

Impact of AETCOM Modules about Communication, Bioethics and Professionalism in Second Year MBBS Students

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Abstract:

Background: The Attitude, Ethics, and Communication (AETCOM) module was introduced under the Competency-Based Medical Education (CBME) curriculum to strengthen communication skills, ethical reasoning, and professionalism among undergraduate medical students. Evidence regarding its impact among second-year MBBS students remains limited.

Objectives: To evaluate the effectiveness of AETCOM modules in enhancing communication skills, ethical awareness, and professional behaviour among second-year MBBS students.

Material And Methods: A prospective, single-arm, quasi-experimental pre- and post-test study was conducted among 171 second-year MBBS students at Subbaiah Institute of Medical Sciences, Shivamogga. The intervention consisted of the mandatory 16-hour AETCOM module delivered through interactive lectures, case discussions, role-plays, and reflective learning sessions. A validated 25-item questionnaire assessed knowledge across communication, bioethics, and professionalism domains (20 items) and perceptions toward AETCOM (5 Likert-scale items). Pre- and post-intervention scores were compared using paired statistical tests.

Results: The overall knowledge score increased from 15.84 ± 3.10 in the pre-test to 16.26 ± 2.94 in the post-test ($t = 1.91$, $p = 0.058$). Domain-specific scores showed modest improvement in doctor-patient communication and rapport (8.92 ± 1.18 to 9.08 ± 1.12), bioethics principles and consent application (5.33 ± 2.05 to 5.52 ± 1.98), and professional conduct and confidentiality (1.58 ± 0.62 to 1.66 ± 0.56), with no statistically significant differences ($p > 0.05$). Perceptions toward AETCOM were favorable, with increased agreement across all assessed constructs after the intervention.

Conclusion: Second-year MBBS students demonstrated high baseline knowledge and positive perceptions toward AETCOM. The module produced modest improvements in knowledge and perceptions, although the short-term changes were not statistically significant.

Keywords: AETCOM, Bioethics, Communication Skills, Competency-Based Medical Education, Professionalism.

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Introduction

The integration of the Attitude, Ethics, and Communication (AETCOM) module as a core longitudinal component of the Competency-Based Medical Education (CBME) undergraduate curriculum marks a transformative paradigm shift in medical training. [1]

Designed to nurture the humanistic 'heart' of healthcare alongside clinical intellect, AETCOM prioritizes the development of professional attitudes, ethical reasoning, and patient-centered communication skills in real-world clinical environments. [2] Beyond theoretical mastery, effective clinical communication, sound bioethics, and pro-

fessional behavior are established drivers of healthcare quality, treatment adherence, patient satisfaction, and a reduction in medico-legal conflicts. Despite strong clinical knowledge, deficiencies in these affective domains can severely undermine doctor-patient trust, increase diagnostic errors, and compromise overall health outcomes. [3] The National Medical Commission (NMC) explicitly outlines these desired competencies as critical benchmarks for undergraduate trainees across cognitive, psychomotor, and affective domains. [4]

AETCOM seeks to fulfil this mandate early in medical education by cultivating empathy, prepar-

ing students to handle complex counselling scenarios, and training them to obtain ethically sound informed consent. In line with NMC framework guidelines, these affective and interpersonal competencies are evaluated through direct observation and structured assessments alongside clinical skills. [5] The second year of the MBBS program represents a crucial transitional phase where students move from basic pre-clinical sciences to para-clinical subjects and early bedside clinical exposure. [6] During this formative period, trainees face their initial real-world exposure to patient distress, ethical dilemmas, and diverse socio-economic dynamics. Without structured reflective training, early exposure to high-pressure clinical environments can trigger emotional detachment or unintended erosion of empathy. As students begin interacting directly with patients, embedding reflective bioethics and active communication techniques becomes vital for professional identity formation.

