Pre and Post Assessments Show Peer Answer Evaluation in Physiology Practical, Academically Uplifts Performance of Evaluator Student

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ABSTRACT

Introduction: Peer assisted learning is an accepted effective active learning method. This study pursues evaluation of peer, with guidance of teacher, in Physiology practical based short questions, for bringing improvements in academic performance of evaluating students.

Material and methods: Consenting first MBBS students of 2 consecutive years at Government T.D. Medical College, Alappuzha, participated in study having 6 Pretests and 2 Post tests covering Haematology and Clinical experiments. Each Pre test session began with answering Pretest questions, key discussion by teacher, alongside students evaluated answer paper of their peers and concluded with Post test (Initial); having same questions as Pretest. Finally Post tests (Later) at end of Haematology and Clinical sections each, were conducted. Competitions were held, dividing participants into 2 groups, for Haematology viva, Clinical viva and Clinical skill examination.

Results: Average scores of Pretest, shows that Student scores were significantly higher than Teacher. Also Initial Post test scores (at end of each Pre test) were significantly higher than Pretest scores (paired **t** test, p < 0.001 for both, n=116).Students who had attended Later Post tests (at end of sections), their corresponding Pretest scores were specifically compared. These Corresponding average scores show statistically significant improvement from Pretest scores (of teacher) to both Initial and Later Post tests, also Initial scores are significantly higher than Later Post test scores (paired t test, p < 0.001respectively, n=43).

Discussion: Post test scores show peer evaluation has significant benefit for evaluator. The Initial Post test scores being higher than Later is explainable by immediate recall (conducted immediately at end of each session). Student feedback mentioned that the sessions helped them to get-many viva questions, expected way of correct answering and to know expectations of examiner. Competition sessions were lively with active intra group discussions and learning.

Conclusion: Peer evaluation under guidance improves academic performance of the evaluator student, as shown in scores increasing from Pretest to Post test. Peer participation encourages and supplements learning amongst medical students who are already facing some stress and anxiety. Competitions need promotion as a promising peer participated interactive method where active learning occurs effectively for a difficult subject like Physiology.

Keywords: Peer Evaluation, Pre Test, Post Test, Competition, Active Learning, Practical Viva, Peer Participation

INTRODUCTION

Opinion of own peers is generally more encouraging, authentic and welcome for all groups.[1,2,3,4,5] This is equally applicable for medical undergraduates. This educational interventional study tries to assess the effectiveness of evaluation of own peers as an encouraging self improvement method, academically for the student in the role of evaluator. Physiology is a subject given less time by students, generally read only on eve of examination. For Physiology exams students often may have read up but are not able to convey main concepts in answering viva. Though leading viva questions can be asked to bring out exact expected answers, it needs to be kept in mind that there is a dearth of time during exams for this; moreover student would be too anxious to pick up clues. Therefore with intention to improve the learning and answering content for Physiology practical examination and viva, students were made to evaluate short answers of their own peers.

This study takes evaluation of peer as an active method of *peer participated learning* and aims to look for academic improvements for the evaluator student. Discussion of short practical questions using a provided key with split up of marks, ensures uniformity in evaluation. Even when grading own peer, the student evaluator learns the correct answer. By awarding marks understands the scheme of marking and realizes own shortcomings in answering selected short Physiology practical questions. Student is indirectly expected to realize what the examiner expects for a given question. Therefore student's own performance for practical related viva voce can be improved.

MATERIAL AND METHODS

This study involved consenting first Professional MBBS students of 2017 and 2018 admission batches at Government T.D. Medical College, Alappuzha, Kerala. This study was cleared by Institutional Research Committee - Protocol no: S30/2016 dated 29/11/2016 and Institutional Ethics Committee - EC 51/2016 dated 29/11/2016 (Part B). Principal's permission as study involves medical students as

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per Order no: B6/12948/2016/GTDMCA dated 5/12/2016. This study is a continuation of an earlier pilot study involving peer evaluation and based on its main findings, modifications were done in this study after getting approval.[6]

Based on division of Physiology practical into Haematology and Clinical experiments, short questions were planned for 6 Pretest sessions (3 each for Haematology and Clinical). Sessions were conducted only after respective practical had been completed as per routine practical schedule.

