

## An Investigation on the Impact of Series of Small Group Oral Examinations on Student Performance in Pharmacology among Second Year Medical Students

Prakash Krishnan<sup>1</sup>, Sanitha Kuriachan<sup>2</sup>, Sancy Mary Sam<sup>3</sup>, Naga Guhan<sup>4</sup>, Thilak Sura Anjanappa<sup>5</sup>

<sup>1</sup>MBBS, MD, Professor, Department of Pharmacology, Believers Church Medical College, Thiruvalla, Kerala, India

<sup>2</sup>MBBS, MD, Associate professor, Department of Pharmacology, Amrita School of Medicine, Amrita Institute of Medical Sciences, Amrita Vishwa Vidyapeetham

<sup>3</sup>Associate Professor, Department of Pharmacology, Al Azhar Medical College, Thodupuzha, Kerala, India

<sup>4</sup>MBBS, MD, Assistant Professor Department of Biochemistry, All India Institute of Medical Sciences, Mangalagiri, India

<sup>5</sup>MBBS, MD, Professor and Head, Department of Community Medicine, Viswabharathi Medical College, Kurnool, Andhra Pradesh, India

Received: 25-08-2023 / Revised: 28-09-2023 / Accepted: 30-10-2023

Corresponding author: Dr. Sanitha Kuriachan

Conflict of interest: Nil

### Abstract:

**Background:** Traditional, summative viva ineffectively imparts deep knowledge. This study assessed the impact of conducting a series of group viva on pharmacology learning.

**Methods:** After the first and second internal assessment (IA), students attended a series of 84 group viva voce sessions during the revision hours followed by a third internal assessment in pharmacology. Student performances were grouped as poor (<50%), good (50-75%) and excellent (75-100%) based on first and second IA written exam marks. The marks scored by students in written internal assessment exams (Pre and post group viva) and university exams were analysed retrospectively.

**Results:** The mean written exam scores (out of 40 marks) of first (M1), second (M2) internal assessment, first paper (M3) and second paper (M4) of third internal assessment were 15.97±5.72, 25.60±5.77, 22.36±5.59 and 22.64±5.30 respectively. The mean pre and post viva written exam scores were 41.57±10.36 and 45.00±10.42 respectively (out of 80 marks). The mean scores Post viva of written exam (M3 + M4) was statistically greater than pre viva (M1 + M2) for all the students across all categories except excellent performers. Students' achievement in university exams post viva was noteworthy. About eighty-eight percent of pre-viva poor performers improved to become good performers in university examinations, and 12% excelled as well; 76.3% of good performers became excellent. There were no poor performers in university exams.

**Conclusions:** Conducting a series of group viva voce had a positive impact on student performance in pharmacology.

**Keywords:** Group Viva Voce, Formative Assessment, Revision, Learning, Written Exams, Traditional Theory Viva Voce.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Irrational prescriptions can lead to therapeutic failure and negative patient outcomes. Theoretical and practical instruction in the concepts of rational prescribing is necessary to enhance the prescribing knowledge and skills of newly graduated medical professionals.[1] Rational treatment strategies require a deep understanding of pharmacology. But the existing evaluation format of a written exam, a practical exam, and traditional theory viva voce does not challenge students enough to learn. Viva

voce is used in medical education, clinical exams, and doctoral defences to assess deep knowledge, but its conventional summative, unstructured format has often made it unproductive.[2,3] In India, each student is currently required to participate in a theory viva by four examiners taken separately, with just three to five minutes allotted to each station. Since the viva voce is mostly summative in nature, the input students get from examiners may not be helpful in expanding their

comprehension of the subject matter. [4] Multiple restrictions apply when a viva is held for each student individually during a session. Traditional oral examinations have been called into question due to issues like the "halo effect," "subjectivity," "drift from the main topic," "non-uniform coverage of topics in a given time," and "influence of various academic and non-academic factors," that include the knowledge, attitude in terms of leniency and provision of prompts or clues, and mood of the faculty. Inadequate assessment and feedback for some applicants might also result from unequal time allocation due to factors like exhaustion. [5-7]

