

Comparison of Structured Viva Examination and Traditional Viva Examination as a Tool of Assessment in Biochemistry for Medical Students

Ayaz Khurram Mallick^{1*}, Ayyub Patel²

¹Associate Professor, Department of Clinical Biochemistry, College of Medicine, King Khalid University, Abha, KSA.

²Assistant Professor, Department of Clinical Biochemistry, College of Medicine, King Khalid University, Abha, KSA.

***Corresponding author**

Dr. Ayaz Khurram Mallick

Associate Professor

Department of Clinical Biochemistry

College of Medicine King Khalid University Abha.

Kingdom of Saudi Arabia

Abstract

Context: Traditional viva exams (TVE) has high subjectivity and low reliability as they are not conducted uniformly. Structured viva examination (SVE) brings uniformity in the viva, remove bias and provides conducive atmosphere to the students

Objective: To compare students' assessment by structured viva examination (SVE) and traditional viva examination (TVE) and study the perception of students and faculties towards SVE.

Methodology: Comparative educational study was done after ethical consideration. Hundred students consented of which nine dropped out. As there were three examiners, 91 students were divided into three groups: A (32), B (29) and C (30). Examiner A, B and C conducted TVE in their respective groups. Following this, sensitisation of faculty and students towards SVE was done. Same examiners then conducted SVE using pre-validated questions and checklists. Feedback from students and faculty were obtained using pre-validated five-point Likert scale questionnaire. Significance of mean was analysed by paired t test. P value < 0.05 was considered significant.

Result: Of the three examiners, mean marks given by Examiner C in SVE (8.9±2.8) and TVE (7.8±1.5) varied significantly (p=0.046). Over 85% of the student preferred giving SVE as would help them prepare and score better. All faculty agreed that SVE was a fair method of assessment but low faculty strength and time management could limit its use.

Conclusion: SVE may be considered as a preferred tool of assessment as it minimises bias, reduces inter-examiner variation and motivate students to prepare well for viva.

Running title: Structured viva examination as an assessment tool

Key message: Assessment drives learning. Validity, reliability, feasibility are some core components for an effective assessment. Subjectivity, bias and non-uniformity are few methods which hinders viva assessment. Therefore, bringing uniformity and objectivity not only increases the reliability and validity of viva examination and also encourages students to perform

better.

Oral examinations or viva-voce is an integral part of assessment for medical students for years. The viva-voce method of assessment was defined by Joughin^[1] as an "assessment in which a student's response to the assessment task is verbal, in the sense of being expressed or conveyed by speech instead of writing". Viva voce is preferred because it offers flexibility, has a high face validity, and ability to test those aspects of clinical skills that cannot be assessed in written examination.² However, there are a few challenges faced in viva examination. Traditionally, viva examination in most of the Indian medical colleges is a one on one interaction between the student and the examiner where the examiner poses questions to the student which he has to answer. Hence high subjectivity, intimidating atmosphere, nervousness of students, inter-examiner variation in terms of questions and biases are some of the factors which challenges the reliability and validity of traditional viva examination (TVE).^[3,4] Therefore, increasing objectivity by structuring the viva can make viva assessment fair and reliable. Structured viva exam (SVE) can bring uniformity in the difficulty level of the question, remove bias (topic, student, previous performance) and provide conducive atmosphere to the students thus reducing their anxiety and nervousness. Thus, SVE being a novel concept with very limited studies done especially in the Biochemistry subject, the present study was done with an aim of making viva examination structured for some selected topics in biochemistry and its introduction as a tool for assessment tool for first year MBBS students.

