

## Original Research Article

# A study on the awareness and practice of medical education technologies among medical college teachers

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## ABSTRACT

**Background:** Globally there is a move to reorient the medical education to suit the needs of the developing nations. Medical Council of India has made it mandatory that all faculty need to attend Basic course in Medical Education Technologies (MET) to improve teaching effectiveness. In spite of their efforts in this regard many of the faculty is still unaware of this initiative and those who have already attended the course are not effectively practicing it. This study aimed at assessing level of awareness and practice of medical education technologies among the teaching faculty.

**Methods:** Data was collected from the faculty by personal interviews using a validated semi-structured questionnaire and analysed using SPSS.

**Results:** 219 faculty members participated in the study working in 26 departments. Mean age of faculty was 40.98 (SD: 12.36). 57.1% of them were males and 42.9% were females. The level of awareness among study participants about learning process related medical education technologies ranged from 57% (for psychomotor domain) to 74% (for setting up of educational objectives). The awareness and practice of 'teaching process' and assessment process related medical education technologies remained low. No statistically significant association was obtained between awareness and practice of SLO, Microteaching, and MiniCEX.

**Conclusions:** Majority of teachers remain untrained in the medical education technologies at the time of the study. Of the non-clinical compared to the clinical stream of teachers, greater proportion of teachers in non-clinical section have been trained. The awareness and practice of 'medical education technologies' remain low among the study participants.

**Keywords:** Assessment process related medical education technologies, Awareness of medical education technologies, Micro teaching, Practice of medical education technologies, Specific learning objectives, Teaching process related medical education technologies

## INTRODUCTION

Medical education was developed with the objective of training students to serve to the health needs of the community.<sup>1</sup> Globally there was a move to reorient the medical education to suit the needs of the developing nations.<sup>2</sup> Developing an effective health care delivery system and ensuring universal access to health care immensely depend on the status of the medical education

system and the nature of medical manpower it produces.<sup>2</sup> Medical education envisages training of candidates leading to career as practicing physicians.<sup>3</sup> The curriculum develops the learning skills essential for independent study and continued learning in their future career as physicians.<sup>4</sup>

Medical Council of India had made it mandatory that the entire teaching faculty in medical colleges should

undergo Basic course in Medical Education Technologies (MET). Faculty Development Programs (FDPs) are especially important in adapting faculty members to their changing roles in initiating and setting the directions for curricular changes.<sup>5</sup> The Medical Council of India, by the MCI Regulations on Graduate Medical Education, 1997, made it mandatory for all medical colleges to establish Medical Education Units (MEUs) or departments to enable faculty members to utilize modern education technology for teaching.<sup>6</sup> In order to enhance this activity, MCI had selected Regional Centers as delivery points for faculty development programmes. This had provided opportunity for many faculties to get trained in Basic Course in Medical Education Technologies at various centers located all over India.<sup>6</sup> The purpose of the Basic Course Workshop in Medical Education Technology is to provide basic knowledge, skills and attitudes to all faculty members in medical colleges which they can apply in day to day practice in different areas of teaching and assessment.

While many medical schools abroad are offering innovative curricula such as 'Problem Based curriculum (PBL)', 'integrated curriculum', 'Competency based curriculum' and 'Hybrid curriculum', Indian medical institutions had been following traditional subject based curriculum. Efforts are directed now to change the current state of affairs.<sup>7-9</sup>

It is in this context that the study was conducted on the awareness and practice of Medical Education technologies among faculty of a Medical College. The objectives of the study were to assess the level of awareness among the teaching faculty regarding selected medical education technologies and to assess the practice of medical education technologies.

## METHODS

Study design was descriptive study. Study setting at Amala Institute of Medical Sciences, Thrissur. Study period was 5 months (March 2016 to July 2016).

Study subjects was all medical teaching faculty of Amala Institute of Medical Sciences, Thrissur, Kerala. Sample size was 219 (All the medical teaching faculty of Amala Institute of Medical Sciences, Thrissur, Kerala.) Study tool was a set of questionnaires with two parts: Part 1 for collecting general information and data related to awareness, Part 2 for collecting data related to practice.

### Inclusion criteria

- All medical teaching faculty of Amala Institute of Medical Sciences, Thrissur, Kerala.

### Exclusion criteria

- Those who were not willing to take part in the study were excluded.