So in this study supplemental learning takes off with revision of completed experiments; revolving around the usual expected questions and their adequate answers.

Haematology experiments being comparatively simpler were planned as **Direct - Pretest sessions (Passive** learning group, not requiring prior referring of answers) sessions I,II,III (Table:1).

Clinical experiments being more elaborate and difficult (involving learning many methods of examination, apart from the scheme for system examination) were planned as *After refer -* **Pretest sessions (Active** learning group, requiring prior reference of a given list of questions), sessions IV,V,VI (Table:1).

Each session involved around 3 experiments, portions of which were informed 1 week earlier itself to students via their batch WhatsApp groups. As sessions were after routine theory hours, mild refreshment, as permissible was provided from funding itself.

Each session of 1 hour began with a **Pretest** in which a printed question paper is given, with space provided for answering 10 short questions of 1 mark each, taking total of 10-15 min. This was followed by discussion of answers to these short questions, projected with provided key, taking around 30-35min. Key points were discussed and mark distribution clarified. Any disputes or doubts were clarified immediately. At end of each session the outline of key was given as a small printout.

Students corrected the answers of their nearby or random peers depending on given shuffled answer papers. Evaluator was asked to put marks for each of 10 questions, then the total marks, his signature and write roll no: also, at bottom, just to clarify any queries if investigator has later on. Each student then was given back their own answer sheet to be satisfied with marks obtained, know what they missed in answer, be clear of the scheme of marks distribution as per key (sort of reinforcing of answers and mark distribution). This was then collected back.

Student (S) evaluation was later followed by Investigator/Teacher (T) evaluation, to ensure compliance to scheme of marking and for comparison. Session concluded with a Post test of 10-15 min duration, where the same questions as in Pretest were given; **Initial Post test** (*at end of each Pre test session*). So possibly immediate recall alone may be assessed here.

In case of Clinical sessions for- *After refer -* **Pretest sessions**, a list of expected 20 questions for each of sessions IV,V and VI were given 1week prior, for referring and finding answers. From these, 10 questions of 1 mark each were given as Pretest per session.

There were also **Later Post tests** (*at end of each of sections* for Haematology and Clinical*)*, to test long term learning, retention and recall, as portions were from prior 3 sessions respectively. These had 20 questions of 1 mark each (selected out of the 30 from prior 3 sessions).

As inferred from previous pilot study[6], to compare and to draw conclusions regarding effectiveness of this type of educational studies, where different students may attend different sessions, each discussion session was planned to have a **Pretest** and **Initial Post test** and finally to be followed by a **Later Post test**. It obviously requires high level of motivation for the same set of students to consistently attend all the 8 sessions, which was difficult.

Both Initial and Later Post test sessions were evaluated by Investigator alone. Post test scores out of 20 were converted to 10 for uniformity and ease in comparison across different sessions.

The data from both years 2017 and 2018 were clubbed together. Feedback was taken separately for each session.

Finally one round of **Open competition** for Hematology viva, Clinical viva and demonstration of **skills in clinical examination methods** was conducted by dividing participants into two groups. This was to encourage active peer participated learning via healthy competition.[7,8] Turn wise questions were asked to each group and only1 participant could answer. Intra group discussion was *allowed* for 1 min before giving answer, encouraging peer participation and peer assisted learning. Each student had to present the answer for his team, after coming to front/standing up; to enable coherence and confidence in answering. A student could come only once, as per rotation, ensuring participation of everyone. Opposite group always listened keenly to answers and awarded marks quite stingily; along with the justification for reduced marks. Any extra / missed points mentioned would give the team extra marks as permitted by investigator.

Investigator as moderator served to solve any disputes and also keep track of any missed points and for marks compiling. Higher scoring group won the competition and was rewarded.

For Clinical skills competition also, any 1 student had to come and demonstrate the examination method asked, after intra group discussion. Opposite team had to point out mistakes and award marks after correcting the wrong methods if any and also demonstrate the correct method.