An educational study was carried out at Rohilkhand Medical College and Hospital after obtaining IEC clearance between November 2017 to March 2018. Hundred first year MBBS students were enrolled in the study after obtaining their informed consent. As there were three examiners, these students were randomly divided into three groups; Group A, B and C having 33, 33 and 34 students respectively. However, during the period of the study, nine students dropped out therefore group A had 32 students, Group B had 29 and Group C had 30. The students of the three groups were subjected to traditional viva examination (TVE) by Examiners A, B and C respectively. The viva carried 15 marks and the syllabus for the viva was announced 10 days prior. The marks obtained were recorded. Following the TVE, all the students and faculty were sensitized regarding structured viva examination. All queries and doubts regarding it were cleared. After sensitization, syllabus for the structured viva was announced 10 days in advance. Two sets of questions with their answer key were made which was subjected to peer review and modified accordingly. The questions were arranged based on their difficulty with recall-based question initially to synthesis and analysis questions at the end. Structured viva was conducted on the students of three groups by the same examiners using the pre-validated questions and marking was done as per the checklist. Following the viva examination, students and examiners feedback towards SVE was taken using a pre-validated questionnaire consisting of five-point Likert scale and open-ended questions. Statistical analysis of the data was done using SPSS 23.0. The marks obtained by both the methods of viva were analysed using paired 't' test for significance. P value of less than 0.05 was considered significant.

Of the 100 students enrolled in the study 9% of the students dropped out hence the response rate was 91%. The mean marks given by the examiners to the students in traditional viva and structured viva are summarized in table 1. The marks given by examiners A and B in both the viva methods

were comparable. However, there was a significant variation in the marks given by examiner C ($P = 0.046$). The mean marks given by examiner C in SVE was 8.9, ranging from 2.5 to 13.5, as compared to mean marks of 7.9 ranging from 6.0 to 10.5 in TVE. Feedback regarding the structured viva was obtained using both open ended questions and five-point Likert scale-based questionnaire. The validity of the questionnaire was checked using Chronbach's Alpha which had a score of 0.88 which indicated that the questionnaire was valid. The responses of faculties and students are summarized in table 2, figure 1 and 2 respectively. Almost all the students felt that the atmosphere of the structured viva examination was conducive for assessment. Over 80% of the students felt that the questions covered the entire syllabus and were easy to understand and also opined that they would prefer SVE over TVE as it removes bias, helps them to prepare better and score better marks. About 25% of the student felt that more time should have been given to answer the questions in the viva. All the examiners felt that the marks given in structured viva was fair and that SVE would be a better method of viva examination. However, they also opined that SVE was a time-consuming process and would be more effective with more examiners. They also felt that SVE limits the role of an examiner and does not allow in-depth analysis of the student.

Medical education can be challenging as it is not limited to knowledge alone but also requires a student to develop attitude, psychomotor and communication skills. In order to assess all the domains of learning, one cannot rely on a single assessment method. It is in this view that a medical student is subjected to multiple modes of assessment such as theory examination, practical or clinical examination, internal assessment and viva-voce is a comprehensive way.^[5] Of these oral examination or viva-voce examination are appealing because it gives the

examiner an opportunity to assess a student's depth of understanding and their ability to express it in a defined manner. Viva voce provides flexibility and if used correctly has the potential for testing higher cognitive skills.^[6,7] It is thought to be a particularly effective way of assessing the clinical decision-making skills or what has been termed "the cognitive processes which constitute professional thinking".^[8,9] Thus, the oral exams format enables an assessor to assess the students on all the cognitive domains of Bloom's taxonomy starting from knowledge, comprehension, application, analysis, synthesis and finally evaluation.^[10]

Despite all this, maintaining the reliability and validity of viva examination can be challenging. This is not due to the viva examination per se but by the way in which it is carried out. Traditional viva examination in most of the medical colleges is a one on one interaction between the student and the examiner where the examiner poses questions to the student which he has to answer. The atmosphere during the traditional viva examination is often intimidating which becomes even worse due to anxiety and nervousness of the student. Knight et al^[11] in their study addressing the issue to anxiety mentioned that although Davis et al reported there was no evidence that viva examination was more stressful than any other type of examination, Arndt et al, Pearce et al and Sayce et al reported students indeed had high degree of pre-viva anxiety. Anxiety and nervousness can have an adverse effect on performance which was also reported by Mellanby et al.^[12] Traditional viva