Data collection of personal interviews were conducted using a structured questionnaire with two parts separately for assessing the level of awareness and extent of practice. The questionnaire was pretested by administering it to two Associate Professors and two Assistant Professors in the department. These two parts of the questionnaire were administered sequentially. For the assessment of awareness on selected medical education technologies the following aspects were included: specific learning objectives, domains of learning, teaching methods, evaluation techniques. For the assessment of practice of selected medical education techniques, the requisite information was obtained using a separate questionnaire as mentioned above.

### Statistical analysis

Analysis was done using SPSS version 16 and data are presented using frequencies, means and Standard Deviation (SD). An awareness score was developed in order to make comparisons relatively easier. The teachers' knowledge and practice were assessed, analyzed and compared based on the teachers' identification data (Non-clinical versus clinical, professors versus associate and assistant professors, and attended verses not attended basic course) using unpaired Student's t-test (for normally distributed data) and Chi-squared tests (for nonparametric data). p-values of  $\leq 0.05$  were used as a level of statistical significance. Ethical considerations- Ethical clearance was obtained before the beginning of the study and Informed consent was obtained from all the participants.

## RESULTS

A descriptive study was conducted among the faculty members of Amala institute of Medical Sciences, Thrissur to assess the level of awareness and practice of selected medical education technologies. 219 faculty members participated in the study working in 26 departments. The age and gender distribution of the study participants are shown in the table no.1. Among the total 219 study participants 94(42.9%) were females and 125(57.1%) were males. The largest number of study participants (70, 32%) were in the age segment of 31 to 40 years. As evident from table no 1, the least number (24, 11%) of study participants belonged to the age group  $\geq 61$  years (Table 1).

**Table 1: Age and Gender of the study participants (N=219).**

Variable	Category	Frequency	Percent
Age	$\leq 30$	53	24.2
	31-40	70	32.0
	41-50	42	19.2
	51-60	30	13.7
	$\geq 61$	24	11.0
Gender	Female	94	42.9
	Male	125	57.1

The mean age of the participants was 40.98 (SD.12.36). There were 48(21.9%) faculty members from the pre- and para-clinical medical specialties. Faculty members from Clinical departments constituted 78.08% (171) of the study participants. Out of 219 faculty members; 56(25.6%) were Professors, 34(15.5%) were Associate professors and 56(25.6%) were Assistant Professors. The rest 73(33.3%) were Senior Residents. Mean teaching experience in years of the faculty members was 9.2(SD.8.29).

**Table 2: Faculty members who had attended basic courses in Medical Education Technologies (MET) and their type of medical speciality (N=219).**

Type of medical speciality	Trained in MET		Total
	Yes	No	
Non-Clinical/paraclinical	27(56.2%)	21(43.8%)	48
Clinical	45(26.3%)	126(73.7%)	171
Total	72(32.79%)	147(67.21%)	219

Table no 2 shows the proportion of study participants who have had attended basic courses in the Medical education technologies. Among the total 219 study participants 72(32.7%) have undergone training in Medical education technologies. While 147(67.21%) of the study participants have not undergone any sort of training in the medical education technologies.

Among the total 48 participants from the nonclinical/paraclinical streams 27(56.2%) had attended basic courses in Medical Education Technologies (MET). Among the 171 faculty members from the clinical medical specialties only 26.3% (45) have underwent training basic courses in medical education technologies (Table 2). This difference observed regarding the attendance of basic courses in medical education technologies between faculty members depending on their type of medical speciality was found to be statistically significant. (X<sup>2</sup>: 15.21, p<0.001).

The study participants were asked whether they were aware of the 'Learning process related Medical Education Technologies'. Namely setting up of Specific Learning Objectives, Pedagogy, Andragogy, setting up of Educational Objectives. They were asked whether they were aware of the terms related to medical education technology.

From table no 3, Majority (161, 74%) of the study participants were aware of setting up educational objectives. Awareness regarding the setting up of specific learning objectives was observed among 62% (136) of the study participants. Among the total 219 study participants, 131(59%) and 122(56%) were aware of pedagogy and andragogy respectively. Awareness regarding cognitive domain, affective domain, psychomotor domain was present in 139(63%), 146(67%), 124(57%) of the study participants respectively.

**Table 3: Awareness of 'learning process related medical education technologies and terms' among the study participants (N=219).**

Awareness of 'Learning process related Medical Education Technologies'	Frequency (n)	Percentage (%)
Specific learning objectives	136	62
Pedagogy	131	59
Andragogy	122	56
Educational objectives	161	74
Cognitive domain	139	63
Affective domain	146	67
Psychomotor domain	124	57

The study participants were asked whether they were aware of the teaching process related' and 'assessment related' Medical Education Technologies.