Investigator would ensure correctness of methods (for example –wrist flexion and forearm semi pronation while examining for radial pulse, correct positioning of limbs while eliciting deep tendon reflexes etc). Such exercises promoted keen attentiveness. Repetition of methods improves skills, by reinforcing the learnt method. Also the fish out of water feeling students get on facing examiners in university exam can be reduced so that they perform better.

STATISTICAL ANALYSIS

Data for each session and for each individual student were

tabulated in excel seperately. Finally data analysis was done using SPSS software version 16. Significant differences between scores of Pretest and Post test (Initial and Later) scores, were compared using Paired t test.

RESULTS

All scores were tabulated as Pretest Student S, Pretest Teacher T, Initial Posttest and Later Post test. Scores of all participants for both years, from all sessions when compiled, the total number of responses for Pretest sessions and Later Post tests were n=289 and 52; {(136+37=173)+ (18+12=30)} for 2017 and { (88+33=116) + (18+4=22)} for 2018 (sum of both Haematology H and Clinical C experiments and total within brackets, for Pretest and Later Post test respectively). Averge All Pretest scores- of student (AllPreS) were significantly higher than teacher (AllPreT) {n=289, Table 2},

also All Initial Post test scores(AllPost Initial) (at end of each Pretest session) were significantly higher when compared to All Pretest score of teacher (AllPreT). Table 5 {pairs 3a and 3b respectively} (Paired t test, p<0.01 for both, n=289).

For each student, all the scores from all sessions attended were compiled, (n =116; 74 students in 2017 and 42 in 2018) to obtain Average scores Avg scores for Pretest of Student (S), Teacher (T) and for Initial Post test. Majority have scored higher in Initial Post test (at end of session). Table: 3. There was significant difference between–Average Pretest scores of student S and Teacher T (S scores being higher than Teacher T). Also Initial Post test scores were significantly higher than Pretest score of Teacher T ($p<0.001$ for both, n=116) Table 5 (pair 1a and 1b).

Students who attended the Final Post tests for Haematology and Clinical sections, their corresponding Pre test scores

Section	Topic	Marks
Hematology Direct - Pretest & Initial PostTest	I-Hemoglobin,Packed Cell Volume,Erthrocyte Sedimentation Rate	10
	II-Red Blood Cell count,White Blood Cell count, Differential Leucocyte Count	10
	III-Clotting time, Bleeding time,Blood group	10
Hematology Later Post Test-1	I,II,III	20
Clinical Examination After Referring -Pretest & Initial PostTest	IV-General examination, Examination of Cardiovascular System, Blood Pressure-effect of posture and exercise	10
	V- Examination of Respiratory system, Sensory system	10
	VI- Examination of Motor system, Reflexes, Cranial nerves.	10
Clinical Examination Later Post Test-2	IV,V,VI	20
Competition-Viva	Hematology H & Clinical C experiments	10
Competition -Skills	Clinical Examination methods	10
Table 1: Schedule of different sessions in study - **Pre Tests** with **Initial Post test** at end of each session. This was followed by **Later Post tests** at end of hematology and clinical experiment sections respectively. Finally competitions were held for Viva questions and Clinical skill demonstration. Post tests were valued by teacher alone and Pretests by both student and teacher.		
Table-1: Schedule of Practical sessions in study		

All values	Mean	Low scorers (%)	High scorers (%)
All PreS	3.4715	244 (84.4)	45 (15.6)
All PreT	3.0484	269 (93.1)	20 (6.9)
All Post Initial	8.4109	7 (2.4)	282 (97.6)
All Post Later	6.3465	7 (13.5)	45 (86.5)
Table 2: Compiling all scores of participants from all sessions for 2017 and 2018; All- Pre Test Student S (All Pre S), All Pre test Teacher T (All Pre T), All Initial Post test (All Post Initial){n=289} and All Later Post tests (All Post Later) scores(n=52) are obtained, where n is the number of total responses. Average scores improve from Pretest to Initial Post test but expected further rise in scores is not seen in Later post tests. With a cut off of 50%; those who scored below 50% are Low scorers and above 50% are High scorers. Their respective % are shown in brackets. Majority in Pre tests are Low scorers while majority have scored higher in Post tests.			
Table-2: All values from all sessions			