Viva voce can be utilized for not only assessment but also for training the students without succumbing to the forementioned flaws of traditional oral examinations. [8-10] By conducting viva voce in small groups, all students can be sequentially evaluated for their depth of knowledge profundity. [11] Group viva voce can be designed in such a way that even wrong responses can be used as guides to link related concepts and clarify ambiguous aspects. The topics covered in each session can be limited to enhance student readiness and coverage. Compared to traditional one-on-one viva, group viva has the flexibility to delve further with the same number of students and time. [12,13] A systematic and logical approach to the questions can also be used to subtly suggest a learning approach to the subject. In conducting viva in a group setting, it makes room for deeper inquiries from the instructors and reduces repetition. Students can benefit from actively listening to their peers' responses in a group setting. This gives the student the chance to observe how others structure and communicate their concepts. Thereby, depth and breadth of knowledge become readily apparent to oneself. [11] This training and evaluation strategy may persuade them to take a more effective learning method. [12,13] Group viva voce can be a valuable component of a constructive teaching methodology as it promotes collaboration, critical thinking, communication skills, and active learning. [14]

There is, however, a relative paucity of published literature looking into the scope of group viva as an educational tool. Hence, the study was aimed at determining the effectiveness of group viva voce as an educational tool in pharmacology and in general.

## Methods

This retrospective analysis of data on group viva voce intervention conducted in the Department of Pharmacology, in a medical college, was done after obtaining approval from the institutional ethics committee. Retrospective analysis of data of a series of group viva voce interventions involved evaluation of the marks scored by students in formative (three internal assessments) and

summative assessments (University examination) after they had been implemented.

Second year MBBS students of admission year 2014 (N = 72) who appeared in all the pharmacology internal assessment exams and participated in group viva voce were included in the study. The study period was from September to December 2016. Students who were absent for any of the internal assessments were not considered for the analysis (n = 5).

## Planning and Conducting of Group Viva Voce:

At the end of the 3rd semester in April 2016, students took their first internal assessment (M1). They finished the fourth semester and the second internal assessment (M2) in August 2016. By the end of September, we had completed all the necessary lectures and labs. Since the M1 and M2 performances of students fell short of expectations, we, faculty were compelled to take corrective action. Viva was selected as it would help students recall and convey the concepts in their own words. Since we needed to take viva for 77 students in one hour and cover the full topic, we opted to hold viva in groups. Consequently, between September and December 2016, group viva voce sessions that covered pharmacology theory topics were administered prior to the third internal examination (M3 and M4) in January 2017. In February 2017, students attended the final university examination for four subjects: pathology, pharmacology, microbiology, and forensic medicine after a two-week break. The final university examination was evaluated externally.

In this intervention, group viva-voce was conducted as a long, structured oral assessment of pharmacology topics in small groups of phase- two medical undergraduates. A comprehensive list of theory topics in pharmacology was divided into 84 sessions. The date, time, topic, teacher, and venue of the viva voce were all notified well in advance to the students.

Seventy-seven students (the full batch) were divided into four-six groups of about 13-20 each. Each group's viva was conducted by one instructor. Teachers took turns rotating between groups to ensure that all students were exposed to them. Throughout the series of group viva voce, students within the groups remained almost constant. Most sessions lasted 30 minutes, with only a few lasting 60 minutes. The teacher posed the question to each student individually.

The teacher gives appropriate verbal feedback to the students based on their responses. If they do not answer the question, the next student in sequence got the opportunity to do so. During the session, there was no interaction between students. The responses were not graded as the viva voce was

conducted as a teaching aid rather than an evaluation instrument.

#### Data Collection and Analysis:

After obtaining ethics committee approval, we accessed and analyzed the data of the three internal assessment marks and university exam marks of the students. Based on First and Second internal assessments (IA) aggregate score (pre-intervention), students were grouped into Poor (less than 50%), Good (50–74.9%), and Excellent (75–100%).

The pre-viva written exam scores were labelled as M1 (first IA) and M2 (second IA), and the post-viva written exam scores were designated as M3 (first paper of the third IA) and M4 (second paper of the third IA). M1 and M2 represent pre-viva written examination scores, while M3 and M4 represent post-viva written examination scores. In M1 and M3, the same portions were assessed. Likewise, in M2 and M4, the same portions were assessed. All the internal assessment marks (M1, M2, M3, and M4) were out of 40, and aggregate scores (M1+M2, M3+M4) were out of 80. The university exam score, which is the sum of theory and practical exams, was out of 150. Using paired t tests, the scores of the students before and after the

group viva voce were compared. A p-value less than or equal to 0.05 was considered statistically significant. SPSS 21.0 software was used for all statistical analysis.

