

Implementation and Evaluation by Formal Assessments and Term End Student Feedback of a New Methodology of Clinical Teaching in Surgery in Small Group Sessions

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Abstract

The existing clinical teaching in small group sessions is focused on the patient's disease. The main dual limitation is that not only does the clinical skill testing become secondary but there is also a slackening of student involvement as only 1 student is evaluated during the entire session. A new methodology of small group teaching being experimented shifted the focus to testing students' clinical skills with emphasis on team participation by daily evaluation of the entire team. The procedure involved was that the group underwent training sessions where the clinical skills were taught demonstrated and practiced on simulated patients (hear-see-do module). Later the entire small group, as a team, examined the patient and each student was evaluated for 1 of 5 specific tasks – history taking, general examination, systemic examination, discussion and case write-up. Out of 170 students, 69 students (study) and 101 students (control) were randomly chosen and trained according to the new and existing methods respectively. Senior faculty (who were blinded as to which method of teaching the student underwent) evaluated all the students. The marks obtained at 2 examinations were tabulated and compared for tests of significance using *t*-test. The difference in the marks obtained showed a statistically significant improvement in the study group indicating that the new module was an effective methodology of teaching. The teaching effectiveness was evaluated by student feedback regarding improvement in knowledge, clinical and communication skills and positive attitudes on a 5-point Likert scale. Psychometric analysis was very positively indicative of the success of the module.

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Introduction

In clinically-oriented subjects such as surgery, specific guidelines for conducting small group teachings are lacking. Different methods are being practiced and researched in different clinical subjects. Team-based learning (TBL), Interactive Teaching, Peer-assisted Learning (PAL), Self-assessments, Practice Based Learning, Formative Assessments and Simulated Clinical Environment¹ are some of the aspects researched in medical education. A randomised trial suggested that interactive teaching facilitated better knowledge retention.² TBL³ is a well-defined instructional strategy that is being employed increasingly in Medical Education.⁴ Peer-led tutoring, if run by well-trained students, is likely to be a useful adjunct to traditional training methods⁵ In the context of clinical skills training, PAL was highly evaluated across many

parameters including confidence after training. Student interest and enthusiasm supports suggestions that PAL could be a useful adjunct to clinical skills training.⁶ In undergraduate medical education, peer assessment has a positive influence on professional behaviour.⁷ Peer assessment on an informal formative basis might prove to be the most useful and least stressful mechanism of encouraging reflection, improving performance and encouraging team work.⁸ One of the studies provides strong evidence that facilitator and peer ratings measure similar constructs and show even among Year 1 Medical students, peer evaluation can be conducted in a valid manner.⁹

Results concluded that student tutors can act as examiners in summative objective structured clinical examination (OSCE) to assess basic medical skills.¹⁰ Practice-based learning exercises that incorporate feedback to medical

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students hold promise to improve self-assessment skills.¹¹ Self-assessment has been recognised as a key aspect of procedural and technical skills teaching to enable identification of areas that require improvement.¹² Medical and healthcare educators recognise these factors and commonly employ self-assessment methods among learning resources and programme evaluations.¹³ Self-efficacy can be defined as a person's belief in his or her capability to organise and execute the course of action required to produce particular outcomes.¹⁴ Curriculum interventions that raise awareness and change attitudes, teach skills reinforce behaviours and fill knowledge gaps respecting individual characteristics of the trainee are important.^{15,16} Curriculum aims, such as the incorporation of appropriate attitudes towards patients and other team members, a positive ethical stance and understanding legal responsibilities, are of the utmost importance to individuals who intend to fulfill ultimately the role of a doctor. Small group sessions are often used to meet this goal.¹⁷

A new method of teaching with the emphasis on purely clinical skills development, positive attitude development, team participation, peer-assisted learning, formative self assessment was structured and implemented as detailed below.

The efficacy of this system was evaluated both by student feedback and also by analysing their performance in comparison with the outcomes of the former method of teaching in the examinations held at the end of posting and at the end of the semester.

