STRUCTURING THE UNSTRUCTURED: NEW DIMENSION IN VIVA ASSESSMENT FOR ANATOMY

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ABSTRACT

Introduction: Assessment methods of students undertaking medical curriculum has always remained debatable. There are continuous attempts to make assessment more objective and reliable. There has been a shift in the paradigm, where traditional methods such as essay type questions are giving way to newer objective methods in the form of multiple choice questions and short answer questions. The pre clinical undergraduate students are still being assessed in Human Anatomy using the Conventional Viva Examination (CVE) technique in most of the medical schools in India posing risk of examiner bias, non uniformity and variable difficulty level which affects validity and reliability. With this background a need felt to introduce Objective Structured Viva Examination (OSVE), an analogue of Objective Structured Practical Examination (OSPE).

Aim and Objectives: To evaluate Objective Structured Viva Examination versus Conventional Viva as an assessment tool for the undergraduate medical students in Human Anatomy and to study students' and faculty perception regarding both these assessment methods.

Materials and Methods: Fifty two undergraduate students were assessed by CVE followed by OSVE as a part of their formative examination. Student's feedback was obtained using five point Likert scale to assess their perception about both the assessment methods. Students' performance and responses were analysed using SPSS.

Result and Conclusion: Students average scores in OSVE were significantly higher than CVE. OSVE was found to be highly sensitive but less specific. OSVE emerged as a better tool in terms of assessment as well as from the student's point of view.

KEY WORDS: Human Anatomy, Conventional viva, Objective Structured Viva Examination, Assessment, Viva voce.

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INTRODUCTION

In the face of global economic competition, the success of a nation depends on knowledge, skills, and competencies possessed by the young generations. The students should be equipped with the desired competencies that will enable them to think strategically and apply their theories in practice for the betterment of the country [1]. One of the most critical aspects in

the spectra of education is assessment, which not only explores an individual's critical thinking but ensures the quality of the curricular activities [2]. The role of assessment extends from examining the performance of students to facilitating their continuous learning via relevant feedback and prospect of improvement [3]. Ingrained with strength and weaknesses, all the practices of assessments aim at unveiling the

processes that might foster imminent learning [4]. To encourage the advancement of students in the field of academia, the summative assessment organized at the end of course is now being supplemented with formative assessment. Summative assessment emphasizes on judging the overall competence, qualification to practice and intelligence quotient of learners while formative assessment is a proactive approach to augment the learning capabilities of the students through feedback [5].

As stated by Bell and Cowie [6] "Formative assessment is the process of appraising, judging or evaluating students' work or performance and using this to shape and improve students' competence" Formative assessment promotes the students in improving their skills, knowledge and competencies with continuous learning, instead of categorizing students on the basis of 'pass' or 'fail'. In medical education, as asserted by Wormald et al [7] assessment is an entity that drives learning among the learners. The ultimate purpose is to intrinsically motivate the students to seek knowledge and also raise their bar of learning. The shift in paradigm, where traditional methods such as essay type questions are giving way to newer objective methods in the form of multiple choice questions and short answer questions. As far as practical assessment of Human Anatomy in Indian medical schools is concerned, viva voce continues to play a major role and is subjective, posing the risk of examiner bias, non-transparency, low validity and reliability. It is therefore essential to explore new assessment methods which are objective, more reliable and valid. The current research therefore, evaluates the status of Objective Structured Viva Examination in undergraduate Anatomy curriculum as an assessment tool in comparison with conventional viva.

Aim To evaluate Objective Structured Viva Examination versus Conventional Viva as an assessment tool for the undergraduate medical students in Human Anatomy.

Objectives: To compare Objective Structured Viva Examination (OSVE) with Conventional Viva Examination (CVE) as assessment methods. To study the perception of students' and faculty regarding Conventional Viva examination and Objective Structured Viva Examination as a tool

of assessment.

MATERIALS AND METHODS

Study Design: Experimental study.

Ethical Considerations: The current study is approved by Institutional Research and Ethics committee. Study Population: First year undergraduate Medical students at B.J Government Medical College, Pune (2016-2017)

Sample size: Fifty two students.

Inclusion Criteria: self volunteered students. The purpose of the study was explained to the students and a written consent was obtained from them.

Study Protocol: The Faculty conducting OSVE were sensitized and trained accordingly while the faculty conducting conventional viva were kept blinded regarding OSVE. A detailed Blue print was prepared by subject experts.

Questions pertaining to dissected cadaveric specimen, Osteology and Radiology were considered. The questions were designed so as to represent the learning objectives from the region covered in Gross Human anatomy. The questions were further sub structured into 'must know, good to know, and nice to know' types.

The model answers and the marking scheme were pre validated and finalized unanimously by examiners. Appropriate check list containing model answers with marking scheme was prepared for each student and provided to all examiners.

