

Original Research Article

Effectiveness of a structured AETCOM training intervention on knowledge, attitude and communication practices among medical interns in Maharashtra: an interventional study

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ABSTRACT

Background: Attitude, ethics and communication are key attributes in doctor-patient relationship and to strengthen them, National Medical Commission (NMC) introduced the Attitude, Ethics and Communication (AETCOM) module within Competency-Based Medical Education (CBME). Evidence on its impact among medical interns in Maharashtra is limited. This study evaluates interns' baseline knowledge, attitudes and communication practices regarding AETCOM and examines the module's effectiveness in improving them.

Methods: An interventional study was conducted among 180 medical interns from three medical colleges in Maharashtra from December 2025 to May 2026. Baseline assessment was carried out using a validated Knowledge-Attitude-Practice (KAP) questionnaire and Kalamazoo Essential Elements Communication Checklist-Adapted (KEECC-A). A structured 12-hour AETCOM training was delivered over four weeks, with post-intervention evaluation done six weeks later. The difference in means of pre-intervention and post-intervention scores were analysed for statistical significance using 'paired t-test' ('p' value < 0.05 considered significant).

Results: The mean knowledge score increased significantly from 18.6 ± 4.2 to 27.9 ± 3.1 ($p < 0.001$). Mean attitude score improved from 62.4 ± 8.7 to 79.6 ± 6.4 ($p < 0.001$). Mean communication practice score increased from 58.3 ± 10.2 to 91.4 ± 12.1 ($p < 0.001$). Female interns demonstrated marginally higher post-test scores than males, though the difference was not statistically significant ($p > 0.05$).

Conclusions: The structured AETCOM module demonstrated significant effectiveness in improving knowledge, professional attitude and communication practices among medical interns in Maharashtra.

Keywords: AETCOM, Communication skills, Kalamazoo, Medical interns, Maharashtra

INTRODUCTION

Communication forms the cornerstone of effective healthcare delivery. Effective doctor patient communication has been shown to enhance patient satisfaction, compliance with treatment, medical decisions and outcomes. Effective communication between the doctor and the patient leads to better compliance to suggested lifestyle changes and treatment, better health outcomes, decreased medicolegal conflicts and higher satisfaction both for doctors and patients.¹⁻³ Medical

students' interpersonal and communication skills are considered as the fundamental dimension of their clinical competence.⁴ Hence, the acquisition of communication and interpersonal skills is recognised and documented as a core competency for medical students' training in many countries.⁵⁻⁷

Various studies have also proved that educational interventions in the form of interactive workshops, interviews of simulated patients, role modelling, role-play, videotape review and skills practice can enhance the skills

of students in communicating with patients.^{8,9} Recognising this need, the National Medical Commission (NMC) introduced Competency-Based Medical Education (CBME) in 2019. A major component of CBME is the Attitude, Ethics and Communication (AETCOM) module, designed to systematically develop competencies related to professionalism, ethical practice, empathy, teamwork and effective communication.

The AETCOM curriculum emphasizes experiential learning through role play, reflective exercises, case discussions, self-directed learning and workplace-based assessments. It seeks to produce an Indian Medical Graduate who is not only clinically competent but also ethical, compassionate and capable of effective communication with patients, families, colleagues and communities.¹⁰ Several studies conducted in India have demonstrated positive effects of communication-skills training among undergraduate medical students and interns. Jain et al, reported significant improvement in communication competencies among medical interns following implementation of AETCOM communication modules using the Kalamazoo Essential Elements Communication Checklist.¹¹ Similarly, Thakur et al, observed substantial enhancement in communication scores among undergraduate medical students in Maharashtra following structured AETCOM training.¹²

Studies from Gujarat, Karnataka, West Bengal, Tamil Nadu and Maharashtra have consistently reported improved confidence, communication competence, empathy and ethical awareness among learners exposed to structured communication-skills interventions.¹³⁻¹⁸ International literature also supports the effectiveness of communication-skills curricula in improving patient-centric interviewing, empathy, shared decision-making and professional conduct.¹⁹⁻²¹