examination tends to be very subjective. Quality of oral examination is affected by inter-examiner variations and inability to cover the syllabus. The questions are mostly recall type rather than

those which test the higher cognitive levels such as analytical and problem-solving ability of the students. Non-uniformity of the questions in terms of difficulty level, also affects the fairness of the assessment of the students. Moreover, personal biases and sometime carry over effect i.e, previous student's performance affecting the marks of next student, are likely to happen during traditional oral examination. These factors tend to make the viva examination less reliable and at times unfair. [2,13]

In order to make the viva examination valid, reliable and fair it is necessary to replace the traditional viva by a structured viva examination. Structuring a viva examination requires pre deciding the syllabus to be covered, the competencies to be measured and preparing a blueprint or checklist of questions to be asked. Though this process is tedious and time consuming initially, but once adopted it can increase the reliability and validity of viva assessment. [13] Structured viva examination can ensure better coverage of the syllabus, assess

the students for different levels of cognitive domain, minimize the luck factor, remove the bias and importantly remove the inter-examiner variation thereby increasing the reliability of viva examination.

One major factor challenging the reliability of viva examination is its non-standardization. [14] Different examiners conduct the viva in different ways. Their preferences, nature, mood, strictness, bias, fixed mind set are bound to affect the assessment process. This leads to inter-examiner variation during TVE. In this study the students were first subjected to TVE by three examiners. The same examiners then conducted SVE using a pre-decided questions and checklist. As seen in table 1, there was significant variation in the marks given by Examiner C. Low range of marks indicates that the examiner has a preference for giving marks within a narrow range. However, while conducting SVE and using a checklist, the marks given by the same examiner was not only higher but also showed a wider range. Giving marks within a narrow range leads to poor differentiation of students' performance. Therefore, SVE minimizes the inter-examiner variation and can also be a very effective tool to differentiate low scorers and high achievers.

An evaluation of students' feedback towards SVE revealed that they would prefer SVE over the TVE (figure 2). As all the students are assessed on the same sets of questions it makes the examination fair and meaningful. Many of the students preferred SVE as they were less anxious during the viva and also felt that there would be no bias. Their opinion that SVE would encourage them to learn better substantiates that assessment drives learning. Another encouraging outcome from this study was the examiners response towards SVE which was mostly positive.

Although structuring the viva examination improves the validity and reliability of viva examination there are few concerns which was highlighted in this study. Structuring the viva examination itself would be challenging. More resources in terms of manpower, space and time would be required to conduct a successful SVE. A major challenge in structuring a viva examination would be creating a question bank with a checklist. Scrutiny of the questions for ambiguity, preparation of questions of varying levels of difficulty based on Miller's pyramid and item analysis are some essential steps for preparation of question bank. During the SVE, segregation of students is a crucial step in order to maintain the confidentiality of the questions during the assessment. Updating the question banks is also essential to avoid repeating

questions in subsequent viva examination. The limitations in this study is that it was carried out in just one department. Similar study needs to be carried out in different subjects and topics in order to come to a concrete conclusion.

Conclusion

The findings of this study suggest that standardizing the viva examination by structuring it would increase its reliability and validity. It would also help to assess the student's varying levels of learning and thus differentiate them based on their cognitive abilities. Although there are challenges in terms of preparing question banks, segregation of students during viva examination and training of faculty, but once they are overcome, SVE would provide a fair, uniform and unbiased platform for assessment of students.

Acknowledgments:

We would like to thank all the students and faculty members who participated in this study. We would also like to especially thank Mr. Muhammad Abid Khan, Department of Medical Education, College of Medicine, King Khalid University, Abha, for data analysis.

