Training-module for Residents in Medical Educational Technologies (TRIM): Need and Operational Strategies

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ABSTRACT
Residents-as-teachers campaign started abroad during last decade of 20th century. In India, though used informally for teaching of undergraduate students, residents have mostly been used for patientcare and their formal induction as teacher in Indian scenario is rare. Accordingly, not much effort has been made to train them formally in educational technologies. Teaching job requirements of residents are not the same as that of medical college faculty; as such, a program designed for medical college faculty will not prove equally effective for the residents. There is urgent need to train the residents in educational technologies for tapping their full potential as teachers and for this to happen, there must be a training module, tailor-made for the teaching-job requirements of the residents. This paper proposes such a program, after emphasizing the need of inducting residents in departmental formal teaching activities.

Keywords: Faculty development, Educational technologies, Residents as teachers, Training module, Workshop.

Visiting memory lane back to the days of an undergraduate medical student, the first visuals appearing in flash-back of most medical graduate are those of clinical classes, held during the evening hours, conducted by residents, where one used to have in-depth discussion on clinical cases and used to finalize a work-up; where one could elicit sign and symptoms freely and in a non-threatening environment; where probably one was more comfortable in admitting mistakes and looking for ways to correct them. Those sessions by residents and demonstrators helped medical undergraduates immensely in honing their clinical reasoning and psychomotor skills.

Residents and demonstrators are involved in routine teaching activities in most of the departments. It has been estimated that residents spend approximately 25% of their time teaching medical students [1]. Another study found that residents spent 19% of their total time in teaching activities, with 90% of this effort devoted to teaching associated with patient care and 10% spent in classroom teaching [2]. Even medical graduates perceive that 18% of the knowledge they gained during clinical clerkships came from residents and 13% from interns, compared with 25% from attending physicians and 43% from the students’ own initiative [3]. As evident, residents have always been involved in the departmental teaching activities. Of course, all these figures are from other countries and no such data could be found from India.

Is the picture same in India? Yes, to a large extent. Residents are being used in departmental teaching activities without being formally trained for the same in most of the non-clinical subjects. We don’t have a data...
for clinical subjects either, but it seems that utilization is suboptimal. With the introduction of competency-based curriculum at undergraduate level there will be paradigm shift and residents will be increasingly used for formal teaching activities in India without any formal training. Should we not have tailor-made faculty development activities for residents, both senior residents as well as post-graduate students, in order to tap their full potential in the conduct of the teaching activities in the department? We are discussing some of these issues here.

RESIDENTS AS TEACHERS

Literature is full of the reasons and means of involving residents-as-teachers in various medical disciplines, as explained here.

Regulatory Obligations

The literal meaning of word doctor is – to teach (derived from Latin verb docere). Being christened with the title ‘doctor’, residents are licensed to teach. Various regulatory bodies also make it mandatory for residents to teach the undergraduate medical students as they are given teaching experience certificate for the same, which is counted for career progression. As per Medical Council of India (MCI) regulations, three-year experience as Junior Residents and one year experience as Senior Resident in a recognized medical college in concerned subject is necessary to be appointed as Assistant Professor [4]. Naturally residents, who are given teaching experience, must teach as per regulatory and statutory provisions.

Institutional Requirements

Regulatory bodies have also mandated certain number of senior and junior residents (tutors in pre- and para-clinical subjects) to be appointed in medical colleges in all clinical disciplines. These staffed residents will certainly be utilized for the teaching purposes of undergraduate students.

Moreover, with the implementation of competency based medical curriculum in India from the admission session 2019, it has become imperative to use the services of residents in the teaching – as more hands are needed for ‘assessment for the learning’ purposes [5].

Refining residents’ own competencies

Teaching is the highest form of understanding. As is often quoted, ‘to teach is to learn twice’. Being involved in teaching process in the department provides residents opportunities to improve their own perceived professional competencies. Over the time, residents have opined that teaching helps them in being good clinicians – as teaching stimulates critical thinking and reflection on knowledge, besides enhancing self-learning [6,7].

In another study, attending doctors expressed the opinion that students and residents both are benefitted due to teaching by residents and teaching by residents should be regarded as an integral part of residency program [8]. Thus involving residents in the departmental teaching activities improve residents’ professional and clinical competencies, as perceived by them.
BENEFITS OF USING RESIDENTS AS TEACHERS

Students often rate teaching by residents higher than faculty teaching; and often view residents as more approachable, thus encouraging them to acknowledge their mistakes easily and accept feedback readily [9-11]. Residents-as-teachers also provide a kind of support system for the students by acting as near-peer mentors.