#### Results

Seventy-two Phase 2 medical undergraduates participated in the study. There were 23 males and 49 females, and their mean age was  $19.5 \pm 1.3$  years. The mean written exam scores M1, M2, M1+M2 (pre-viva marks) and M3, M4, M3+M4 (post-viva marks) were  $15.97 \pm 5.72$ ,  $25.60 \pm 5.77$ ,  $41.57 \pm 10.36$ ,  $22.36 \pm 5.59$ ,  $22.64 \pm 5.30$ , and  $45.00 \pm 10.42$  respectively (Figure 1). There was a statistically significant increase in marks in all groups except M4. The students were categorized into three groups based on their first and second IA written exam marks: poor performers (<50%): 32 students (44.4%); good performers (50–74.9%): 38 students (52.8%); and excellent performers (75–100%): 2 students (2.8%).

The mean post-viva scores (M3+M4) were greater than the mean pre-viva scores for all the students across all categories, and they were statistically significant among all the categories except excellent performers (Table 1). The results were similar for M3 and M1.

**Table 1: Category wise distribution of pre- and post-viva internal exam marks**

Categories	Internal Assessments	Mean±SD	P value
Poor Performers (n=32)	Pre Viva-Score (M1+M2)	31.69±4.59	0.003*
	Post Viva- Score (M3+M4)	36.28±7.48	
	M1	11.16±3.79	<0.001*
	M3	17.94±4.56	
	M2	20.53±3.76	0.016*
M4	18.34±3.61		
Good Performers (n=38)	Pre Viva-Score (M1+M2)	48.92±5.50	0.004*
	Post Viva- Score (M3+M4)	51.53±6.25	
	M1	19.47±3.48	<0.001*
	M3	25.68±3.33	
	M2	29.45±3.36	<0.001*
M4	25.84±3.64		
Excellent Performers (n=2)	Pre Viva-Score (M1+M2)	60.00±0	0.80
	Post Viva- Score (M3+M4)	60.50±2.12	
	M1	26.50±2.12	0.090
	M3	30.00±1.41	
	M2	33.50±2.12	0.374
M4	30.50±0.71		

The mean written exam marks of the second paper of the third IA (M4) were lesser than the second IA (M2) for all the students across all categories, and they were significant statistically among all the categories except excellent performers (Table 1 and Figure 1).

Figure 1: Distribution of pre- and post-viva internal exam marks

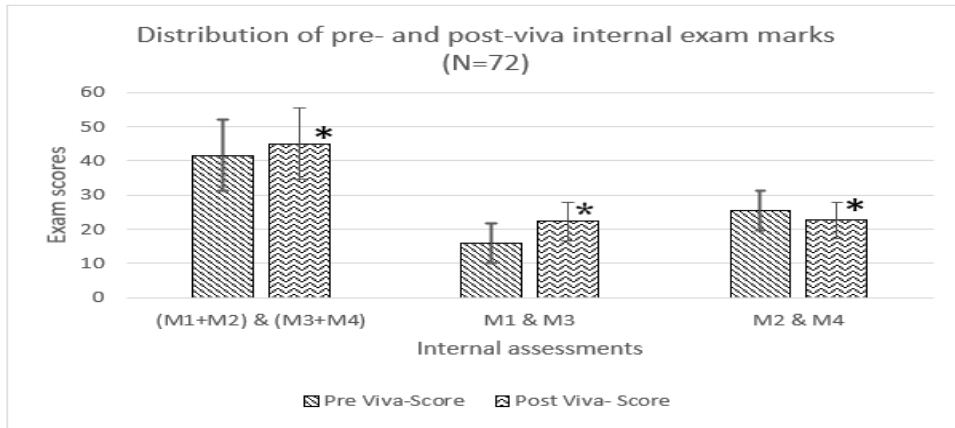


Figure 1:

Similarly, university exam marks were significantly higher than pre-viva marks for all the students across all categories except excellent performers (Table 2). Students' achievement in university exams was noteworthy (Table 2). About eighty-eight percent of pre-viva poor performers improved to become good performers in university examinations, and 12.5% excelled as well; 76.3% of good performers became excellent. There were no poor performers in university exams (Figure 2).

Table 2: Category wise distribution of percentage marks of pre- viva IAs versus summative university exam.

Categories	Pre Viva-Score (M1+M2) marks percentage (mean±SD)	University Exam marks percentage (mean±SD)	P value
All Students (N=72)	51.96±12.95	73.77±7.69	<0.001*
Poor Performers (n=32)	39.61±5.74	67.71±5.82	<0.001*
Good Performers (n=38)	61.15±6.87	78.39±5.17	<0.001*
Excellent Performers (n=2)	75±0	83.0±2.35	0.13

Figure 2: Student distribution based on performance in pre-viva IA and University examination marks.

