

Is “modular” the way to go for small group learning in community medicine in undergraduate clinical postings?

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ABSTRACT

Context: There is a need to shift from the didactic lecture-based instruction to more student-centered active learning methods for undergraduate teaching in community medicine. **Aims:** To compare didactic and modular method of learning on Level 1 and 2 on Kirkpatrick’s training evaluation model. **Settings and Design:** This was a two-arm educational intervention study for a small group of the 2nd year MBBS students in their 4th semester during clinical posting in the subject of community medicine. **Subjects and Methods:** The topic chosen was “rabies prophylaxis” in the 2nd clinical posting during 4th semester. With permission from Institutional Ethics Committee, first batch of 17 students was taught this topic by didactic method. Next batch of 22 students was taught by the modular method. A self-reading module was prepared for this study and validated by three teachers. What was different in modular teaching was a circular sitting arrangement, module reading by students, video presentation, and exercise using case vignettes. **Statistical Analysis Used:** Student’s t-test was used for pre- and post-test score comparison and Mann–Whitney U-test for students’ responses on Likert scale. **Results:** The mean gain in obtained marks after modular learning (7.9/15) was significantly higher as compared to gain after didactic teaching (5.9/15) ($P = 0.0038$); more students asserted to be confident to manage a case in modular group compared to the didactic group ($P < 0.05$) indicating a higher level of learning through modular teaching. **Conclusions:** Modular teaching fares better than didactic method and hence should be used more frequently in community medicine clinical posting.

Key words: Community Medicine, Kirkpatrick’s training evaluation model, modular teaching, small group learning

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INTRODUCTION

Undergraduate teaching in community medicine is a mix of large group teaching in the form of lectures and small group teaching in clinical postings. The Department of PSM of the medical college has devoted 3 h per day during clinical postings of the 2nd year MBBS students. The current practice is to have a didactic lecture followed by a visit, where applicable,

during this 3 h session. When the session is taken for full 3 h with didactic method, the students find it monotonous and tend to lose interest in the topic. Further, with the current method of didactic teaching the focus of learning remains more on the lower taxonomic levels in the cognitive domain.^[1] Hence, there is a need to try new interactive methods of teaching–learning for clinical postings.

The WHO consultation paper on the teaching of community medicine also stresses on the need to shift focus from didactic lectures to innovative teaching–learning methods that are student-centered, integrated, community-based, interactive,

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and problem-solving.^[2] Some earlier studies documenting the students' perspective regarding the teaching in community medicine also report that the students prefer such methods of learning where there is active involvement of students over the lecture method.^[3,4] The competency-based curriculum emphasized in MCI vision 2015 also makes reference to such new methods.^[5]

Modular teaching is one such method which is widely used in the in-service trainings of health personnel in India.^[6,7] Modular teaching is a unit of instruction which involves self-directed learning of predefined skills involving mix of multiple learning activities.^[8] Srikanth *et al.* have also tried modular method of teaching-learning in community medicine from India.^[9] The current project involved using modular way of teaching for the topic rabies prophylaxis (animal bite prophylaxis) in a small group in clinical posting. Thus, the goal with new teaching-learning method was that the students are competent to choose correct plan of management for rabies prophylaxis at the end of their learning session. The objective of the study was to compare the didactic and modular methods for small group learning in clinical postings in community medicine using students' performance and their perceptions.

SUBJECTS AND METHODS

This study was conducted at a medical college from central part of Gujarat. The study population was formed of the 4th semester (2nd year) undergraduate medical students attending their second clinical posting in community medicine. Approval of Institutional Ethics Committee was obtained before starting the study. The study duration was from March to August 2015.

This was an experimental study to compare two teaching-learning methods. The second clinical posting for undergraduates in community medicine covers around 24 different topics in 4 weeks. The topic "rabies prophylaxis" was chosen for this study. Rabies prophylaxis was covered by two methods to separate batches of students. The sequence of events in both the sessions was as follows: Informed consent, pretest, teaching session, posttest, and feedback from students. Both the sessions were taken by the same teacher from the department to avoid bias.