Materials and Methods

While in their surgery clinical posting, all Semester Six (Year Three) medical students were divided randomly into small groups and different teachers taught each group. Sixty-nine students were taught according to the new module (Study) and 101 students were taught according to the existing method (Control) for the whole term. None of the students were excluded.

The new method focused on practice-based clinical skill development, team involvement, formative, self and peer assessment.

The “hear-see-do-repeat” module was used followed by “evaluate and rectify” to achieve perfection.

Hear – The clinical skills were first explained in detail.

See – The skills were demonstrated in the classroom on simulated patients.

Do – The students under supervision practiced the skills.

Repeat, Evaluate and Rectify – The students under mutual evaluation and rectification perfected the skills.

In the wards, the entire group was involved in the tasks.

- i) History taking;
- ii) General examination;
- iii) Systemic examination;
- iv) Discussion on investigation and management;
- v) Follow-up with case write-up submission

These were the 5 components taken up by 5 students separately.

After each student presented his part in the presence of the teacher, the other 4 students enumerated the fallacies encountered in the presentation. The student then evaluated his own performance. The teacher then summarised the shortcomings and highlighted areas requiring further improvement.

All the students were assessed based on:

- i) their presentation,
- ii) their keen observation of the fallacies in the fellow students' presentation,
- iii) their attitude towards the patient, teacher and colleagues.

The following day the students went on to the next component task, thus completing the entire cycle within 5 days. Separate clinical tutorials were held to discuss the case scenarios not experienced in the wards for both groups.

All students were evaluated at the end of the clinical posting by senior faculty who were not involved in regular teaching of the batch of students and were unaware as to which teaching method had been followed (Blinded).

Teaching outcomes were assessed by student feedback (from the new module group) regarding course satisfaction at the end of the posting.

The examinations were held on 2 occasions:

- i) the end posting tests and
- ii) the end of semester written examinations.

The marks obtained at formal assessment of the students were compared for statistical significance to determine the effectiveness of this teaching methodology.

Results

The marks obtained by the students – end posting out of 50 marks and term end examination out of 100 marks – were tabulated according to the 2 groups (study group, $n = 69$; control, group $n = 101$) and were compared using the t -test.

The psychometric analysis was done using the 5-point Likert scale (strongly disagree, disagree, neither disagree nor disagree, agree and strongly agree). The analysis of end of posting test results was based on a maximum of 50 marks (Table 1). The mean marks of the study group were 32.20; SD, 3.29; (CI, 31.42-32.98) and that of the control group

Table 1. Marks Obtained at the End of Posting Test

	New Module	Existing Module
n	69	101
Mean	32.2029	30.71287
Confidence interval	31.42-32.98	29.95-31.47
SD	3.288034	3.89188
Probability	0.009957	

n: number of students; SD: standard deviation

Table 3. Psychometric Analysis

Felt an increase in the following	1	2	3	4	5
Knowledge content	0	5	21	22	21
Conceptual	0	0	14	26	29
Understanding					
Clinical skills	0	0	21	23	25
Communication skills	0	0	21	26	22
Positive attitude towards a group	0	0	17	26	26
Positive attitude and empathy towards the patient	0	4	13	26	26
Effective psychological mentoring	0	0	21	26	22
Effective professional mentoring	0	0	26	23	20

1 = Strongly disagree, 2 = disagree, 3 = neither disagree nor disagree, 4 = agree, 5 = strongly agree

was 30.71; SD, 3.89; (CI, 29.95-31.47). The Student's *t*-test showed statistically significant results with $P < 0.05$.

The analysis of end of semester examination results was based on marks obtained out of a maximum of 100 (Table 2). The mean marks of the study group were 47.41; SD, 8.14; (CI, 45.49-49.33) and that of the control group was 44.14; SD, 9.91; (CI, 42.21-46.07). The Student's *t*-test showed statistically significant results with $P < 0.05$.

The difference in the marks obtained by the 2 groups showed statistical significance indicating that the new module was an effective methodology of teaching.