As evident from table no 4, among the total 219 study participants, 113(52%) were aware of 'learner-controlled learning methods. Small group discussion and large group discussion were familiar to 150(68%) and 129(59%) of the study participants. Group discussion as a teaching process medical education technology was known to 98(45%) of the study participants.

Among the total, 73% (159) participants were aware of microteaching as a method of teaching process medical education technology. Only 18% (40) of the study participants were aware of problem-based learning. Innovative Teaching Methods and Newer Teaching aids were known to 63(29%) and 56(26%) study participants respectively. Microteaching was known to major share of the study participants and problem-based learning was known to least number of study participants (Table 4).

As depicted in table no 4, among the total 219 study participants, 46(21%) were aware of 'Formative Assessment'. OSPE (Objective Structured Practical Examination) and OSCE (Objectively Structured Clinical Examination) were familiar to 76(35%) and 122(56%) of the study participants. 'Summative assessment' as a teaching process medical education technology was known to 48(22%) of the study participants. From table no 4, among the total study subjects, 69% (152) participants were aware of MiniCEX (Mini Clinical Evaluation Exercise) as an 'Assessment related medical education technology'. Only 22(10%) of the study participants were aware of. OSLE (Objective Structured Long Examination Record). MiniCEX (Mini Clinical Evaluation Exercise) was known to major share of the study participants and OSLE (Objective Structured Long Examination Record) was known to least number of study participants.

The study participants were asked regarding the practice of teaching process related Medical Education Technologies. From table no 5, majority of the study

participants (177, 81%) practiced the setting up of Setting Specific Learning Objectives (SLO). Among the total study participants, 135(62%) had the practice of testing the cognitive domain. Among the total study participants, 91(42%) study participants had the practice of testing the

affective domain of the students. Testing psychomotor domain and micro teaching were practiced by 94(43%) and 53(24%) study participants respectively. Microteaching was the least practiced 'Teaching process related Medical Education Technology'.

**Table 4: Awareness of 'teaching process related' and 'assessment related' Medical Education Technologies among the study subjects (N=219).**

Variable	Category	Frequency(n)	Percentage (%)
Awareness of 'Teaching process related Medical Education Technologies'	Learner controlled learning method	113	52
	Small group teaching	150	68
	Large group teaching	129	59
	Group discussion	98	45
	Problem Based Learning	40	18
	Innovative Teaching Methods	63	29
	Micro Teaching	159	73
Awareness of 'Assessment related medical education technologies.'	Newer Teaching aids	56	26
	Formative Assessment	46	21
	Summative Assessment	48	22
	OSPE (Objective Structured Practical Examination)	76	35
	OSCE (Objectively Structured Clinical Examination)	122	56
	OSLER (Objective Structured Long Examination Record)	22	10
	MiniCEX (Mini Clinical Evaluation Exercise)	152	69

**Table 5: Practice of teaching process related medical education technologies (N=219).**

Variable	Frequency (n)	Percentage (%)
Practice of Setting Specific Learning Objectives (SLO)	177	81
Practice of testing cognitive domain	135	62
Practice of testing affective domain	91	42
Practice of testing psychomotor domain	94	43
Practice of micro teaching	53	24

From table no 6, only a minority of the study participants (4, 2%) practiced OSLE (Objective Structured Long Examination Record). Among the total study participants, 83(38%) had the practice of assessing students using modified essay. As a method of student assessment, 61(28%) study participants used MiniCEX (Mini Clinical Evaluation Exercise). OSPE (Objectively Structured

Practical Examination) and OSCE (Objectively Structured Clinical Examination) were practiced by 23(11%) and 60(27%) study participants respectively. Direct Observation of Procedural Skills was practiced by 6% (13) study participants. OSLE (Objective Structured Long Examination Record) was the least practiced 'Assessment related newer Medical Education Technology.'