On June 17, 2015, one batch of students (Batch B) was taught the topic by didactic method using a PowerPoint presentation and visit to the rabies vaccine clinic in hospital attached to medical college. A total of 17 students attended the session. The second batch of students learnt by modular method on July 8, 2015. For this method, a 20-page self-learning module was prepared based on the National Guidelines for Rabies

Prophylaxis.^[10] It was validated for the content by three subject experts. A hardcopy of module was given to each student at start of session. Students were made to sit in semi-circular fashion in the class. The students read portions of the module one by one as per their turn. The teacher facilitated reading by students and clarified concepts where required, showed relevant videos, guided students through exercises. The exercises in the form of clinical case vignettes were an important part of the module which was designed to help the students learn actual management of a case with animal bite. The students wrote the management plan on the blank spaces provided for this purpose in the module. A total of 23 students attended this session. A copy of the module was also made available on the internet.^[11]

Kirkpatrick's four-level training evaluation model was used for evaluation of this intervention.^[12] We did a short-term evaluation of our teaching program using first two levels. Level 1 (reaction) was assessed by taking students' perceptions about the session on Likert scale using a questionnaire. We applied Mann-Whitney U-test for this comparison of Likert scores for both the groups. This was supplemented by content analysis of responses made by students in reply of the open-ended questions at the end of feedback form. To allow the students to express themselves freely, writing name or roll numbers on feedback form was not kept mandatory.

Level 2 (learning) was assessed by comparing the pre- and post-test score of the students in each group (paired *t*-test). We also compared the posttest results of students from both groups (unpaired *t*-test). The predesigned 15 mark pre- and post-test question paper involved short answer type and essay type questions. The students' roll numbers were taken on the pre- and post-test answer papers to allow for paired comparisons between pre- and post-test score.

RESULTS

Table 1 shows the performance of the students on pre- and post-test for both the teaching-learning methods. The posttest scores were significantly higher than pretest scores for both

Table 1: Comparison of students' performance: Marks obtained by students out of 15

Method	Mean test score±SD		Gain in marks (%)	Paired t-test
	Pretest	Posttest		
Didactic (n=17)	2.7 (1.4)	8.6 (1.6)	5.9 (218)	t=13.2, P≤0.0001
Modular (n=22)	2.5 (0.97)	10.4 (2.1)	7.9 (316)	t=17, P≤0.0001
Unpaired t-test	t=0.6, P=0.55	t=2.88; P=0.006		

SD: Standard deviation

the methods. However, the students in the modular group achieved a significantly higher posttest scores compared to the didactic group. Furthermore, percent gain in posttest score was significantly higher in modular teaching group compared to didactic group.

Table 2 shows the feedback obtained from students about the session for both methods on Likert scale. The difference in responses was significant for the last question. More students asserted to be confident to manage a case in the modular group compared to the didactic group indicating learning at higher taxonomic level through modular teaching. Both batches were also asked if they recommend using the same method for subsequent batches. While 89% students in modular group recommended continuing using the same method, i.e., modular for the subsequent batches, only 52% students in didactic group recommended continuing using that method.

Content analysis of the students' responses to the open-ended questions showed that for the didactic method the students liked the pre- and post-test, well-organized content, visit to clinic and revision done at the end. The suggestions for improvement in didactic session included the following: Discontinue using PowerPoint, making it more interesting and showing more of actual cases. For the modular method, the students liked module reading, video, interaction with teacher and examples or exercises. While majority of them liked sitting arrangement, some did not like it, probably because they were made to sit as per their role numbers. The important suggestions for improvement in modular method included to reduce the length of the module and to change the seating arrangement.

DISCUSSION

The current study showed a higher gain in knowledge with modular method of learning compared with didactic teaching.

