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Using peer assessment in teaching pharmacology for medical undergraduates

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Abstract

Introduction: Pharmacology, though challenging, is fundamental in medical practice, necessitating effective knowledge acquisition and retention for future application. This study aims to analyse student perceptions of the newly introduced teaching method, peer assessment, to enhance pharmacology teaching.

Method: Eighty-six third-year medical students of the Faculty of Medicine, University of Peradeniya participated in the peer assessment. They were divided into two groups of 40-45 and a case scenario in pharmacology was given to answer. Three volunteers from each group presented the answers. Peers evaluated the answers using provided criteria and gave feedback. The teacher then facilitated discussions, highlighting key points. Assessors and assesses perceptions on the teaching learning method was assessed using questionnaire and focus group discussions (FGD).

Results: The majority of students (n=64) (74.41%) enjoyed the task of assessing their peers. 80.23% (n=69) acknowledged the value of peer assessment for student engagement. However, 34.88% (n=30) mentioned that they did not feel they had the skills and knowledge to assess their peers. 17.43% (n=15) mentioned that they were reluctant to be critical of their peers. In the FGD students mentioned that in this student-centered learning method all students actively participated than the usual small group discussion sessions. They could compare peers' knowledge with their own knowledge and preferred the teacher grading to be combined with peer grading.

Conclusion: Peer assessment for enhancing pharmacology teaching was well received by the students. Also, students emphasise the importance of lecturer guidance and advocate for a combined assessment approach to improve engagement and learning outcomes.

Practice Highlights

- Peer assessment keeps the students more focused during teaching learning process.
- Peer assessment enhances critical thinking and allows student centered learning.
- Combined assessment approach improves engagement and learning outcomes.
- Peer assessment for enhancing pharmacology teaching is well received by the students.

I. INTRODUCTION

The focus in higher education has shifted from conventional teaching methods to a more learner-centric approach, moving away from teacher-centered management toward fostering student self-direction (Arnold et al., 2005). This transition has sparked a growing interest in the educational benefits associated with students evaluating both their own work (self-assessment) and that of their peers (peer assessment).

Peer assessment is defined as assessment by and of individuals who have attained the same general level of training or expertise, exercise no formal authority over each other, and share the same hierarchic status in an institution (Arnold et al., 2005).

Peer assessment can be summative or formative. This focuses on the formative side, helping students plan learning, identify strengths and weaknesses, improve, and build metacognitive and professional skills. Traditional teacher-centered assessments often limit

such growth. Educators valuing dialogue and collaboration should actively involve students in assessments.

Evidence is scarce regarding the utilisation of peer assessment methods for undergraduate formative assessments of a particular subject.

Pharmacology is often perceived as challenging to remember and thus, less engaging for students. Consequently, there's reduced enthusiasm for participation in lectures. However, pharmacology serves as a fundamental aspect of medical practice, necessitating students to acquire and retain knowledge effectively for future application. Interactive teaching offer distinct advantages over traditional, teacher-centered methods by facilitating long-term retention, contextual learning, and the development of essential skills and attitudes. Thus, we introduced this teaching and learning method related to the peer assessment that integrates student centered learning within the classroom setting.

II. METHODS

A. Study Setting

The study was conducted at the Faculty of Medicine, University of Peradeniya, Sri Lanka.

B. Informed Consent

Informed written consent was obtained from the students who volunteered to the study.

C. Participants

The study involved third-year medical students from the Faculty of Medicine, University of Peradeniya, Sri Lanka. These students participated in small group discussions, each consisting of 40-45 members.

D. Peer Assessment Process

Each group was assigned short essay questions on pharmacology and students encouraged to draft written answers. Three volunteers from each group presented their answers to the class, and peers assessed them gave feedback based on criteria set by the lecturer. The teacher then facilitated discussions, highlighting key points.

E. Gathering Student Perceptions

1) *Using Questionnaires:* All students, except the three who presented, were provided with a self-administered

Likert scale questionnaire to capture their perspectives as "assessors," drawing from McGarr and Clifford (2013). The students who presented their answers completed a different Likert scale questionnaire, designed to capture their viewpoints as "assesses," referencing Tahir (2012).

2) *Focus Group Discussions:* Nineteen students volunteered. They were divided into 3 groups. Focus group discussions, using a structured interview guide led by one investigator, lasted 30 to 40 minutes each, continued until data saturation was reached. The discussions were recorded for transcription. Participants were assured of confidentiality, and their views were anonymised. During transcription, all identifying features were removed.

F. Analysis

Quantitative data from the questionnaires were analysed using percentages. Qualitative data from the focus group discussions were analysed separately by identifying common themes in the responses.

Transcribed data were analysed using inductive content analysis. The researchers first read the transcripts to familiarise themselves with the data. Then, each transcript was coded into broad content categories. The transcripts were reread sentence by sentence and further coded into categories and subcategories.

G. Ethical Considerations

Ethical clearance was obtained from the ethics review committee of the Faculty of Medicine, University of Peradeniya. (2024/EC/25).