**Table 6: Practice of assessment related newer medical education technologies.**

Variable	Frequency (n)	Percentage (%)
Practice of MiniCEX (Mini Clinical Evaluation Exercise) for student assessment	61	28
Practice of Modified Essay	83	38
Practice of OSPE (Objective Structured Practical Examination)	23	11
Practice of OSCE (Objectively Structured Clinical Examination)	60	27
Practice of OSLE (Objective Structured Long Examination Record)	4	2
Practice of Direct Observation of Procedural Skills	13	6

**Table 7: Association between awareness of Specific Learning Objectives (SLO) and its practice (N=219).**

Awareness about the medical education technology of setting up Specific Learning Objectives (SLO)	Practice of Specific Learning Objectives (SLO)		Total
	Yes	No	
Yes	114(83.80%)	22(16.20%)	136
No	63(75.90%)	20(24.10%)	83
Total	177(80.80%)	42 (19.20%)	219

From table no.7, among 136 study participants who were aware of setting up specific learning objectives only 114(83.8%) actually practiced it. Among the study subjects who were not aware of the process of setting up of specific learning objectives 63(75.9%) claimed to be

practicing it during their teaching session. No statistically significant association was observed between Awareness of Specific Learning Objectives (SLO) and Practice of setting up of Specific Learning Objectives (SLO) ( $\chi^2:2.09$ ,  $p<0.149$ )

**Table 8: Association between awareness of micro teaching and its practice (N=219).**

Awareness about the medical education technology called 'Micro teaching'.	Practice of Micro teaching		Total
	Yes	No	
Yes	40(25.20%)	119(74.80%)	159
No	13(21.70%)	47(78.30%)	60
Total	53(24.20%)	166(75.80%)	219

**Table 9: Association between awareness of Mini-CEX (Mini Clinical Evaluation Exercise) and its practice (N=219).**

Awareness about the medical education technology called Mini-CEX	Practice of Mini-CEX ( Mini Clinical Evaluation Exercise)		Total
	Yes	No	
Yes	27(24.10%)	85(75.9%)	112
No	26(44.1%)	33(55.9%)	59
Total	63	118	171

From table no.8, among 159 study participants who were aware of Micro teaching only actually 119(74.80%) didn't actually practice it. While among the study subjects who were not aware of Practice of Micro teaching, 13(21.70%) claimed to be practicing it during their teaching session. Thus, the practice of micro teaching was comparable in those who were aware and those who were not aware about micro teaching. But such an association was not found to be statistically significant. ( $\chi^2 0.289$ ,  $p<0.591$ )

From table no.9, among 112 study participants who were aware of the medical education technology called Mini-CEX only 27(24.10%) actually practiced it. While among the study subjects who were not aware of Mini-CEX, 26 (44.1%) claimed to be practicing it during their teaching session. Thus, the practice of Mini-CEX was comparable in those who were aware and those who were not aware about Mini-CEX. But such an association was not found to be statistically significant. ( $\chi^2 0.189$ ,  $p<0.791$ )

## DISCUSSION

Medical council of India had made it mandatory for all the medical faculty members to attend the basic workshops in medical education technology.<sup>5</sup> Yet this study revealed that among the total 219 study participants only 72(32.7%) have undergone training in Medical education technologies. While 147(67.21%) of the study participants have not undergone any sort of training in the medical education technologies. The impediments faced by medical faculty in attending such faculty development workshops should be probed into by further studies. Adequate measures should be taken to ensure the participation of faculty in medical education technology workshops. The medical education unit in the medical colleges should be strengthened to address the challenge.<sup>5</sup>

Among the total 48 participants from the nonclinical/paraclinical streams 27(56.2%) had attended basic courses in Medical Education Technologies (MET). Among the 171 faculty members from the clinical medical



specialities only 26.3% (45) have underwent training basic courses in medical education technologies. This disparity between clinical and non/para clinical medical specialities was found to be statistically significant in this study. There are various assessment modalities in medical education and its appropriate use helps in better education outcomes.<sup>10</sup> So it's quite important that the medical faculty from all specialities obtain sufficient competency with respect to medical education technologies.

Medical students of the current generation score higher on assertiveness, self-liking, narcissistic traits and high expectations.<sup>11</sup> The medical education system should make timely changes by incorporating new medical education technologies. Studies have shown that medical educational technologies like formative assessment. There are studies showing that there was a significant improvement in the student's academic performance after the implementation of medical educational technologies like formative assessments.<sup>12</sup>

The level of awareness among study participants about learning process related medical education technologies ranged from 56 % (for andragogy) to 74% (for setting up of educational objectives.). The level of awareness among study participants about teaching process related medical education technologies ranged from 73% (159, for Micro Teaching) to 18% for Problem Based Learning. The awareness of study participants regarding Innovative Teaching Methods (63,29%); newer teaching aids (56, 26%) was observed to be low. In a study conducted among medical teachers in India showed that 80% of the teachers had the knowledge about microteaching which is much higher than that observed in this study.<sup>13</sup>

Similar pattern of low awareness levels was observed with respect to 'Assessment related medical education technologies only 21% (46) and 22 % (48) of the study participants were aware of formative assessment and summative assessment. Only 35% (76) were aware of OSPE (Objective Structured Practical Examination). OSLER (Objective Structured Long Examination Record) was known to least number of study participants (22, 10%). MiniCEX (Mini Clinical Evaluation Exercise) was known to major share of the study participants (152, 69%).