Earlier study by Srikanth *et al.* that experimented with modular teaching for the topic acute respiratory infections among children found that the mean posttest score was higher in the modular group compared to lecture group.^[9] Soudarssanane and Singh, although not terming it as modular teaching, also documented effectiveness of using a mix of handout combined with video clips and participatory discussions in learning for undergraduate students in India way back in 1994.^[13]

The students' feedback suggested that for both the methods they found the sessions to be interesting and the contents to be well organized. Furthermore, students from both groups expressed that they were given opportunity to ask questions. This may be teacher specific and likely to be changed for a different teacher. An important finding was that a larger proportion of students in modular method reported that they were actively involved in learning, which meant that the modular method served its purpose. Each student had to read a portion of the module as per their turn which ensured their active involvement. For this study, we kept the turns by roll number of students but it was suggested to keep it as per random numbers to keep an element of surprise and increase the attention.

Moreover, a significantly larger proportion of students asserted that they were confident to manage an actual case of animal bite among the modular group compared to didactic one. Making the students solve clinical exercises at the end and making them write the answers in the module was probably helpful in achieving this learning at "knows how" level in cognitive domain.

The authors of this study attempted to prepare a module which gives the students a directly usable learning material that they can easily refer to, which is devoid of redundant theory material and which is written in self-learning conversational style. Furthermore, we ensured that the students are exposed

Table 2: Students feedback about the session on Likert scale (n=17 for didactic and 19 for modular method)

Question	Type	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	U*
Session was interesting	Didactic	0	7	2	6	2	103.5 (0.06)
	Modular	0	1	4	10	4	
Contents well organized	Didactic	0	0	3	12	2	139.5 (0.49)
	Modular	0	0	3	11	5	
Actively involved in learning	Didactic	0	6	3	7	1	103 (0.06)
	Modular	0	1	4	11	3	
Liked seating arrangement	Didactic	1	0	7	5	4	157 (0.9)
	Modular	3	2	2	6	6	
Given opportunity to ask questions	Didactic	0	0	2	9	6	128 (0.3)
	Modular	0	0	2	6	11	
Confidant to manage a case now	Didactic	1	4	8	3	1	42.5 (<0.05)#
	Modular	0	1	1	6	11	

*Mann-Whitney U-test value; #Statistically significant

to different methods of learning through modular teaching in the form of module reading, brainstorming by teacher, showing video presentation, solving clinical exercises and visit to the clinic. Another study by Karthikeyan and Kumar using integrated learning module in dermatology also found that using more than one method of learning in modular way helps in better learning compared to didactic sessions.^[14]

This was our first experiment with modular teaching, and we also learnt some lessons. The module we prepared was a little lengthy which was brought to our notice by the student feedback. However, this was because during this trial of modular teaching a large part of the session was spent in pre- and post-test, taking informed consent and student feedback. A regular learning session may skip some of these activities and hence it may be possible to complete the module in stipulated time of 3 h. Nevertheless, in the revised versions, we intend to reduce the length of the module. In the process, we also learnt that developing such module is a complex and time-consuming task. It not only takes the subject-related knowledge but also linguistic skills to make it learner friendly.

The modular learning may not be a new concept among the medical educationists. However, it has not been used as commonly. Lately, with the renewed interest there are publications which report experimentation with modular teaching-learning for undergraduate medical students from various subject specialties.^[15,16] It is logical that the future trend will be in the direction of developing such e-learning modules.^[17] Moreover, there is a need for preparing theme-based integrated learning modules covering more than one department.

Limitations of the study

Only one topic was covered for comparison of two teaching-learning methods. The sample size was small as the students of only two groups out of total four groups of a regular batch could be taken for this study. The module covered only the cognitive domain, the psychomotor aspects of the ability to administer the vaccine and immunoglobulin were not covered here in this study.

CONCLUSIONS

To conclude modular teaching fares better compared to didactic teaching not only in the form of students' performance but also as per their feedback. Hence, it should be used more frequently as the teaching-learning methods in community medicine clinical posting.

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Conflicts of interest

There are no conflicts of interest.

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