in our institution, and following the new competency-based medical curriculum,⁴ the spotting and clinical-based question assessment methods were introduced along with the other conventional assessment procedures like HP, GC, and CE in the first year of the medical curriculum. We wanted to see the relationship between marks obtained in different forms of evaluation.

Our first observation was a significant variation in the marks obtained in different assessment procedures. The mean score of Graphs and Charts marks were the highest while students scored lowest in the Clinical based question assessment method. This may be because of the fact that the various assessment methods assess the different capabilities of the students.³ Also, because of the ongoing pandemic of COVID 19, most of the classes were done online affecting more on early clinical exposure classes.⁵⁻⁶ Therefore, students have scored lowest in the clinical-based question assessment method.

The comparison of HP with other forms of the assessment showed a consistent similarity to GC, and CBQ and a variation with CE, and S. GC marks were different from the corresponding CE marks. However, CE marks were similar to S and CBQ scores. This similarity in the scores maybe because we are testing the same domain in the knowledge and skills of the students. Lack of correlation among different forms of assessment shows that we are testing different things. We must however keep in mind that there is no gold standard for assessment and so we cannot say which method is better.⁷ The criterion of a good examination includes validity, reliability, objectivity,

practicability, relevance, and promotion of learning, power to discriminate between students, relaxed environment, and positive student feedback.⁸ Mahajan A et al⁹ also observed no correlation between varied forms of assessment.

In this study, among the conventional methods like HP, CE & GC, there were no significant gender differences. However, in spotting and clinical base questions which primarily evaluated the knowledge (cognitive domain), the female scored comparatively higher values. This implied deficit of knowledge (cognitive domain) among male students, as compared to their female counterparts. Other studies¹⁰⁻¹⁴ from varied geographical areas have also reported that female students performed significantly better, as compared to male counterparts.

CONCLUSION

Practical physiology performance more specifically the clinical-based question assessment method was affected because of the covid pandemic. The results of the study also revealed that female students obtained significantly higher average scores in spotting and clinical-based question (that primarily evaluated cognitive domain) but the gender differences in the average scores were not significant at conventional methods like hematology practical, graphs and charts, and clinical examination (which also assess the psychomotor domain in addition to the cognitive domain).

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