When residents are used as teachers, it is not only beneficial for the professional development of the students and the residents but for the overall growth of the institutions also, thus paving the way for the ultimate improvement in patient care outcomes (Fig. 1).

NEED AND IMPACT OF EDUCATIONAL TRAINING PROGRAM FOR RESIDENTS

For generations, residents teach the way they saw their teachers do that and imbibe skills through ‘role modeling’. However, learning the art and science of teaching through role modeling alone is not the correct and optimal way of learning; one needs to have formal experiential learning through formal training. Only a formally trained resident in teaching technology will be motivated and dedicated enough to have overall professional development. There are many reports of formal residents-as-teachers program from many Universities worldwide. However, considering the unique and contextual nature of educational content and environment, it may be worthwhile formulating our own program. Residents and demonstrators are usually involved in practical demonstrations, bed-side teaching and sometimes in assessment activities like conduct of objective structured clinical / practical examinations (OSCE/OSPE). They are also increasingly being used for skill development in the skill labs and other simulated environments.

Medical post-graduates are inherently trained to be competent in-patient care; they are not trained as ‘medical teachers’. Unlike requirements of having an educational degree in the field of humanities and arts, there is no specialized degree in the field of medicine which they must acquire in order to be medical teachers. This precise reason has forced regulatory bodies to start faculty development programs in medical educational technologies for the benefit of the medical faculties. In India, Medical Council of India (MCI) has developed two such structured programs –Basic Course Workshop in Medical Educational Technologies and Advance Course in Medical Education [12]. If tailor-made faculty development programs are required to be structured for medical faculty, the logic weighs-in on the side of structuring and implementing such a training program in educational technologies for residents also.

Literature has evidence that the training improves the didactic, cognitive and clinical skills of the trainees [13]. Some qualitative and quantitative studies have provided evidence of utility of training for residents in educational technologies [6,14,15]. Morrison, et al. by using the Objective Structure Teaching Examination to determine the impact of a 13-hour teaching training program for residents found that compared to a control group, residents’ having undergone training had an overall improvement in teaching scores by 28% [15]. However, Dunnington and DaRosa found minimal changes in resident teaching behavior by using OSTE, after introducing a residents-as-teachers intervention [16].
In another study, Snell by using triangulation of data method tried to evaluate the effectiveness of a training program for residents-as-teachers, which included five three-hour sessions. She proved that trained residents had improved resident teaching skills, showed better application of those skills and maintained those skills over the academic year [17]. This is perhaps the only kind of study using data from multi-sources to establish the effectiveness of training programs for residents in educational technologies.

It is also pertinent to note that many of these residents would be joining medical colleges as faculty. Others may end up teaching DNB residents. It would thus be a useful intervention to change the mindset towards teaching at an early stage of post-graduate career.

**TRAINING PROGRAM – DOCUMENTED EFFORTS**

Training modules for the formal training of residents in educational technologies and principles have been developed and implemented by various universities and colleges, ranging from 2 hour modules to workshops for 2-3 days to weekly / fortnightly one hour training for up to six months duration [15,16]. Longitudinal training programs in the form of electives for residents have also been designed, implemented and evaluated [18-20]. In most of these training programs and workshops most commonly used instruction methods were - lectures, small group interactive sessions and role-play. Large group interactive discussions and standardized students were the least commonly used methods [21].

A literature search could retrieve very few studies having used the concept of resident-as-teachers in India [22-24]. Of these studies, only Senior Resident Training on Educational Principles (STEP) study has described a structured training module in the form of workshop delivered to senior residents for enhancing their teaching skills [22]. Maharashtra University of Health Sciences also started ‘resident as teacher’ program.[25] All such programs started at various institutes could not sustain for various reasons; one of them possibly being lack of conviction about utility of such an exercise. As literature shows content, structure, duration and delivery variability of different workshops / training programs designed for residents-as-teachers, with hardly any visibility of such training modules and programs in India and as the use of residents-as-teachers is in transient phase in congruence with the paradigm shifts in the medical education and undergraduate and post-graduate medical curriculum in India, it is imperative that a structured training program in medical education technologies for residents’ training in India be designed.