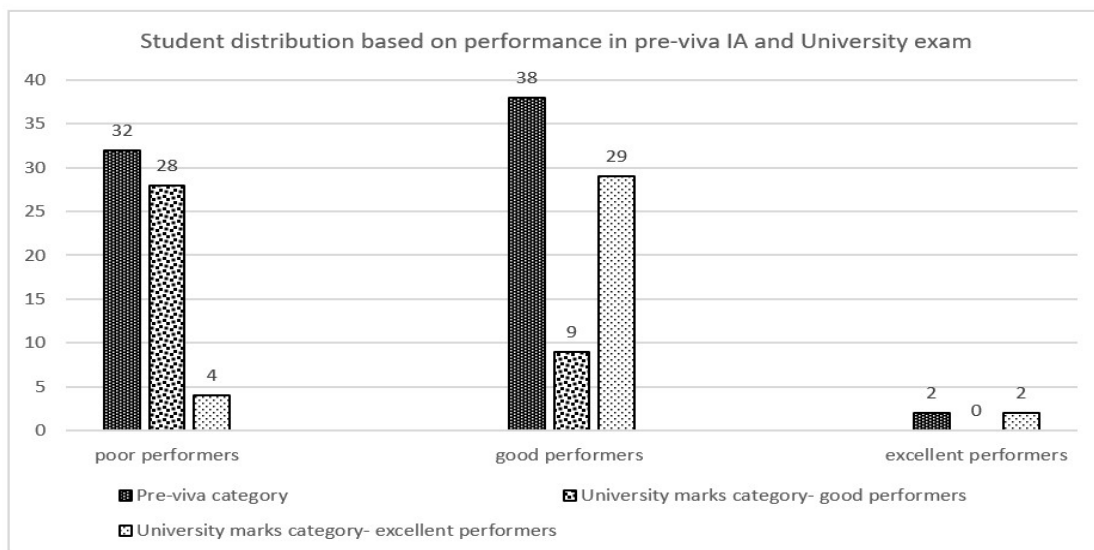


Figure 2:

## Discussion

Any evaluation of a student's learning that is carried out entirely or in part verbally is referred to as an "oral assessment." Since ancient times, viva voce examinations have long been the most reliable method of evaluating domains of higher learning. [2] We decided to use viva voce to help our students prepare for various reasons. It helps in assessing their capacity for problem-solving. To gauge each student's level of understanding, follow-up questions might be specifically designed for them.

Assessors can direct the questions to delve further into the student's knowledge and ask them to elaborate on their responses. [15] By offering thorough and prompt feedback following each viva voce, educators can help promote intrinsic motivation. [16,17] the heuristic perspective of viva voce has contributed to its widespread acceptance because of its flexibility and capacity to evaluate learning outcomes such as the application of deep learning and theory, testing problem-solving abilities, ethical and professional judgements, and communication skills. [3,18]

However, viva voce is not without drawbacks. Judgmental errors influenced by preceding candidates, clustering in the middle, the attributes of the candidate, and the leniency of the evaluator can affect their reliability. [19] The reliability of oral evaluations can be improved by increasing the number of examiners and viva voce sessions. [20] It is generally well known that assessment is the engine that powers learning. [21] In our study, we used an assessment tool called "Viva voce" as a means for learning pharmacology.

All the students improved in the third internal assessment written exam (mean score out of 80,  $M3 + M4 = 45 \pm 10.42$ ) compared to the first and second internal written exam assessments (mean score out of 80,  $M1 + M2 = 41.57 \pm 10.36$ ,  $p < 0.001$ ). All groups demonstrated a significant improvement in their university exam scores (Figure 2). There was an increase in scores for excellent performers, but it was not statistically significant due to the small sample size ( $n = 2$ ). This progress could be due to many reasons.