On analysing the results in the Psychometric analysis, it was found to be very positively indicative of the success of the module (Table 3, Fig. 1). There was an increase in the knowledge content, conceptual understanding and clinical skills development for most of the students. It was found that the new module was also statistically significant in increasing the performance in terms of concrete evaluation by formal examination and therefore bound to be effective.

Discussion

Small group teaching is a promising methodology of teaching to ensure proper inculcation of skills in the students. Within a small group, there is no established methodology as to how to conduct a particular clinical

Table 2. Marks Obtained at the End of Semester Examination

	New Module	Existing Module
n	69	101
Mean	47.4058	44.14356
Confidence interval	45.49-49.33	42.21-46.07
SD	8.142244	9.906144
Probability	0.024964	

n: number of students; SD: standard deviation

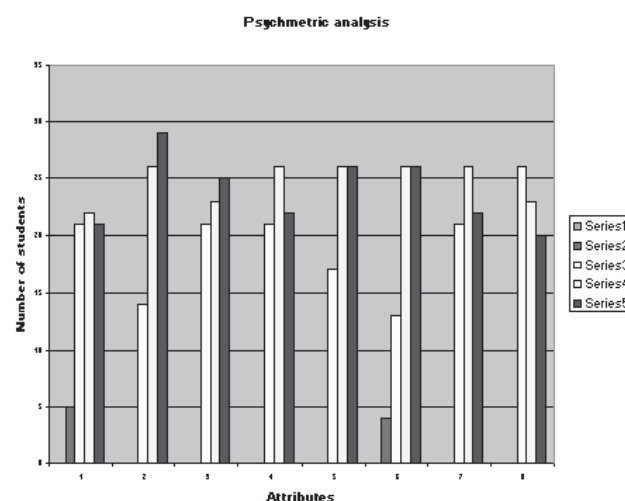


Fig. 1. Psychometric analysis.

Series 1 = Strongly disagree, Series 2 = disagree, Series 3 = neither disagree nor disagree, Series 4 = agree, Series 5 = strongly agree

Attributes

1 = Knowledge content

2 = Conceptual understanding

3 = Clinical skills

4 = Communication skills

5 = Positive attitude towards a group

6 = Positive attitude and empathy towards the patient

7 = Effective psychological mentoring

8 = Effective professional mentoring

teaching session especially for the clinically-oriented subjects such as surgery. Each of the teachers has his/ her own teaching pattern to improve students' clinical knowledge. The focus is mainly on the disease encountered and its presentation and management. Therefore, a foolproof method to ensure proper skill development in every student is not ensured.

In the original teaching method, at the bedside, students (in small groups of 5) were allotted cases and only 1 student was evaluated per session for his history taking and clinical skills. The discussion that followed was based more on the patient's condition, than on the minute scrutiny of the clinical skills of the students. The disadvantages were that there was a gradual deterioration of clinical skills due to lack of supervision and assessment. The rest of the group tended to be disinterested due to minimal involvement as only the student presenting the case was evaluated.

The idea that medical student's communication skills decline as students are increasingly exposed to clinical rotations has implications for curriculum redesign during the clinical years of training.¹⁸ In traditional clinical-based learning (CBL), details of individual cases are created and provided to students along with additional readings. Although this can result in a patient-focused discussion, it is not a particularly student-centred mode of learning as faculty members tend to drive the discussion around the provided cases. In an adaptation of CBL, the studied method was particularly keen to emphasise both the patient focused and complex nature of clinical care and to maintain the self-directed and student-centered learning begun with problem-based learning.¹⁹

The advantages of the new methodology are as follows (i) there was a continuous sharpening of clinical skills due to participation and supervision by colleagues and assessment by the teacher and (ii) the interest of the rest of the group was increased due to maximal involvement, since all the students presented a part of the case and were evaluated by both the students and the teacher and were therefore alert and sincere.

The future prospect for this teaching module appears good. Though the number of students in the control group had adequate power, the limitation is that the test group power fell short slightly.

Conclusion

This module had the characteristics of sound educational strategy, perfection of clinical skills in simulated environment, one-to-one clinical education, team learning

and building positive attitudes about working in teams, imparting an opportunity for self direction and supervision, practice-based learning, self and peer assessment.

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