Average Avg	Low scorers (%)	High scorers (%)
AvgPreS	105 (90.5)	11 (9.5)
AvgPreT	114 (98.3)	2 (1.7)
AvgPostInitial	3 (2.1)	113 (97.4)
Table 3: Average scores of Pre test Student S (AvgPreS), Pre test Teacher T (AvgPre T) and Post test Initial (AvgPostInitial) were compared. Taking a cut off of 50%; those who scored below 50% are Low scorers and above 50% are High scorers, with their respective % in brackets. Majority in Initial Post test (at end of each Pretest) are high scorers.		
Table-3: Average scores of each student –from all attended sessions		

Corresponding C Avg	Low scorers (%)	High scorers (%)
CAvgPreS	39 (90.7)	4 (9.3)
CAvgPreT	42 (97.7)	1 (2.3)
CAvgPostInitial	0	43 (100)
CPostLater	5 (11.6)	38 (88.4)

Table 4: From CAvg scores – of Pre test Student S (CAvgPreS), Pre test Teacher T (CAvgPre T) and Post test Initial (CAvgPostInitial) and Post test Later (CPost Later), the number of Low and High scorers with their respective % in brackets is shown. Majority in Post test are high scorers.

Table-4: Corresponding Average CAvg scores of Final Post test participants

	Group	n	Mean	Std. Deviation	*p* value
Pair 1a	AvgPreS	116	3.3317	1.26070	0.000
	AvgPreT	116	2.9162	1.11604	
Pair 1b	AvgPreT	116	2.9162	1.11604	0.000
	AvgPostInitial	116	8.2141	1.11803	
Pair 2a	CAvgPreS	43	3.4203	1.13406	0.158
	CAvgPreT	43	3.1791	0.94610	
Pair 2b	CAvgPreT	43	3.1791	0.94610	0.000
	CAvgPostInitial	43	8.5464	0.86621	
Pair 2c	CAvgPreT	43	3.1791	0.94610	0.000
	CPostLatr	43	6.4153	1.28067	
Pair 2d	CAvgPostInitial	43	8.5464	0.86621	0.000
	CPostLatr	43	6.4153	1.28067	
Pair 3a	AllPreS	289	3.4715	1.64261	0.000
	AllPreT	289	3.0484	1.44211	
Pair 3b	AllPreT	289	3.0484	1.44211	0.000
	AllPostInitial	289	8.4109	1.20115	

Table 5: Shows the pairs and groups compared, number of participants as n, average scores as Mean, standard deviation and p value of Paired t test.

Paired t test shows significant difference p <0.001 between following 7 pairs. Group 1-Average scores, wherein, pair 1a- Average Pre test scores of Student (AvgPreS) and Teacher (AvgPreT), pair 1b- average scores of Pre test Teacher (AvgPreT) and Initial Post test (AvgPostInitial)[at end of each pretest session](n=116). Group 2- Corresponding average scores, wherein, pair 2b-Corresponding Pre test Teacher (CAvgPreT) and Post test Initial (CAvgPostInitial), pair 2c- Corresponding Pre test Teacher (CAvgPreT)and Post test Later (CPostLater) scores, pair 2d-Corresponding Initial (CAvgPostInitial) and Later (CPostLater) Post tests. Group 3 –All scores compiled, wherein, pair 3a-All pre test scores Student (AllPreS) and teacher (AllPreT), pair 3b-All pre test scores Teacher (All PreT) and all Initial post test (All Post Initial)scores. Mean scores were higher for Post test. Also the mean Initial Post test scores are higher than Later Post test.