References

1. Joughin G. A short guide to oral assessment: Leeds Met Press in association with University of Wollongong; 2010.
2. Torke S, Abraham RR, Ramnarayan K, Asha K. The impact of viva-voce examination on student's performance in theory component of the final summative examination in physiology. *Journal of Physiology and Pathophysiology*. 2010;1(1):10-2.
3. Alam MS, Begum T. Evaluation of structured oral examination format used in the assessment of undergraduate medical course (MBBS) of the University of Dhaka. *Ibrahim Medical College Journal*. 2015;9(1):1-10.
4. Ghosh A, Mandal A, Das N, Tripathi SK, Biswas A, Bera T. Students' performance in written and viva-voce components of final summative pharmacology examination in MBBS curriculum: A critical insight. *Indian J Pharmacol*. 2012;44(2):274-5.
5. Haque M, Yousuf R, Baker SA, Salam A. Assessment in undergraduate medical education: Bangladesh perspectives. *Bangladesh Journal of Medical Science*. 2013;12(4):357-63.
6. Davis MH, Karunathilake I. The place of the oral examination in today's assessment systems. *Med Teach*. 2005;27(4):294-7.
7. Khilnani AK, Charan J, Thaddanee R, Pathak RR, Makwana S, Khilnani G. Structured oral examination in pharmacology for undergraduate medical students: Factors influencing its implementation. *Indian J Pharmacol*. 2015;47(5):546.
8. Schickler A, Brüstle P, Biller S. The Final Oral/Practical State Examination at Freiburg Medical Faculty in 2012--Analysis of grading to test quality assurance. *GMS Zeitschrift für medizinische Ausbildung*. 2015;32(4):Doc39-Doc. PubMed PMID: 26483852. eng.
9. Ganji KK. Evaluation of reliability in structured viva voce as a formative assessment of dental students. *J Dent Educ*. 2017;81(5):590-6.
10. Bloom BS. *Taxonomy of educational objectives. Vol. 1: Cognitive domain*. New York: McKay. 1956:20-4.
11. Knight R-A, Dipper L, Cruice M. The use of video in addressing anxiety prior to viva voce exams. *Br J Educat Tech*. 2013;44(6):E217-E9.
12. Mellanby J, Zimdars A. Trait anxiety and final degree performance at the University of Oxford. *Higher Education*. 2011;61(4):357-70.
13. Shenwai MR, Patil KB. Introduction of structured oral examination as a novel assessment tool to first year medical students in physiology. *Journal of clinical and diagnostic research: JCDR*. 2013;7(11):2544.
14. Hashim R, Ayyub A, Hameed S, Ali S. Structured viva as an assessment tool: perceptions of undergraduate medical students. *Pakistan Armed Forces Medical Journal*. 2015;65(1):141-4.

Tables

Examiner	Examination	Marks given (Maximum marks 15)			Significance (P value)
		Minimum	Maximum	Mean (SD)	
Examiner A	Traditional Viva	1.5	13.0	8.6 (2.8)	NS
	Structured Viva	4.0	14.5	8.3 (2.8)	
Examiner B	Traditional Viva	4.0	12.0	8.9 (2.5)	NS
	Structured Viva	1.5	13.5	8.5 (2.7)	
Examiner C	Traditional Viva	6.0	10.5	7.8 (1.5)	= 0.046
	Structured Viva	2.5	13.5	8.9 (2.8)	

Table 1: Table showing minimum, maximum and mean marks given by the three examiners

in structured viva and traditional viva with significance determined by paired 't' test. P value less than 0.05 is significant.