**PROPOSED TRAINING-MODULE**

Though the need and effectiveness of a structured program in educational technologies for residents is self-explanatory, less than 10% of residents and interns reported to have undergone any sort of training in teaching. This fact alone emphasizes the need to design and implement a structured program for interns-as-teachers, particularly tailor-made for our needs and requirements. Due to differences in teaching-job profile, the structured module used for training of the medical faculty can’t be used for the residents also.
Accordingly, a ‘Training-module for Residents’ in India in Medical education technologies (TRIM)’ in the form of workshop, based on some fundamental assumptions has been proposed here (Box 1).

The goal of the proposed program is to orient the residents to the use of medical education teaching and assessment tools. The content of the proposed program has been designed by extracting data from three sources – previous experience of institutes in designing and implementing such programs; MCI requirements for residents in India; and curricular mandates requiring use of residents in students’ teaching as per authors own experiences. Three main areas identified for training and orientation of residents are – Teaching principles and tools, assessment and assessment tools, mentoring and teamwork.

The training module has been structured with the objectives of sensitizing and training residents in the concepts of – group dynamics and team-based learning, small group teaching, bed-side teaching, simulation based teaching and assessment, assessment of learning and assessment for learning and mentoring. These focused areas align well with the teaching job profile of the residents. However, efforts must be made to sustain this training through reinforcements during residency as well as during working period as faculty, as and when a resident joins as faculty in any institute. The description of the sessions and the instructional strategies proposed for delivery of those sessions has been briefed in Web Table 1.

This workshop of 22 hours can be conducted over three days, with 30-35 residents. If three-day continuous workshop is not possible, the institute concerned can distribute sessions daily, as appropriate. Trained faculty members from all departments can be involved. A self-explanatory and most-appropriate instructional method for the conduct of each session has been recommended; however local factors like available infrastructure, availability of time, expertise of facilitators will ultimately decide the choice of any of these methods.

Local planners may consider adding sessions on – appropriate use of multimedia, integrated teaching, assessment in integrated teaching-learning, self-directed learning – if their local needs direct the same. Similarly, based upon expertise of the faculty other instructional strategies like – cine-meducation, team-based learning, team objective structured clinical examination – can be used [27-29]. One can also explore the possibility of using online platforms and educational strategies for the delivery of the content; even partially, if not fully. Combination of synchronous and face-to-face training followed by asynchronous or synchronous online training can be a viable option in institutes with heavy patient footfall, making time constraints for residents a real issue.

EXPECTED OUTCOMES

What is expected to be achieved with this module? It is not expected that with this training module the residents will be fully equipped with all the teaching and assessment tools available in the armamentarium. Only expectation is that the sensitized residents after the training will start applying these concepts in their teaching activities. They are expected to be handy resources as facilitators in the conduct of Objective
structured clinical examination / Objective structured practical examination (OSCE / OSPE) in the department. After the training, they must be field-ready to act as instructors in the upcoming skill labs.

It is further expected that residents teaching skills will evolve and will improve from ‘being novice’ to at least ‘advance beginners’. More importantly residents are expected to build the concept of ‘transfer of training’ at their young age as teachers and understand the utility of having a learner-oriented educational environment in the institute.

**PROGRAM EVALUATION**

A detailed plan of action for program evaluation of the proposed “Training-module for Residents’ in India in Medical education technologies (TRIM)” is out of the scope of this paper. However, we are trying to issue generalized suggestions, so that the program is evaluated and monitored continuously for refinement as well as for ensuring accountability. The evaluation must include both process evaluation and outcome evaluation. While outcome evaluation will measure if the desired change has been achieved or not, the process evaluation will measure how the desired change was achieved – that is if the program was carried out as planned. Typically, a combination of logic and Kirkpatrick’s model will be good enough for such a program evaluation.

**CHALLENGES IN IMPLEMENTING TRAINING PROGRAM**

First challenge will be to find trained faculty for the conduct of the training program of the residents as teacher. The faculty needs to be trained themselves. The Medical Council of India’s new guidelines, making revised basic course workshop as mandatory requirement for promotion of faculty will result in many trained faculty members. Faculty inertia and resistance will be the next big challenge in the implementation of teachers training program for residents. The resistance is not baseless even. Faculty in medical colleges is already involved in multitasking – patient care, teaching postgraduates and undergraduates, curriculum development, administrative duties to name a few. Making arrangements and then conducting a workshop for residents will be labor intensive; though the very incentive that the trained residents will ultimately prove helping hands for these faculty members for undergraduate teaching will motivate faculty to plan and conduct such teachers training programs for residents.