Table-5: All different groups compared for academic improvement by Paired t test with respective p values

III. Hematology practical- Blood group,Clotting time CT & Bleeding time BT
1. What is the principle underlying blood grouping?
2. Which is the choice anticoagulant used in blood banks? Why?
3. A person with Bombay blood group has which agglutinins in plasma?
4.Which is the exception to Landsteiner's 2nd law
5.In case of doubt, how to rule out Rouleaux formation from blood grouping reaction?
6.Basic steps in primary haemostasis.
7.After how much time do we start breaking capillary tube for Clotting time ?
8.Which are the Vit K dependent clotting factors?
9.Normal range of Platelet count.
10. Pathological conditions producing Thrombocytopenia
IV. Clinical examination- General examination,Cardio Vascular System
1.Which is the standardised method to comment on built and nutrition of a person?
2.What is the normal range of body temperature?
3.Sites to be examined for presence of pallor? Special instruction to be given to subject during examination?
4.What is cyanosis? Give 2 examples of conditions producing it?
5.Define Oedema. Which site is examined for dependent edema and for how much duration?
6.What is precordium?
7. Define pulse? What is normal range of arterial pulse rate?
8.What does an elevated JVP indicate?
9.What is apex beat? Where is it normally located?
10.Define BP.

Table-6: Sample Questions - of Pretest sessions III & IV

were compiled and Corresponding Average scores obtained (n=43; 25 students from 2017 and 18 in 2018). Corresponding Average CAvg scores showed improvements in post test scores with majority being high scorers (Table 4)

Corresponding Average scores of T were not significantly different from S, though mean student scores were higher (p=0.158, Table 5-pair 2a). Initial and Later Post test scores were significantly higher than Pretest scores of T.(Table 5- pair 2b and 2c). The Initial Post test scores were significantly higher than Later Post test.(Table 5- pair 2d). Mean pretest scores of students remain higher than teacher (groups-1a,2a,3a) and Post test scores are higher than Pretest (in all three groups-1,2,3) (Table 5).

Based on questionnaires filled and returned; scores of Hamilton Anxiety Scale questionnaire HAS were obtained. Scores Above 25- (indicating moderate to severe anxiety) were seen in 2017-for 14 (48.2%) and in 2018-for 13(30.9%) students { n= 29 and 42 respectively}.

Similarly in Perceived Stress questionnaire PSQ –scores Above 50 (indicating Moderate to High stress) was seen, in 2017 and 2018 batch for 100% participants (n=59 and 37 respectively). This shows that medical undergraduates were having some stress and anxiety during exams.

DISCUSSION

Active learning is known to bring better academic outcomes. Bringing this into arena of Physiology practical is a long felt requirement. Donning the role of an evaluator should help students to predict the likely scores for a given answer. Thinking from viewpoint of examiner enables them to be more prepared for exams; improving the academic outcomes, as students learn from the other side, as to what is expected by examiner.[5] Students thus not only learn to award marks but also in the process, learn the answers and related concepts.

Prior pilot study had shown that as same set of participants had not attended the post test sessions, comparison for improvement from pre test to post test was unclear.[6] So in this study for the discussion sessions with guided evaluation by peers, comparative tests were conducted *before* and *after each* session as Pre test and Initial Post test; which looks for immediate recall. Also to look for long term retention, towards end of sections, Later Post tests were conducted.

Now as participants had not referred the answers to questions given prior, for conducting Clinical experiments section as After refer sessions, in effect all the 6 sessions were **Direct - Pretest** sessions (not involving prior looking up of answers). So more of a passive type of learning only occurred from student side as they came for the study.

Feedback regarding suggestions to improve the sessions or any changes for more benefit to students, were collected at end of all sessions, though some students did not write any response for some feedback questions.

All participants opined the sessions were useful (273 responses); mainly to revise topics learnt earlier(112); learn more questions with their answers, get new points, gain knowledge (92); know more viva questions, evaluate self (17) and easier than revising text (1). A common feedback was that participants could not / did not read up corresponding portions (208 responses), partially read and came (37), while no response was given by 14.