Students had to be well-prepared for the viva, as there was no room for misconduct. [22] Additionally, the students' progress from session to session by organizing their thoughts and providing precise responses. During group viva, although there is no direct interaction with peers, students could listen to how others expressed their thoughts. [23,24] The students' communication skills improved over the course of four months because of multiple viva sessions. An immediate self-awareness of their own level of knowledge would have compelled them to take up a desirable

learning method. [8–10] This reflected improved marks not only in the written formative exam but also in the summative exam. This positive correlation between viva and written components of summative examination in pharmacology was studied by Ghosh et al. [25] Similarly, a positive correlation between oral examinations and in-training examinations was identified by Iqbal et al. [7]

The mean marks of the second paper of the third IA were significantly lower than the second IA for all the students and across all categories (Table 1). Group viva voce on M4 topics was conducted towards the end of the series. These were weeks closer to the third internal assessment written exam for all four phase two subjects. During these times, they become strategic or superficial learners rather than deep learners. As a result, students' lack of thorough preparation for M4 would have negatively impacted their performance on the written exam. Therefore, it is recommended that the group viva voce series be organised to be conducted well ahead of time prior to exams.

Several studies have investigated the effectiveness of structured viva versus conventional viva and found that questions must be standardized and the difficulty of questions must be considered when selecting questions that will benefit both high and low achievers. [5,26] In this study, we found that there was a significant improvement in the scores of poor and good performers for M3, but a reduction in the mean scores for M4. This shows that time spent understanding and applying an idea is very important for filling in knowledge gaps and becoming competent, regardless of how viva is structured. The availability and effective training of instructors is another crucial criterion for the successful implementation of structured group viva as an educational tool. [5,20]

Structured oral examinations require the selection of unambiguous and pertinent questions, appropriate blueprinting, and standardization of questions that elicit responses from all levels of Miller's pyramid. [26,27] This leads to monotony and a lack of flexibility. [5] These drawbacks and time constraints can be tackled through group viva, where each participant has an equal chance of encountering more questions, as well as peer learning, which makes learning less stressful and pleasant. Despite the fact that structured viva had been the subject of numerous studies, its efficacy on either formative or summative assessments had never been measured. [2,5,28] similarly, none have explored the effectiveness of group viva voce in improving the marks scored in the written exams. This study can be considered an initial step towards the adoption of Viva Voce in small groups as an educational tool for training students in pharmacology and pharmacotherapeutics.

In our study, we attempted to fill in the gaps left by one-on-one viva with group viva. When used for formative review, a one-on-one viva takes a lot of time and only covers a small number of questions. Group viva can remedy this by showing all questions and probes to the group. Furthermore, teachers can move on to the next question based on the responses received and modify the viva session based on the students' preparation. Questions were asked to help them link the concepts and integrate what they've learned from different subjects and topics. Since students could stay in the same groups most of the time throughout the viva series, they started to study together in dorms. The limitations of this study included time constraints and instructor constraints. The last sections were rushed at the end, which led to superficial learning rather than the intended deep learning. The entire department had to devote their time to viva, just like one-on-one viva, without compromising on group size. Since this study was done retrospectively, we could not include student and faculty feedback.

### Conclusions

Group viva voce might have contributed to the overall improvement in test marks and student performances. The findings demonstrate that this approach has several benefits that contribute to enhanced learning outcomes and academic achievement. Firstly, the small group oral examinations promote active participation and engagement among students. By engaging in discussions and answering questions in a supportive environment, students develop a deeper understanding of the subject matter.

This interactive process encourages critical thinking, problem-solving, and the application of theoretical knowledge to practical scenarios. Secondly, the series of small group oral examinations foster effective communication skills among students. The opportunity to articulate their thoughts and ideas in front of their peers and instructors improves their ability to convey complex medical concepts with clarity and precision. By regularly assessing students' knowledge and providing immediate feedback, instructors can identify areas for improvement and tailor their teaching accordingly. The timely feedback allows students to address their weaknesses, refine their understanding, and consolidate their knowledge effectively. The positive findings underscore the effectiveness of this approach in medical education and advocate for its continued implementation to enhance student learning and success.

### Recommendations

Given its benefits, we recommend the generalization of the use of small group viva voce

as an instructional tool. In addition to improving students' scholastic performance, group viva voce can encourage students to work collaboratively with peers, thereby fostering intellectual stimulation, promoting reflection, and developing social-emotional skills.

A prospective survey on the perceptions of students and faculty towards the group viva series could be considered in addition.