Despite widespread implementation of AETCOM in Indian medical colleges, evidence regarding its effectiveness during the internship phase remains limited. The compulsory rotatory medical internship represents a critical transition period during which medical graduates engage directly with patients, families and healthcare teams. The effective communication and ethical decision-making become particularly important during this phase. Furthermore, Maharashtra hosts one of the largest medical education systems in India, comprising government, private and deemed medical institutions serving diverse populations. Evaluation of AETCOM interventions among medical interns in this context is essential for evidence-based curriculum refinement and educational policy.

The present study was therefore undertaken to assess baseline knowledge, attitude and communication practices related to AETCOM competencies among medical interns and to evaluate the effectiveness of a structured AETCOM training intervention implemented in selected medical colleges of Maharashtra.

METHODS

The institutional ethical committee's approval was obtained for this interventional study consisting of a pre intervention assessment, intervention in the form of structured AETCOM module sessions and post-intervention assessment, conducted among medical interns in Maharashtra. The study was conducted over a period of six months, from 01 December 2025 to 31 May 2026, within selected medical colleges in Maharashtra. The medical interns undergoing compulsory rotatory internship during the study period and willing to participate in the study were eligible for inclusion in the study. Exclusion criteria included unwillingness to participate, failure to attend all sessions of structured AETCOM module and those who have undergone advanced communication-skills certification courses in the past.

Based on improvement in communication competency scores of medical students and interns observed in previous Indian interventional studies (effect size=0.5, $\alpha=0.05$, power=80%), minimum sample size for this study was calculated as 164. After accounting for 10% attrition in study population, final sample size of 180 interns was calculated.

For this study, a multistage sampling technique was employed. In the first stage, three medical colleges from different regions of Maharashtra were selected purposively to ensure representation of urban, semi-urban and rural populations. In the second stage, all eligible medical interns undergoing compulsory rotatory internship during the study period were approached. A total of 192 medical interns were screened, out of which, twelve interns were excluded due to incomplete participation, resulting in a final study sample of 180 medical interns for this study.

Sociodemographic data of study participants was collected on a semi-structured questionnaire, based on Modified Kuppuswami scale 2019. A pre-validated structured questionnaire consisting of 30 multiple-choice questions for 'Knowledge Assessment Tool', a 20-item Likert scale instrument for 'Attitude Assessment Scale' and Kalamazoo Essential Elements Communication Checklist-Adapted (KEECC-A) for assessing seven domains of communications skills of AETCOM were used in this study. The KEECC-A has been widely used in communication-skills assessment and demonstrated validity and reliability in medical education research.^{22,23}

A structured AETCOM training package of 12 hours duration was developed based on NMC AETCOM modules and findings from previous Indian studies. The structured AETCOM intervention, delivered over four weeks period, utilised various modalities including interactive lectures, small-group discussions, simulated patient encounters, video demonstrations, reflective writing and feedback. Post-test evaluation was conducted six weeks after the completion of structured AETCOM

training. The assessment procedures were identical to baseline assessment.

The data was compiled and statistical analysis was done with SPSS 20.0 statistical software. The difference in the means of pre-intervention scores and post-intervention scores were analysed for statistical significance using 'paired t-test' ('p' value<0.05 considered significant).

RESULTS

A total of 180 medical interns in the age group of 22-25 years participated in this interventional study, with their mean age at 23.4±0.8 years. Table 1 shows the socio-demographic characteristics of study subjects. Out of all participating medical interns, 92 (51.1%) were male and 88 (48.9%) were female. A majority of participants in the study group belonged to urban areas (62.2%). After giving structured AETCOM training intervention to the study

participants, overall knowledge score improved significantly from 18.6±4.2 (pre-intervention) to 27.9±3.1 following intervention. After giving structured AETCOM training intervention to the study participants, statistically insignificant improvement was observed in all attitude domains of the study participants. The mean attitude score of participants improved from 62.4±8.7 to 79.6±6.4 (p<0.001) post-intervention.