III. RESULTS

Eighty-six students participated as assessors. Six students participated as assesses. The results from students who assessed their peers showed mixed perceptions. A significant portion (74.41%) enjoyed the task. 44.17% agreed they were nervous about the peer assessment at the start of the module, while 29.07% were neutral (Table 1).

The comments from students assessed by their peers were generally positive. 66.67% felt they received sufficient comments, while the rest remained neutral. All participants noted that peer assessment offered more opportunities for discussion and practice. Peer assessment is recognised as a valuable exercise for students shown in Table 2.

Questions	Agree (%)	Neutral (%)	Disagree (%)	Total responses (%)
1. nervous about the peer assessment	38 (44.17)	25 (29.07)	21 (24.41)	84 (97.67)
2. limited educational values	6 (6.97)	25 (29.7)	53 (61.62)	84 (97.67)
3. reluctant to be critical	15 (17.43)	45 (52.32)	21 (24.41)	81 (94.19)
4. fairer assessment approach	54 (62.78)	20 (23.25)	7 (8.13)	81 (94.19)
5. enjoyed assessing peers	64 (74.41)	10 (11.62)	4 (4.64)	78 (90.70)
6. difficult to remove personal feelings	19 (22.08)	24 (27.9)	43 (50.00)	86 (100.00)
7. I did not feel I had the skills and knowledge to assess my peers	30 (34.88)	23 (26.44)	32 (37.2)	85 (98.84)
8. reluctant to give low marks	33 (38.36)	19 (22.09)	31 (36.04)	83 (96.51)
9. Including peer assessment in our course made the assessment more accurate	54 (62.79)	27 (31.39)	4 (4.64)	85 (98.84)
10. prefer tutor grading over peer grading	37 (43.02)	28 (32.55)	19 (22.08)	84 (97.67)
11. course assessments were inaccurate	13 (15.11)	38 (44.18)	30 (34.88)	81 (94.19)
12. Assessing peers was difficult	24 (27.9)	20 (23.25)	40 (46.5)	84 (97.67)
13. unfair	4 (4.64)	17 (19.76)	64 (74.41)	85 (98.84)
14. valuable exercise	69 (80.23)	10 (11.63)	7 (8.13)	86 (100.00)

Table 1. Assessors' perception regarding the peer assessment method

Question	Agree (%)	Neutral (%)	Disagree (%)
1. Evaluation and comments are fair	6 (100.00)	0 (0.00)	0 (0.00)
2. Comments are useful for making improvement	6 (100.00)	0 (0.00)	0 (0.00)
3. Comments are sufficient	4 (66.67)	2 (33.33)	0 (0.00)
4. Chance to practice and discuss	6 (100.00)	0 (0.00)	0 (0.00)
5. Less pressure and more relaxed	3 (50.00)	3 (50.00)	0 (0.00)
6. Who review my essays are nice	6 (100.00)	0 (0.00)	0 (0.00)
7. Overestimate me	3 (50.00)	2 (33.33)	1 (16.67)
8. Underestimate me	0 (0.00)	1 (16.67)	5 (88.33)
9. The quality of comments given by my peers is low	1 (16.67)	3 (50.00)	2 (33.33)
10. I did not like being assessed by my peers	0 (0.00)	1 (16.67)	5 (88.33)
11. Comments were beneficial for identifying errors in content and ideas	6 (100.00)	0 (0.00)	0 (0.00)
12. Comments were beneficial for identifying errors in the organisation	6 (100.00)	0 (0.00)	0 (0.00)
13. Prefer my tutor to grade me rather than my peers	1 (16.67)	5 (83.33)	0 (0.00)
14. I did not feel my peers assessed the content accurately	1 (16.67)	1 (16.67)	4 (66.67)
15. Unfair	0 (0.00)	0 (0.00)	6 (100.00)
16. A valuable exercise	6 (100.00)	0 (0.00)	0 (0.00)

Table 2. Perception of the students who got assessed by peers

Several key themes were identified by the focus group discussion.

A. Benefits of the Peer Assessment

1) *Less stressful*: Students mentioned that being assessed by their peers was less stressful than being assessed by a lecturer. They also noted that this method encouraged active participation in the assessment process due to its more convenient and relaxed nature.

"No nervousness at all. Because I just assesses my colleagues"

2) *Kept students focused*: Students commented that peer assessment is fairer than the traditional method as it kept them focused on work more than usual.

"When students have to assess their peers, they have to focus on the presenting answer. So, all students fully focus on the process. The lecturer will discuss the given scenario again. So, I think we do not miss any subject content, we can learn effectively."

3) *Peers are more accessible than lecturers*: They accepted this method as a good alternative to traditional assessment methods as lecturers are not always available for the assessment.

"It's unable to assess students by lecturers all the time, so peer assessment is a good approach to assess students."

4) *Improved understanding*: Being able to know how their peers answer a question was found as a good way of comparing their knowledge and improving themselves.