Table 2: Table highlighting the common responses given by the students and examiners regarding structured viva examination

Students' perception towards structured viva (n= 91)	Faculties' perception towards structured viva (n=3)
Positive response	
"Every student was asked same question and given same time, hence no partiality" "Pressure and anxiety were less" "This type of viva should be held regularly"	"It removes bias or partiality" "Students get direction for what to study and how to study" "Tests all student on equivalent scale"
Negative response	
"Enough time was not given to answer"	"Time consuming hence requires good faculty strength" "Restricts the examiner to limited number of question and does not allow in depth analysis"

Figures

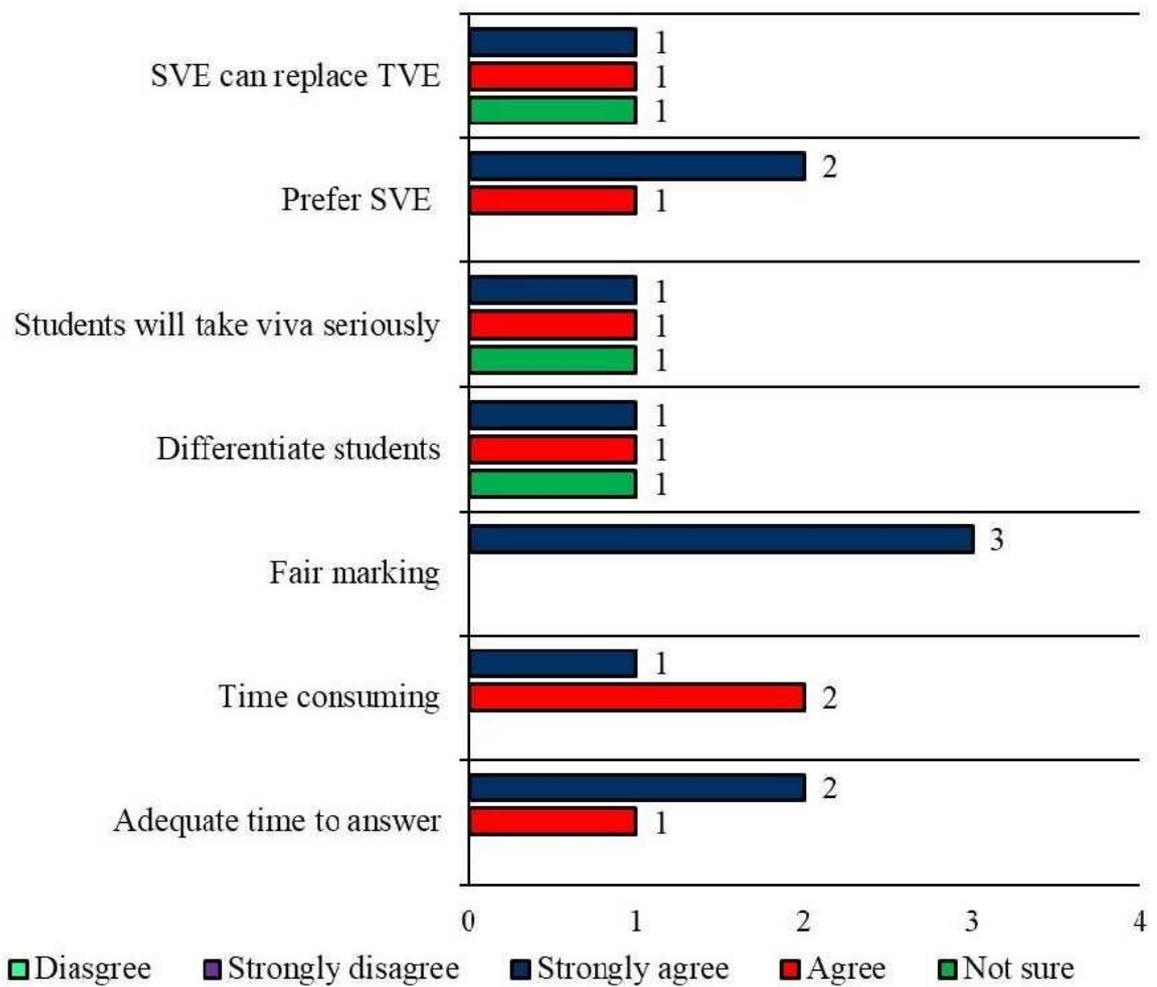


Figure 1: A graph showing the response of faculty to the five-point questionnaire on structured viva (n = 3)