After giving structured AETCOM training intervention to the study participants, statistically significant improvement was observed in overall communication competency scores in the study participants. The mean communication practice score of participants increased from 58.3±10.2 to 91.4±12.1 (p<0.001), post-intervention. In this study, the female interns demonstrated marginally higher post-test scores in knowledge, attitudes and communication practices than the male interns, though the difference was not statistically significant (p>0.05).

Table 1: Socio-demographic characteristics of study participants (n=180).

Variables	Category	Frequency	%
Age (in years)	22–23	52	28.9
	23–24	98	54.4
	>24	30	16.7
Gender	Male	92	51.1
	Female	88	48.9
Type of college	Government	74	41.1
	Private	106	58.9
Residence	Urban	112	62.2
	Rural	68	37.8

Table 2: Comparison of knowledge scores before and after AETCOM intervention.

Domains	Pre-test mean±SD	Post-test mean±SD	Mean difference	P value
Medical ethics	4.1±1.4	6.5±1.0	2.4	<0.001
Confidentiality	3.2±1.3	4.9±0.8	1.7	<0.001
Informed consent	2.9±1.1	4.8±0.9	1.9	<0.001
Professionalism	3.5±1.2	5.3±0.8	1.8	<0.001
Communication principles	4.9±1.5	6.4±0.9	1.5	<0.001
Ethical decision making	18.6±4.2	27.9±3.1	9.3	<0.001

Table 3: Comparison of attitude scores before and after AETCOM intervention.

Attitude domains	Pre-test mean±SD	Post-test mean±SD	P value
Empathy	12.5±2.4	16.4±1.8	<0.001
Respect for patient autonomy	11.7±2.8	15.2±2.1	<0.001
Professional responsibility	13.1±2.2	16.3±1.6	<0.001
Ethical sensitivity	12.4±2.5	15.8±1.9	<0.001
Teamwork	12.7±2.1	15.9±1.7	<0.001
Total attitude score	62.4±8.7	79.6±6.4	<0.001

Table 4: Communication competency scores using KEECC-A checklist.

Communication competencies	Pre-test Mean±SD	Post-test Mean±SD	P value
Builds a relationship	8.1±2.2	13.5±2.0	<0.001
Opens the discussion	7.2±1.8	12.6±1.9	<0.001

Continued.

Communication competencies	Pre-test Mean±SD	Post-test Mean±SD	P value
Gathers information	9.4±2.4	15.8±2.3	<0.001
Understands patient perspective	5.8±1.6	11.7±2.1	<0.001
Shares information	9.3±2.1	14.8±2.0	<0.001
Reaches agreement	5.3±1.4	10.9±1.8	<0.001
Provides closure	7.2±1.8	12.1±1.9	<0.001
Total communication score	58.3±10.2	91.4±12.1	<0.001

Table 5: Gender comparison of KAP scores before and after AETCOM intervention.

Gender	Pre-test score	Post-test score	P value
Male	57.6±10.8	90.8±12.5	<0.001
Female	59.0±9.8	92.1±11.4	<0.001

DISCUSSION

The present interventional study demonstrated that a structured AETCOM training intervention significantly improved knowledge, attitudes and communication practices among medical interns in Maharashtra. Significant improvements were observed across all assessed domains, including medical ethics, professionalism, empathy, informed consent, patient-centric communication and overall communication competencies measured using the Kalamazoo Essential Elements Communication Checklist–Adapted (KEECC-A). This study findings reinforce the importance of structured AETCOM training during internship, a critical phase of medical education where learners transition from theoretical learning to independent patient care.