They gave suggestions like - more time and more questions be discussed (42), no suggestions as its good already(111 responses), more interaction, answer papers be given

Competition session questions:
Hematology Viva
1.Name the method you used for Hemoglobin Hb estimation.
2.Principle of method you used for Hemoglobin Hb estimation.
3.In Sahli-Adam's tube, 100% corresponds to what value in gm% scale
4.Amount of blood taken in Hb pipette?
5.Dilution is started how much time after mixing acid & blood
6.Method you used for PCV estimation
7.What is done with blood filled tube for PVC determination?
8.Name another method using less amount of blood for PCV
9.Use of ESR estimation.
10.Method you used for ESR estimation
11.Name the diluting fluid you used for WBC count
12.Name the diluting fluid you used for RBC count
13.Graduations of WBC pipette with units
14.Graduations of RBC pipette with units
15.Parts of Ideal peripheral blood smear
16.Part of stained peripheral blood smear used for counting cells
17.Why staining occurs only on adding distilled water?
18.Bombay blood group person has which agglutinogens on RBC membrane.
19.Vit K dependent clotting factors?
Clinical Viva
1.What is cyanosis? Give 2 examples of conditions producing it?
2.What is apex beat? Where is it normally located?
3.Define BP.
4.Name the Cortical sensations?
5.What does positive Babinski's sign mean?
6.What happens to Rinne's test in conductive deafness?
7.What are thrills?
8.What are the components of a Reflex arc?
9.Differentiate LMN & UMN lesion.
10.Root value for knee jerk.
Clinical examination Skills
1.Examine subject for presence of pallor.
2.Examine for presence of Icterus.
3.Examine the pulse rate of the subject.
4.Does the subject have elevated JVP?
5.Examine the vocal resonance in posterior respiratory areas.
6.Examine speech of the subject.
7.Examine vibration sense of upper limbs.
8.Examine power of shoulder abductors.
9.Demonstrate Romberg's test.
10.Examine for presence of nystagmus.
Table-7: Competition session - few sample questions

back along with the answer key(11), the experiments and procedures to be repeated (11) {but this was not feasible in given short time available. Moreover revision classes were already there for this}. Important frequently asked questions to be given for each practical (4), give printed notes, show equipments again (2), give back written answer sheets and key (4), should have read beforehand and attended (4), discuss more theory and application (3), briefly explain initially topic to be taken (9), bit slower and more time for discussion (5), more interactive sessions and combined study (3), multiple choice type questions, 10min to read before exam and doubt clearing session at end (4), include video showing experiment (6), more slides, videos, audiovisual aids(4), include corresponding instruments of practical (6), give time to write notes (3), pretest class would be useful(4), useful to know mistakes, bigger classroom, more snacks, highlight important points, break required as sessions are after 4pm (1) etc.

Majority found the sessions to be Very useful (40) and Useful (12). Feedback also welcomes to extend this type of learning to theory topics. Majority preferred small group discussions (52 responses) for more benefit.

Most difficult subject in first year was Physiology (24) and Anatomy and Biochemistry (14 responses each) (rest did not mention any specific subject). In Physiology most difficult systems mentioned by students were Nervous system (22) and cardiovascular system (13 responses) {rest did not give any response}. Regarding practical experiments, haematology was mentioned difficult as students had to draw their own blood (6) and clinical examination because there was lot to remember including methods (2 responses).

It may be emphasized that even the new curriculum promotes small group discussions to achieve some core competencies. Even for clinical system examination, acquisition of certain skills is a core competency to be attained under domain - show or show how; example-examination of pulse, blood pressure etc.

Competition sessions were rated good (27 responses), enjoyed, it was nice, fun (11), interesting (11), learnt better (2) and no effect except for discussion (1 response).

Competition actually grooms active peer discussion, keen observation, evaluation as a team, allows students to know scheme of awarding marks according to correctness of answer and even pointing out missed points or gross mistakes. They all actively discussed, intra-group the entire answer, be it haematology viva, clinical viva or clinical examination skills. As some common mistakes could be brought out for example in eliciting reflexes the correct positioning of limbs, distance between patient and examiner when examining field of vision using Confrontation test etc, thus correct methods could be revised by both groups.This process also makes student more confident to clarify doubts, learn and even perform better. Physiology being difficult subject for students, new approaches for active learning with better outcomes are required.[7,8] Supplementing routine teaching learning process is proven to have benefit.[9,10]

Peer assisted learning is also a proven mode of active learning in prior studies.[4,5] Similarly peer tutoring and also peer mentoring by senior students have been shown to be of benefit.