At the end of teaching Gross Anatomy of Head Neck Face region students were exposed to CVE followed by the OSVE on the same day. Both these viva were conducted for twenty five marks each. CVE was conducted by the faculty in the way it is usually conducted in the University examinations.

During OSVE all the students were exposed to the same set of questions and were given equal time to answer them. Examined students were strictly isolated from the students yet to be examined.

An anonymous feedback using five point Likert scale to assess the examinees' perception and their level of satisfaction regarding both the assessment methods was obtained.

Model answers to the questions asked in OSVE with detailed feedback of their performance were provided to the students.

Faculty views regarding both assessment techniques were considered.

Data analysis: The mean academic scores obtained in both CVE and OSVE was compared using paired t-test where $p < 0.05$ was considered significant. Responses obtained from the students in relation to both these assessment tools were analyzed using SPSS version 20. The median score for both CVE and OSVE were compared and analysed using Wilcoxon signed rank test where $p \leq 0.05$ was considered significant.

RESULTS

Fifty two students participated in this study and faced both CVE and OSVE marks secured in CVE ranged between 0 and 22 and in OSVE between 1.5 and 24 respectively. Among the fifty two students, thirty eight students (73%) secured above passing scores (50%) or above while fourteen students (27%) failed to achieve the same in the conventional viva assessment. Seventeen students (33%) achieved scores between 60-80 percent and three students (6%) achieved above 80 percent

In contrast, in OSVE only 5 students (10%) failed to achieve the passing score. Out of the forty seven passing students twenty three (44%) of them secured scores between 60-80 percent and nineteen students (37%) scored above 80 percent, as shown in Figure 1, 2 and 3.

Fig. 1: Percentage of Students' passing and failing in CVE.

Fig. 2: CVE- Distribution students' Scores.

Fig. 3: OSVE- Distribution students' Scores.

The mean academic scores for CVE and OSVE were 14.5 ± 3.89 and 17.55 ± 4.05 respectively. The scores obtained by the students in both these assessments when compared using paired t-test revealed $p = 0.001$ ($p \leq 0.05$) indicating statistically significant difference in the marks by two techniques (Figure 4).

Fig. 4: Box plot Comparison of marks in VIVA 1 (CVE) and VIVA 2 (OSVE).

Fig. 5: Scattered Plot- correlation between CVE and OSVE.

Fig. 6: Sensitivity and specificity of OSVE.

SENSITIVITY AND SPECIFICITY			
TEST	GOLD STANDARD		TOTAL
	D+	D-	
T+	36	11	47
T-	2	3	5
TOTAL	38	14	52
95% CI			
SENSITIVITY	0.95		
SPECIFICITY	0.21		

At the end of each assessment, student's feedback was obtained using five point Likert scale (1- Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree, 5-Strongly Agree). The median score of responses given by the students for each statement for both CVE and OSVE were analysed and compared using Wilcoxon signed rank test where $p \leq 0.05$ was considered significant (Table-1).

Table 1: Students' feedback: Comparison of Conventional Viva Examination with Objective Structured Viva Examination.

Serial Number	Questions	Median Score CVE	Median Score OSVE	p- value
1	Examiner's mood affects scores given to examinee	4	2	0.001
2	There are no chances of personal bias	2	4	0.001
3	Peer student's performance affects the scores given	4	2	0.001
4	The gender of examinee/examiner affects scores given	4	1	0.001
4a	Examiner of opposite gender has a positive impact on scores given	3	2	0.001
4b	Examiner of opposite gender has a negative impact on scores given	3	2	0.002
5	There are chances of denial of equal opportunity to all examinee (number and difficulty level of questions asked, time given to each student)	4	2	0.001
6	Constructive feedback was given to the students examinee	2	4	0.02
7	Evidence of students performance is maintained	2	5	0.01
8	The syllabus was not adequately covered.	3	1	0.001
9	Sufficient time was given to answer the questions	3	4	0.472
10	Flexibility to assess in depth knowledge of examinee	4	4	0.684

Table 2: Students' feedback: Comparison of Conventional Viva Examination with Objective Structured Viva Examination.

Rate the method of assessment	Very poor	Poor	Fair	Good	Very Good
CVE	7.50%	22.60%	45.20%	23.70%	1.10%
OSVE	-	1.40%	2.70%	57.50%	38.40%

Table 3: Feedback from the faculty members.

Conventional viva examination (CVE)
1. Easy to conduct (no ground work is needed).
2. The assessment method offers lot of flexibility for the examiner in order to judge the comprehensive knowledge of the students about the subject.
Objective Structured oral examination (OSVE)
1. Reduces bias and minimizes anxiety and fear.
2. Uniformity of questions making it a fair assessment tool.
3. Monotony of asking same questions to all the students especially for large population, this can be avoided by more sets of questions and checklists with properly adjusted difficulty level of the questions need to be created.
4. More effort and cumbersome (for preparation) but worth the positive and fair impact on students' performance.

