

Medical Education

Microteaching enhances teaching skills of resident doctors in India: A pilot study

SURIYA PRAKASH MUTHUKRISHNAN, NALIN MEHTA

ABSTRACT

Background. The Medical Council of India has recommended microteaching for training medical graduates to improve their teaching efficiency. We assessed the effectiveness of microteaching on teaching skills of resident doctors through objective and subjective methods.

Methods. We obtained data from three microteaching sessions in which 10 resident doctors participated. Seven core teaching skills of the participants were compared between two training sessions using the paired *t*-test. Only 4 residents who had participated in the training sessions appeared for the semester examination. We compared the performance of the 'trained' residents ($n=4$) with the 'naïve' residents ($n=6$) who were getting exposed to microteaching for the first time during the semester examination using the Mann-Whitney test.

Results. Participants scored significantly high in the second training session compared to the first one. All the participants perceived the training sessions to have a positive effect on their teaching skills. In the semester examination, 'trained' residents performed significantly better than their 'naïve' counterparts.

Conclusions. Microteaching not only improved the teaching skills of the residents but also helped them perform well in their semester examination held 10 months later. Our results indicate that microteaching can be an effective teacher training technique for residents.

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INTRODUCTION

Microteaching was introduced by Allen at Stanford University to overcome the lacunae in their teacher training programmes.¹ Developed as a scaled-down simulated teaching encounter designed to develop new teaching skills and to improve existing skills, microteaching includes the presenter 'teacher', along with the actual students, or peers and supervisors as audience.

In India, resident doctors actively participate in teaching and assessment of MBBS students. Previous reports from undergraduate medical students suggest that residents play an important role in their education.^{2,3} Research, however, shows that medical schools lack effective instructional skills for teacher's training, and training of residents is low on priority. It is imperative that we improve teaching skills of residents through effective teacher training techniques.^{3,4} The Medical Council of India has

recommended microteaching for training medical graduates to improve their teaching efficiency at any age.⁵ We did not come across any study which investigated the effectiveness of microteaching of residents in India using subjective and objective methods.

Our study was designed to assess the effectiveness of microteaching technique on the teaching skills of Indian resident doctors by objective and subjective methods.

METHODS

This retrospective study used data of routine postgraduate training and assessment of the Department of Physiology, All India Institute of Medical Sciences, New Delhi, where microteaching is an integral part of the postgraduate teaching programme. We used data obtained from three microteaching sessions (2 training sessions and 1 semester examination) involving residents of our department. Ten residents participated in microteaching training. Incidentally, only 4 who had participated in the training sessions held before the semester examination appeared in the examination. Hence, we had a total of 10 residents who appeared for the semester examination: 4 'trained' in microteaching and 6 'naïve' to microteaching, exposed to microteaching for the first time during the semester examination.

Microteaching sessions for residents of our department involve objective assessment of seven core teaching skills, namely, set induction and lesson planning, presentation, reinforcement, stimulus variation, proper use of audiovisual aids, closure and completeness of communication, which are assessed by peers and faculty members (in training) and only by faculty members (during assessments) using a checklist which has a scale ranging from 1 to 5.

Training included two microteaching sessions. In the first session, participants were instructed to 'teach' a physiology topic of their choice relevant for MBBS students in 6 minutes. They were instructed to conduct a teaching session for average performers. The target audience consisted of their peers instructed to conduct themselves as MBBS students. At the end of individual sessions, presenters were provided with a comprehensive feedback by the audience and a copy of the video recording of their performance for self-reflection. On the basis of the self-reflection and feedback, they were required to make appropriate changes and 'teach' the same topic again in the second session, scheduled for the next day. Feedback survey using a 20-item survey instrument was administered to the participants at the end of the microteaching training sessions, for their subjective assessment of microteaching training activity. In the semester examinations, the participants were assessed by at least three faculty members and their scores/marks recorded.

All India Institute of Medical Sciences, New Delhi 110029, India
SURIYA PRAKASH MUTHUKRISHNAN, NALIN MEHTA
Department of Physiology

Correspondence to NALIN MEHTA; nalinaiims.mehta@gmail.com

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Statistical analysis

Normality of the data was tested using the D'Agostino and Pearson omnibus normality test. Statistical significance was accepted at $p < 0.05$. All the analyses were performed using GraphPad Prism 6. Core teaching skills of participants over two microteaching sessions during training were compared using the paired *t*-test. Pearson correlation was performed to determine whether the performances in the first-training session were related to changes in the scores between the two training sessions. We also compared the scores obtained by 'trained' residents ($n=4$) with their 'naïve' counterparts ($n=6$) in the semester examination using the Mann-Whitney test.

RESULTS

The scores of the core teaching skills of the participants were significantly higher in the second-training session as compared to those in the first session (Fig. 1). Significant negative correlation between the total scores of the participants in the first training session and the change of scores (difference in scores between the two training sessions) was observed for reinforcement ($R^2=0.4149$; $p=0.005$), stimulus variation ($R^2=0.6563$; $p=0.004$) and completeness of communication ($R^2=0.6548$; $p=0.005$). All 10 participants responded positively ('Yes') to all the items in the 20-item survey instrument after the training sessions. The training was perceived by them to have a positive effect on their teaching style. 'Trained' residents scored significantly higher than 'naïve' residents in five out of seven core skills (Table I).