The definite advantage in being an evaluator is that student gets a clear idea of expected correct answers, therefore significant improvement in performance was seen in both Initial and Later Post tests.Table: 5. Majority in post test are high scorers.

Had all students attended all sessions this would have been the most ideal situation to predict and demonstrate authentic outcomes for learning. Supplementation of routine didactic lecture based learning has good results, especially for difficult subject like Physiology, as per student feedback itself.[10,11] Already when students are facing some stress due to new course, difficult subject, its more important to help students to identify Physiology topics on which they should concentrate more.[12]

As part of Peer assisted learning, benefits to the student tutor as such needs further scrutiny.[13] The value of peer assessment in bringing positive outcomes in student development personally and professionally is already known.[14,15] Students value learning from near peers as seen in earlier studies involving peer teaching programmes.[16] Quite surprisingly overall peer assessment/rating is shown to be equivalent to self assessment and better than teacher assessment in terms of positive outcomes in student performance.[17] Now if this benefits the evaluator student also, its an added benefit; as conceived for this study. But peer marking, not being beneficial to student has been shown in a study, with mention of need for further studies.[18]

Active learning being the core of peer discussions, it is definitely beneficial for students.[19] Though student as peer assessor, may have less skill or may take more time but somehow assessment validity and reliability is equivalent to teacher, this should be incorporated into routine teaching; being more acceptable, encouraging for students.[20,21] Teaching strategies should therefore be modified so that assessments bring about good learning outcomes.[22] New models for peer assessment need to be developed, not only be beneficial but also should be suited to achieving specific learning objectives.[23,24]

Peer participated learning in competitions enables revisions. Retrieval of previously formed memory helps in reconsolidation (consolidation being formation of long term memory).[25] Even giving a test based on previously taken topic is one such approach.[25] There seems no substitute to active participation of learner for better formation of short and its conversion to long term memory; which is required for better recall during examinations. Undoubtedly a student needs to be motivated enough to have interest and put required effort to learn concepts in Physiology. Good understanding of Physiology, lays down the foundation for good clinical concepts and skills.

Constraints of study

Participants did not read up portions to be covered or refer answers to questions as scheduled for Clinical experiment

section. The purpose of supplementing routine learning schedule with a blended learning method could not be fully acheived. Students were too tired by late timing of these sessions. Hence only 8 total sessions were planned. Ideally a session for each practical would have been of more benefit to the student. Not having read portions, students knew they have to face low scores, which will be awarded by peers, this was a major dissuading factor from attending sessions. Even while signing consent it was clarified to students, that attendance and marks of this study would not be taken for academic purposes.

CONCLUSION

Peer opinion somehow is generally more acceptable. Evaluation of peer serves as a mode of peer assisted learning which supplements and reinforces learning. Significant improvement is shown by pre and post assessments in this educational interventional study, as evidenced by evaluator student's scores increasing from Pre test to Post test (both Initial and Later).

Medical students already are facing some stress and anxiety. Newer blended learning methods are thus need of hour to make learning less stressful, more enjoyable and interesting. This study proves there is benefit to the evaluator students when they become evaluator under guidance, for their peers, finally leading to their own academic improvement. They realize viewpoint of examiner, in terms of expected complete answers and possible marks going to be scored, enabling to be more prepared for exams, boosting morale and allowing to perform confidently.

Active peer interactions occurred during competitions. Possibly being a method involving peer participated learning, competitions were wholeheartedly welcomed, thoroughly enjoyed and also served to improve oral presentation skills in small groups, instilling confidence, preparing students for exam scenario, especially for a difficult subject like Physiology.

ACKNOWLEDGEMENTS

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