### References

1. Oshikoya KA, Bello JA, Ayorinde EO. Prescribing knowledge and skills of final year medical students in Nigeria. *Indian J Pharmacol.* 2008 Nov;40(6):251–5.
2. Dhasmana DC, Bala S, Sharma R, Sharma T, Kohli S, Aggarwal N, et al. Introducing structured viva voce examination in medical undergraduate pharmacology: A pilot study. *Indian J Pharmacol.* 2016 Oct;48(Suppl 1):S52–6.
3. Pearce G, Lee G. Viva Voce (Oral Examination) as an Assessment Method: Insights From Marketing Students. *J Mark Educ [Internet].* 2009 Apr 8;31(2):120–30.
4. Verma A, Mahajan N, Jasani K, Patel J. Evaluation & Comparison of Result: Conventional Viva Vs. Structured Viva. *Glob Res Anal.* 2013 May 1;2:188–9.
5. 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):546–50.
6. Thomas CS, Mellsop G, Callender K, Crawshaw J, Ellis PM, Hall A, et al. The oral examination: a study of academic and non-academic factors. *Med Educ.* 1993 Sep;27(5):433–9.
7. Iqbal IZ, Naqvi S, Abeysundara L, Narula AA. The Value of Oral Assessments: A Review. *Bull R Coll Surg Engl.* 2010 Jul 1;92:1–6.
8. Romy L. The Effect of Viva Assessment on Students' Approaches to Learning and Motivation. *Int Rev Soc Sci Humanit.* 2012 Jan 1;2.
9. Van Der Vleuten CPM. The assessment of professional competence: Developments, research and practical implications. *Adv Heal Sci Educ [Internet].* 1996;1(1):41–67.
10. Mudey G, Damke S, Tankhiwale N, Mudey A. Assessment of perception for objectively structured viva voce amongst undergraduate medical students and teaching faculties in a medical college of central India. *Int J Res Med Sci.* 2016 Jul 1;2951–4.
11. Mackey RA, O'Brien BA. The Small Group Oral Examination As an Educational Tool. *J Educ Soc Work [Internet].* 1978 Jun

- 14;14(1):82–6.
12. O'Brien BA, Mackey RA. Use of Group Oral Examinations as an Evaluative Method. *Prof Psychol.* 1976;7:674–6.
  13. Singel T, Shah C, Daksha. Small Group Structured Oral Examination Small Group Structured Oral Examination: An innovation in oral Examination. 2014 Feb 1;5:2230–9969.
  14. Schreiber LM, Valle BE. Social constructivist teaching strategies in the small group classroom. *Small Gr Res.* 2013;44:395–411.
  15. Joughin G. A Short Guide to Oral Assessment. University of Wollongong, editor. Leeds: Leeds Met Press; 2010. 1–23 p.
  16. Cauley K, McMillan J. Formative Assessment Techniques to Support Student Motivation and Achievement. *Clear House.* 2009 Nov 1;83:1–6.
  17. Rushton A. Formative assessment: a key to deep learning? *Med Teach.* 2005 Sep; 27(6): 509–13.
  18. Rangachari PK. The targeted oral. *Adv Physiol Educ.* 2004 Dec;28(1–4):213–4.
  19. Torke S, Abraham RR, Ramnarayan K, Asha K. The impact of viva-voce examination on students' performance in theory component of the final summative examination in physiology. *J Physiol Pathophysiol.* 2010; 1(1): 10–2.
  20. Daelmans HEM, Scherpbier AJJA, Van Der Vleuten CPM, Donker AJM. Reliability of clinical oral examinations re-examined. *Med Teach.* 2001 Jul;23(4):422–4.
  21. Tekian A. Curriculum on medical professionalism for undergraduates. *Asian Acad Res J Multidiscip.* 2015 Jun 1;2:222–43.
  22. Joughin G. Dimensions of Oral Assessment. *Assess Eval High Educ [Internet].* 1998 Dec 1;23(4):367–78.
  23. Wakeford R, Southgate L, Wass V. Improving oral examinations: selecting, training, and monitoring examiners for the MRCGP. *Royal College of General Practitioners. BMJ.* 1995 Oct;311(7010):931–5.
  24. Davis MH, Karunathilake I. The place of the oral examination in today's assessment systems. *Med Teach.* 2005 Jun;27(4):294–7.
  25. 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 Mar;44(2):274–5.
  26. Majagi S, Park YS. Evaluation of Oral Examination of Medical Undergraduates in Pharmacology – A Conceptual Study. *Br J Pharm Res.* 2015 Jan 10;8:1–11.
  27. Miller GE. The assessment of clinical skills/competence/performance. *Acad Med.* 1990 Sep;65(9 Suppl):S63-7.
  28. Naseem S, Javed M, Baneen B. Developing and Implementing Structured Viva Voce Examination as a Valid and Reliable Assessment Tool in Biochemistry for First Year BDS Students. *J Clin Diagnostic Res.* 2019 Jun 27;13.