DISCUSSION

Our results showed significant improvement in the core teaching skills of the residents in the second training session compared to the first training session, which suggests that feedback of the first training session might have impacted them, thereby improving their performance. Negative correlation between the total scores of the first training session with the difference in scores between the two training sessions showed that residents who had inferior core teaching skills benefited more from microteaching. These findings are in agreement with the previous studies conducted on physicians and pharmacy students.^{4,6}

Better performance of 'trained' residents compared to 'naïve' residents during semester examinations emphasizes the importance of microteaching in improving teaching performances of residents. The objective results indicate that microteaching is effective in training residents to become effective teachers.

In their feedback, all the participants appreciated the benefits of microteaching and found it an effective modality for teacher's training. In agreement with our subjective results, microteaching has been shown to improve self-assessed teaching behaviours and self-confidence as teachers.^{3,7}

In summary, both objective and subjective results of our study identify microteaching as a simple, cost-effective and less time-consuming technique for efficient training of Indian resident doctors with lasting effects. However, the findings of this pilot study, though highly encouraging, may not be generalizable to other medical institutions of India in view of the differences in the

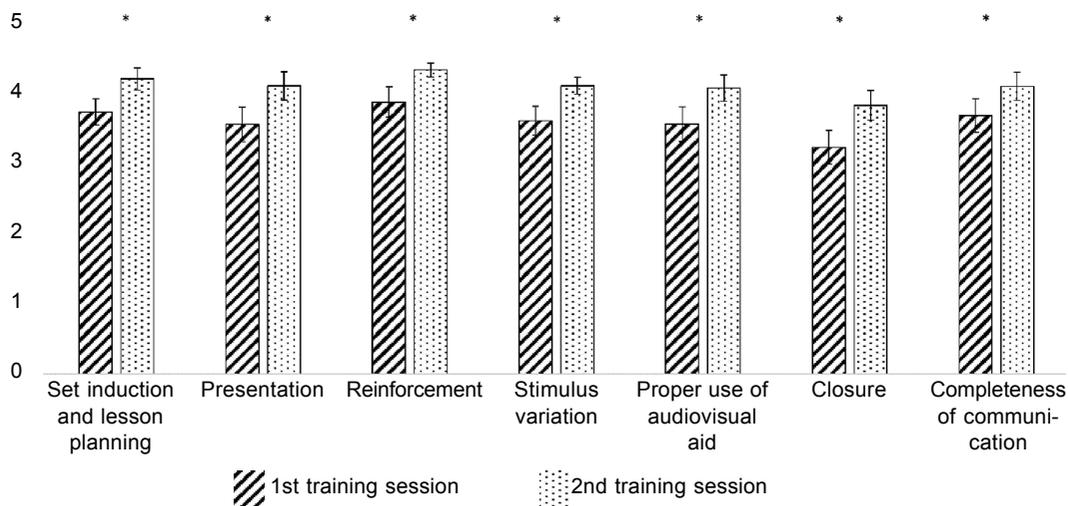


FIG 1. Objective evaluation of core teaching skills of residents in the two training sessions
* $p < 0.01$. Error bars represent \pm standard error of the mean

TABLE I. Comparison of the teaching skills of 'trained' residents ($n=4$) with the 'naïve' residents ($n=6$) during the postgraduate semester examination

| Teaching skill | p value | Mann-Whitney U-test | Median score | | |
|-----------------------------------|---------|---------------------|--------------|-------|------------|
| | | | Trained | Naïve | Difference |
| Set induction and lesson planning | 0.001 | 0.0 | 4.750 | 2.969 | 1.781 |
| Presentation | 0.019 | 1.0 | 4.425 | 2.900 | 1.525 |
| Reinforcement | 0.019 | 1.0 | 3.738 | 2.594 | -1.144 |
| Stimulus variation | 0.038 | -1.0 | 4.063 | 2.750 | 1.313 |
| Proper use of audiovisual aids | 0.005 | 0.0 | 4.313 | 2.938 | 1.375 |
| Closure | 0.743 | 10.0 | 2.550 | 2.313 | 0.237 |
| Completeness of communication | 0.281 | 6.5 | 3.625 | 3.0 | 0.625 |

infrastructure, resources, number of trainees and quality of the postgraduate (physiology) training programme at the All India Institute of Medical Sciences, New Delhi.

Microteaching is underrated in India and not optimally used to train residents. Previous report suggests that improvement of teachers after training is non-linear and highly influenced by support from senior faculty and the institution.⁸ We recommend microteaching as a part of the postgraduate curriculum for residents in Indian medical colleges. Participation of residents in these programmes should be voluntary and it should be encouraged by the instructors.⁴

Limitations

This study has a small sample size. Inclusion of residents from other departments at the institution would have added strength to the study and also enabled a meaningful comparison in improvement of teaching skills with and without intervention. Lastly, it is a challenge to ensure homogeneity of the study groups since we get postgraduates with varying proficiency and prior teaching experience.

Conclusions

Microteaching appears to be an effective technique to help improve teaching skills of residents. It should be accorded due importance in the postgraduate medical curriculum to enhance teaching skills of residents involved in teaching medical undergraduates. Microteaching can also assist physicians in acquiring effective teaching skills and making them successful teachers, preceptors and instructors of patients.

Conflicts of interest. None declared

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