"Can compare our knowledge with peers"

5) *Confidence building*: Another advantage they pointed out was an improvement in the level of confidence in facing an assessment as they felt more comfortable when they are assessed by peers.

"Improved confidence"

B. Challenges of Peer Assessment

1) *Peers are not knowledgeable enough*: Some students identified being assessed by the lecturers is better than the peer assessment as lecturers are more knowledgeable than the peers.

"Lecturers are more knowledgeable than students, so being assessed by them is essential."

"We didn't have deep, fine knowledge to assess peers, but we had superficial knowledge to assess them."

C. Suggestions

A larger proportion of participants expressed appreciation for both traditional assessment methods and peer assessment, stating that using both simultaneously would be ideal.

"I think the lecturer grading is the best because we are not very experienced. However, with the time limitation, it is hard to assess students by lecturer frequently. In that case, peer assessment will be beneficial if it is combined with lecturer grading."

Many participants expressed preference for using this in other courses.

IV. DISCUSSION

While superior assessment has been the traditional and more prevalent approach, it faces challenges due to increasing student numbers, limited lecturer availability, and time constraints. This study aims to explore students' perceptions of peer assessment as a complementary evaluation method, addressing some of the limitations of superior assessment. The findings reveal several advantages and challenges of peer assessment.

A. Less Stressful, More Focused Learning Environment

One of the key advantages of peer assessment is its ability to create a less stressful and more focused learning

environment. The results indicate that students feel more comfortable being evaluated by their peers, which allows them to engage more deeply in the learning process.

Presenters and assessors both noted that the peer assessment structure promoted active engagement, as assessors remained attentive throughout the session to provide meaningful feedback, and those not presenting felt more relaxed and focused compared to traditional SGD formats. This shows that peer assessment method enhances student focus in learning environment.

B. Increased Availability and Accessibility

Given the time constraints and growing student populations, continuous evaluation by lecturers is challenging. However, well-prepared peer groups can effectively bridge this gap, providing timely feedback and support. This aspect of peer assessment enhances students' opportunities for formative feedback, which is critical for their learning process.

C. Improves the Assessor's Understanding of the Subject/Confidence Building

Students gain valuable insights and deepen their understanding by evaluating and providing feedback on their peers' written work, as this process enhances their critical thinking and analytical skills (Topping, 2009). This fact was noted by the participants of our study also. They appreciated the chance to analyse their peers' answers.

The supportive environment of peer assessment enabled students to share and compare their knowledge openly, which in turn helped them refine their answers and learn better organisational techniques, which improve their confidence.

D. Addressing Knowledge Gaps

One challenge identified in peer assessment is the limited expertise of peers in accurately assessing their classmates. However, this challenge can be mitigated with proper preparation and guidance from lecturers. Topping (2009) has highlighted that training students to provide constructive feedback is a challenging process. However, the benefits it yields outweigh the burden of training peer assessors.

Literature also gives evidence regarding the doubt about the validity level of peer assessment among teachers and students (Holroyd, 2000). This attitude has been identified as a major barrier to the use of peer assessment as a standard method of evaluating students.

Fry (1990) highlighted that, when it is implemented in the right way, peer evaluation demonstrates results, which are comparable with lecturer evaluation.

E. Overcoming Personal Bias

A drawback noted by students was the difficulty of remaining objective when assessing their peers. Many students found it challenging to give low marks or critically evaluate their friends' work as a lecturer might. This concern highlights the need for students to be properly trained as an assessor.

Several published studies shows that peer evaluation can be affected by negative social factors like peer pressure, favoritism, or fear of criticism, especially when done face-to-face. To address these issues, it's important to use methods that ensure anonymity in peer reviews.

F. Recommendations for Future Application

Overall, students in this study expressed a positive view of peer assessment and suggested its use in other courses. They acknowledged that combining peer assessment with superior assessment could enhance learning outcomes. To ensure the effectiveness of peer assessment, students recommended conducting it under the supervision and guidance of lecturers. This combined approach would offer the benefits of peer-to-peer engagement while maintaining the academic rigor provided by expert feedback.

V. CONCLUSION

While peer assessment presents certain challenges, it offers substantial advantages in creating a more accessible, engaging, and confidence-building learning environment. With proper training and lecturer involvement, peer assessment can serve as a valuable complement to traditional assessment methods in higher education.

Notes on Contributors

Thilanka Seneviratne led the study's conception, design, and implementation, contributed to data analysis and interpretation, drafted and critically revised the manuscript. Wathsala Edirisingha was involved in the implementation of the study and contributed to data acquisition and analysis. Himali Palpola contributed to the study's implementation, data analysis, and manuscript drafting. All the authors have read and approved the final manuscript.

Ethical Approval

Ethical clearance was obtained from the ethics review committee of the Faculty of Medicine, University of Peradeniya, (2024/EC/25).

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Declaration of Interest

All authors declare no conflict of interest.

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