When it came to practice of teaching related medical education technologies, majority of the study participants (177, 81%) practised the setting up of Setting Specific Learning Objectives (SLO). Practice of Microteaching was the lowest (24%, 53).

Only a minority of the study participants (4, 2%) practised OSLER (Objective Structured Long Examination Record). OSLER (Objective Structured Long Examination Record) was the least practised Teaching process related newer Medical Education Technology. The practice of MiniCEX (61, 28%), Modified Essay (83, 38%), OSPE (23, 11%), OSCE (60, 27%), DOPS (13, 6%) were also found to be low. This

calls for a concerted effort to increase the awareness and practice of medical educational technologies among medical faculty. Lack of awareness can be a reason for this low level of practice of medical education technologies. More studies should be directed towards finding out the other reasons for the non-practice of medical education technologies by medical faculty.

No statistically significant association was obtained between awareness and practice of SLO, Microteaching, and MiniCEX.

## CONCLUSION

To conclude, majority of teachers remain untrained in the medical education technologies at the time of the study. Of the non-clinical compared to the clinical stream of teachers, greater proportion of teachers in non-clinical section have been trained. The awareness and practice of medical education technologies remain low among the study participants.

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## REFERENCES

1. Al-Muhanna FA. Challenges to Saudi medical education in the third millennium. *J Family Community Med.* 2009;16(2):67.
2. WHO | "Challenges in World Health and Medical Education". WHO. Available at: <https://www.who.int/dg/brundtland/speeches/2003/copenhagen/en/>. Accessed 28 Nov 2019.
3. The Ultimate Goal of Medical Education. Available at: <https://www.harvard Macy.org/index.php/hmi/the-ultimate-goal-of-medical-education>. 18 Nov 2019
4. Scheele F. The art of medical education. *Facts Views Vis Obster Gyn.* 2012;4(4):266-9.

5. Zodpey S, Sharma A, Zahiruddin QS, Gaidhane A, Shrikhande S. Faculty development programs for medical teachers in India. *J Advances Med Education Professionalism.* 2016;4(2):97.
6. Adkoli BV, Sood R. Faculty development and medical education units in India: a survey. *Nat Med J Ind.* 2009;22(1):28-32.
7. Glasgow NA. *New curriculum for new times: A guide to student-cantered, problem-based learning.* Corwin Press, Inc., 2455 Teller Road, Thousand Oaks, CA 91320-2218 (hardcover: ISBN-0-8039-6498-6, \$44.95; softcover: ISBN-0-8039-6499-4, \$19.95); 1997.
8. Quintero GA, Vergel J, Arredondo M, Ariza MC, Gómez P, Pinzon-Barrios AM. Integrated medical curriculum: advantages and disadvantages. *J Med Edu Curricular Develop.* 2016;3:JMECD-S1892.
9. Jacob KS. Medical Council of India's New competency-based curriculum for medical graduates: A critical appraisal. *Ind J Psychol Med.* 2019;41(3):203.
10. Exploring the Impact of Assessment on Medical Students' Learning: Assessment and Evaluation in Higher Education: Vol 0, No 0. Available at: <https://www.tandfonline.com/doi/full/10.1080/02602938.2019.1614145> Accessed 19 Nov 2019.
11. Buja LM. Medical education today: all that glitters is not gold. *BMC Med Edu.* 2019;19(1):110.
12. Arja SB, Acharya Y, Alezaireg S, Ilavarasan V, Ala S, Arja SB. Implementation of formative assessment and its effectiveness in undergraduate medical education: an experience at a Caribbean Medical School. *MedEdPublish.* 2018 Jun 13;7. Available at: <https://www.mededpublish.org/manuscripts/1680>. 20 Nov 2019.
13. G1703153235.pdf. (Cited 2019 Nov 20). Available at: <https://www.iosrjournals.org/iosr-jdms/papers/Vol17-issue3/Version-15/G1703153235.pdf>
14. Jagzape A, Jagzape T, Pathak S. Medical Education Terminologies: Do These Really Percolate to the Level of Medical Students? A Survey. *J Clin Diagnostic Res: JCDR.* 2017;11(9):JC01.

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