Table 4: Comparison: Conventional viva and Objective structured viva Examination.

	CVE	OSVE
1 Type	Subjective	Objective
2 Structured	Un structured	Highly structured
3 Blue print and Check List	Not prepared	Essential
4 Questions asked and Time given to each student	Variable	Uniform
5 Question wise Marking scheme	Not defined	Well defined and uniform
6 Questioning pattern	Variable - questions may not be	Uniform- questions are strongly
7 Evidence of Student's performance	Questions and	Record of questions
8 Fear of Bias	Present	Absent
9 Effect of Peer Performance	Peer performance	Peer performance
10 Reproducibility	Not reproducible	Reproducible- question bank can be generated.

DISCUSSION

Viva voce or oral examination is an ancient method of evaluation where a face to face interview of the learner is taken by the examiner. Viva as a tool for evaluation helps test attitude and professional competence, interactive skills, ability to take decisions, discuss and defend. It has been advocated for the practical assessment at preclinical, para-clinical, clinical levels and for formative or summative assessment in medical curriculum. The criterion of a good examination includes validity, reliability, objectivity, practicability, relevance, and promotion of learning, power to discriminate between students, and to provide a positive student feedback [8]. Oakley and Henchen.C [9] determined that conventional oral examinations are less reliable and valid as an assessment tool, and more time consuming in offering a valuable learning experience to the students. The validity and reliability of oral examinations can be increased by the use of structured, standardized orals and by training examiners. Objective structured clinical examination was first introduced in medical education by Harden in Scotland in 1975 [10] and later on objective specific practical examination (OSPE) for Para clinical subjects [11]. In Anatomy practical assessments, role of OSPE is very limited as psychomotor skills can be assessed in few domains like living surface anatomy and clinical anatomy. As per Maharashtra University of Health Sciences, in the formative and summative examinations, ten percent of total practical marks are allocated to spots and eight percent to living anatomy while almost eighty two

percent of marks are attributed to viva voce. We therefore chose to introduce and investigate the effectiveness of OSVE as a tool of formative assessment to the undergraduate medical students.

Fifty two students participated in this study and faced both CVE and OSVE in Anatomy for twenty five marks each. The range of marks obtained in both assessment methods was almost same suggesting the two viva methods are almost parallel and moderately but statistically significantly correlated $r = 0.55$ ($p=0.001$) (Figure-4). The mean scores obtained in OSVE was 17.55 ± 4.05 which is significantly high ($p=0.001$) when compared to CVE (Figure 4) The study also highlights that with the same level of preparation OSVE put the students to a higher pedestal with a passing rate of 90.4% and 36.5% students scoring above 80% (Figure 1, 2 and 3) as against CVE where passing rate was 73.1% and number of students achieving scores 80% and above were only 6%.

Shaikh et al [12] have also reported higher mean scores when students were tested in Physiology by OSVE as against conventional viva. The objective and non bias nature, as well as no fear for examination/examiners can be the contributing factors for this disparity. Similar studies conducted to compare the performance of students under the two assessment regimes have claimed that the students' perform better under the objective structured program rather than its traditional counterpart. For instance, in the study conducted by Rehman, et al [13] in physiology and study by Ranjan et al [14] in Anatomy revealed that the students attained significantly higher scores in OSPE than the ones who appeared for the viva voce.

In another study conducted by Gor et al [15] the results portrayed that while the unstructured viva was associated with an average score of 5 among the students, the structured on the other hand showed a much higher score of 9. The reasons quoted by them for an enhanced performance among the OSVE students compared to the CVE assessment were owing to the specificity of the questions asked along with the enhanced ability of the students to put in efforts due to the lack of fright of facing the examiner. In the study by Shaikh [12] the failure

rate among the OSVE students was found to be much lower at 9% as opposed to an approximate 27% failure rate among the CVE students. A similar finding was also reported by Rehman, et al [13] Their results showed a 60% failure rate among students who appeared for the traditional viva examination, while a much lower 8–38% failure among the students tested with the OSPE method in various modules tested.

Sensitivity is an indicator to identify candidates passing the examination while Specificity is an indicator to identify candidates failing the examination. Our study establishes that OSVE is 95 percent sensitive but 22 percent specific when compared to traditional viva method. Therefore OSVE is better at predicting a pass in the examination than a failure.