In this study, the mean knowledge scores of study participants increased significantly from 18.6±4.2 before structured AETCOM intervention to 27.9±3.1 after intervention ($p<0.001$). This substantial improvement indicates that structured AETCOM sessions effectively enhanced interns' understanding of ethical principles, informed consent, confidentiality, professionalism and doctor-patient communication. These findings are consistent with those reported by Thakur et al who observed significant improvement in communication-related knowledge among undergraduate medical students after AETCOM training in Maharashtra.¹²

Their study demonstrated a statistically significant enhancement in overall communication competency scores following structured communication-skills training. Similarly, Jain et al, reported significant gains in interns' knowledge of communication principles and ethical decision-making following AETCOM-based training sessions conducted in state of Tamil Nadu.¹¹ That study concluded that structured communication-skills modules are effective in enhancing cognitive understanding of professional competencies among medical trainees. The observed improvement in our study related to knowledge scores may be attributed to multiple educational strategies incorporated into the intervention, including interactive

lectures, case discussions and reflective exercises. The present study demonstrated a statistically significant increase in overall attitude scores from 62.4±8.7 to 79.6±6.4 ($p<0.001$). These findings align with observations reported by Jagzape et al who found substantial improvements in empathy and professionalism among undergraduate medical students following communication-skills training.¹⁷ Similarly, Tanwani et al observed that nearly all participating students perceived improved patient interaction abilities after structured communication-skills sessions.¹⁸ The use of reflective writing by the study participants in the current study might have contributed significantly to attitude change. Modern medical education increasingly recognises reflective practice as a powerful tool for fostering empathy and professionalism.

One of the most important findings of the present study was the significant increase in overall communication competency scores of the study participants from 58.3±10.2 to 91.4±12.1 ($p<0.001$). The improvements were observed across all seven Kalamazoo communication domains. These findings closely resemble to those reported in several Indian studies. Thakur et al, conducted an interventional study among 240 undergraduate medical students across Maharashtra and observed improvement in total communication scores from 54.89±11.55 to 94.4±19.3 following AETCOM training.¹²

Pande et al demonstrated that repeated communication-skills training and periodic reinforcement significantly improved communication performance among medical students and interns in Maharashtra.²⁴ Their study emphasized the value of ongoing assessment and feedback in sustaining communication competencies. Jain et al, reported significant improvements in communication competencies among interns following a structured AETCOM intervention in Tamil Nadu.¹¹ Brahmabhatt and Lodhiya documented enhanced self-perceived communication competence among third-year MBBS students after training.¹⁶ Collectively, these studies support the effectiveness of structured communication-skills training within the Indian medical education context.

Although female interns demonstrated slightly higher post-intervention scores in our study, the difference was not statistically significant. This finding is consistent with studies conducted by Jain et al and Ibrahim et al, which reported no significant gender-based differences in communication competencies following training.^{11,25} The absence of significant gender differences suggests that structured educational interventions benefit all learners regardless of gender.

The present study has certain limitations that must be acknowledged. The absence of a control group in this study restricts the ability to draw causal inferences, while the limited follow-up duration prevents assessment of sustained outcomes from this study. As this study was conducted only in selected medical colleges of Maharashtra, the findings may not be generalisable to other regions. Also, long-term retention of competencies by the study participants was not evaluated, warranting future longitudinal studies on the same topic.

CONCLUSION

The present study demonstrates that a structured AETCOM training intervention significantly improves knowledge, attitudes and communication practices among medical interns in Maharashtra. Improvements were evident across all seven Kalamazoo communication domains, highlighting the effectiveness of experiential learning approaches such as simulation, reflective writing and feedback. Given the increasing emphasis on professionalism and patient-centric healthcare, longitudinal integration of AETCOM training throughout undergraduate medical education and internship is strongly recommended. Periodic reinforcement and workplace-based assessments may further enhance the development and retention of communication competencies among future Indian medical graduates.

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