Residents have multiple tasks to do – patient care, research, participation in continued medical education programs including training in research methodologies; so tapping their full potential as teachers is a challenge in itself. Consequently, many residents might be reluctant to attend teachers training program. However, owing to the huge personal and professional benefits of teaching undergraduate students, residents will get enough sensitization to attend such a training program.

The training program needs to be monitored also, at all levels, not only for continuous refinement and support but also for seamless implementation. Monitoring any program is a challenge in itself. Program evaluation and monitoring demands trained manpower, infrastructure, time and coordination among different
stakeholders. Program evaluation plan, as proposed above, will be required to be designed, once such a program is adopted for implementation.

CONCLUSIONS
There is huge man-power and potential available with us in medical institute in India in the form of junior and senior residents. Though routinely used in patient care, they must be used as facilitators and instructors for departmental teaching and assessment activities. It is logical to assume that orientation and training of residents in the form of a workshop module will improve their acumen for teaching activities. An informed, sensitized, orient and trained resident will prove to be a massive resource for the institutes.

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REFERENCES


### Web Table I Sessions and Instructional Strategies for the Delivery of the Proposed Workshop Module

<table>
<thead>
<tr>
<th>Sessions</th>
<th>Instructional strategies</th>
<th>Duration (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles of group dynamics and team building</td>
<td>Crossing the river – group activity [26]</td>
<td>1</td>
</tr>
<tr>
<td>Goals, roles and competencies and domains of learning and system approach</td>
<td>Brainstorming, interactive lecture</td>
<td>2</td>
</tr>
<tr>
<td>Interactive small group teaching – Problem based learning, case-based learning, tutorials, flipped classroom</td>
<td>Interactive lecture followed by group activities and reporting</td>
<td>3</td>
</tr>
<tr>
<td>Bed-side teaching, one-minute preceptor</td>
<td>Interactive lecture, Brainstorming, Role-play</td>
<td>2</td>
</tr>
<tr>
<td>Simulation based teaching</td>
<td>Hands on training in skill lab</td>
<td>2</td>
</tr>
<tr>
<td>Assessment: Principles and concepts</td>
<td>Interactive lecture</td>
<td>1</td>
</tr>
<tr>
<td>Assessment in competency based medical education</td>
<td>Interactive lecture, brainstorming</td>
<td>1</td>
</tr>
<tr>
<td>Assessment for learning, feedback and its utility</td>
<td>Interactive lecture, brainstorming, demo</td>
<td>1</td>
</tr>
<tr>
<td>Assessment of knowledge – MCQs, essay (long and short) questions, viva-voce</td>
<td>Interactive session, brainstorming, group activity</td>
<td>1</td>
</tr>
<tr>
<td>Assessment of skills – OSCE / OSPE</td>
<td>Brainstorming followed by demo and group activity</td>
<td>2</td>
</tr>
<tr>
<td>Work-place based assessment including assessment of affective domain</td>
<td>Interactive lecture followed by mini-CEX demo</td>
<td>2</td>
</tr>
<tr>
<td>Simulation based assessment</td>
<td>Hands on training in skill lab</td>
<td>1</td>
</tr>
<tr>
<td>Mentoring: Concepts, utility and residents as role-models</td>
<td>Interactive lecture, Brainstorming followed by group activity and reporting</td>
<td>3</td>
</tr>
</tbody>
</table>

*MCQs: Multiple choice questions; OSCE: Objective structured clinical examination, OSPE: Objective structured practical examination; mini-CEX: Mini Clinical Evaluation*

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**Box 1 Fundamental Assumptions for Designing Training Module**

Residents will

- be involved in teaching of cognitive, psychomotor and affective domains to undergraduates (UGs) including professionalism and ethics
- be mainly involved in interactive small group teaching and bedside teaching
- act as role models for UGs, thereby affecting soft skills including professionalism, ethics, communication of UGs
- act as mentors for UGs
- be used for assessment of UGs, of all domains, including assessment of knowledge
- be particularly used for assessment in simulated conditions, and more for formative purposes
- not be used for curriculum design or curriculum evaluation
Fig. 1 Beneficial effects of using residents as teacher.