The research also sought to comprehend the perceptions of the students regarding the traditional viva examination as compared to the Objective Structured Viva Examination. Previous researchers have strongly highlighted the significance of considering the perceptions of students in order to gain useful insights for carrying out reforms aimed at improving the quality of teaching and assessment methods [16] The major areas included were factors related to the examiner (gender, mood), peer students' performance, overall process of examination details (number of questions asked, time given to each student, syllabus covered). In the current study students assigned a median score of 4 out of 5 to the OSVE regarding the claim that the assessment tool is associated with no chances of personal bias, as opposed to a score of 2 to the CVE. In close association with this claim, the OSVE was also reported by the students to be free of any affect from the examiner's mood on the marks given to the examinee, which was the case under the CVE. CVE is criticised for the chances of carry over effect and for lack of equal opportunity given to the students in terms of the difficulty level and time allotted. As opposed to this, the OSVE was regarded at a better position (median score of 2 versus 4) given the fact that it offers a uniform set of questions to be completed within a specified time. Another major finding revealed by the results was the claim that the gender of the examinee/examiner being a significant factor

that affects the scores of the students in CVE. (Table 1) The overall rating assigned by the students to the two sets of assessment techniques showed drastic differences with the OSVE coming up as a better assessment tool. This can be understood by the results indicating that as opposed to a meagre 1.1 percent of the students rating CVE as 'Very Good,' a substantial 38.4 % regarded OSVE as 'Very Good.' While the largest share of students i.e. 45.2 % regarded CVE under the category of 'Fair' while 57.5% of them assigned the category of 'Good' to the OSVE as this method was more objective, allowing constructive feedback to be given to the examinee and evidence of student's performance was maintained.

Awaisu et al [17] in their study among the Malaysian students also reported that the students assigned a higher rating to the OSCE as an assessment tool over the traditional examination, advocating its increased use. On the other hand, as asserted by Khilnani et al [18] difficulties in structuring viva from the entire syllabus, rigidity of time limits, knowledge content and monotony for the teachers are some of the limitations of structured viva. It has been observed offering verbal/nonverbal clues to the students, leniency, and knowledge of examiners are some of the means that disrupts the effectiveness of conventional viva system. Another disadvantage of CVE is that the time duration taken to evaluate the performance of the students is unequal, where usually the students appearing first for viva are asked more questions as compared to those appearing last. With different examiners having different questions of varied difficulty level, this method fuels the possibility of uncertainty and chance. The strengths and weakness of both assessment methods are summarized in Table 4.

In addition to the students, the researchers also considered the opinion of faculty members under its purview. The discussion revealed that the faculty members hold the belief that the CVE assessment technique does not require any ground work on the part of the teachers and is much easier to conduct than the OSVE technique. Further, they indicated that flexibility is the greatest advantage of CVE technique over the OSVE. This is primarily related to the ability

of the teachers conducting the traditional viva examination to cover up a multitude of topics and concepts in order to assess the comprehensive knowledge of the students about the particular subject. On the other hand, the Objective Structured Oral Examination (OSVE) was applauded for its ability to reduce the prevalent bias noticed under the traditional examination technique. This can also be seen in the claim made that the OSVE is considered to be a fair assessment tool as it gives out a standard and uniform set of questions to all the students, as opposed to the different set of questions asked to each student under the traditional viva examination. The monotonous process of asking the same or similar set of questions to a large number of students can be replaced with a properly planned set of questions catering to the difficulty levels. The preparation of question sets may appear slightly cumbersome to the faculty initially, however later it serves as a reference question bank. A major point reported by the faculty members was the absence of any anxiety or fear among the students under the OSVE, which is often regarded as the greatest limiting factor for better performance of the students under the traditional method of examination or CVE.

CONCLUSION

The present research was aimed at comparing objective structured viva examination and Objective structured viva examination as an assessment tool for the undergraduate medical students in Human Anatomy. The results presented in our study thus indicate the number of students successfully passing the examinations is reported to be high with higher percentage scores in the OSVE. The overall outlook of the students towards the assessment techniques revealed that the students assign a greater value and favourability to the OSVE. The research also cites the faculty members who assign several positive points to the OSVE over the CVE, and consider the former as a fair, bias-free, and a valid assessment tool. This was an initiative taken by the researchers and an extensive study will be continued in future. Viva voce is an important tool of evaluation in verbal assessment and an objective structured approach can make it an effective & efficient

tool of evaluation and can be implemented for assessing students at all levels of medical curriculum. A good OSVE can be conducted by advanced planning, pre-validation and feed-back.

Limitations: The present study was conducted in a batch of students. More work is required to implement successfully the structured viva format into the medicine curriculum.

ABBREVIATIONS

OSVE – Objective structured viva examination

CVE – Conventional viva examination

OSPE – Objective structured Practical examination

OSCE – Objective structured clinical examination.

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Conflicts of Interests: None

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