However, because AETCOM is a relatively recent nationwide curricular intervention, empirical evidence regarding its long-term impact, skill retention, and perception among medical trainees—particularly within the Indian context—remains limited. Evaluating the impact of AETCOM modules on communication skills, bioethical awareness, and professionalism among second-year MBBS students is therefore essential to determine whether these intended competencies are being effectively translated into practice. [7] Empirical insights from this assessment can highlight implementation strengths, expose pedagogical gaps, inform faculty development programs, and support the ongoing refinement of CBME implementation. [8] Accordingly, this cross-sectional study was undertaken to evaluate the impact of AETCOM modules among second-year MBBS students, aiming to contribute actionable evidence toward training competent, ethical, and compassionate medical graduates.

Objectives: To evaluate the effectiveness of AETCOM modules in enhancing communication skills, ethical awareness, and professional behaviour among second year MBBS students

Materials and Methods

Study Design and Setting: This prospective, single-arm, quasi-experimental study (pre- and post-test design) was conducted at the Subbaiah Institute of Medical Sciences, Shivamogga, Karnataka, India. The evaluation was integrated into the Attitude, Ethics, and Communication (AETCOM) curriculum allocated to the Department of Pharmacology over a total study duration of two months.

Study Participants and Sampling: The target population comprised second-year MBBS undergraduate students actively enrolled in the pharmacology curriculum during the study period. A uni-

versal sampling technique was employed to include all eligible students in the cohort.

Inclusion Criteria: All second-year MBBS undergraduate students who attended the designated AETCOM sessions and voluntarily submitted complete responses to both pre-test and post-test digital survey forms.

Exclusion Criteria: Students who failed to attend all mandated AETCOM hours, those with incomplete survey responses, or those who declined to provide informed consent.

Educational Intervention: The educational intervention consisted of the mandatory 16-hour AETCOM module delivered by trained faculty from the Department of Pharmacology as prescribed by the National Medical Commission (NMC) Competency-Based Medical Education (CBME) guidelines. The instructional methods encompassed interactive lectures, small-group case discussions, clinical scenario role-plays, and reflective learning sessions focused on communication skills, bioethics awareness, and professional conduct.

Study Instrument and Data Collection Procedure: Data were collected using a semi-structured, pre-validated online questionnaire distributed via Google Forms:

1. **Pre-test Assessment:** The baseline questionnaire was administered to all participating students immediately prior to the commencement of the first AETCOM session.
2. **Post-test Assessment:** The follow-up questionnaire was re-administered upon the completion of the 16-hour AETCOM module in pharmacology.

"The assessment instrument was a 25-item, semi-structured, validated questionnaire structured into two parts:

Knowledge and Reasoning Assessment (Items 1–20): Objective multiple-choice questions assessing core concepts across three primary domains: clinical communication skills (6 items), core bioethical principles and consent (10 items), and professional conduct/confidentiality (4 items). Each correct answer was scored 1 point, yielding a total maximum score of 20.

Attitude and Perception Survey (Items 21–25): 5-point Likert scale items (1 = Strongly Disagree to 5 = Strongly Agree) evaluating students' perceptions regarding the relevance of AETCOM, communication self-efficacy, ethical conflicts, and the efficacy of experiential learning modalities like role-play."

Ethical Considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee (IEC) (IEC-SUIMS/206/DEC-2025) of the Subbaiah Institute of Medical Sciences prior to

study initiation. Digital informed consent was explicitly obtained from all participants on the first page of the Google Form before allowing access to the survey items. Student participation was voluntary, and strict confidentiality and anonymity were maintained throughout data collection and processing by assigning unique alphanumeric identifiers to each student pair (pre- and post-test).

Statistical Analysis: Data were exported from Google Forms into Microsoft Excel and analyzed using standard statistical software (e.g., SPSS version 26.0). Descriptive statistics, including frequencies, percentages, means, and standard deviations (SD), were calculated for continuous and categorical variables. Pre- and post-intervention scores across individual domains were compared using the paired t-test (for normally distributed continuous data) or the Wilcoxon signed-rank test (for non-parametric data). A p-value < 0.05 was considered statistically significant.

Results

AETCOM domain scores showed a modest improvement in the post-test compared with the pre-test across all domains. The mean score for

doctor-patient communication and rapport increased from 8.92 ± 1.18 in the pre-test to 9.08 ± 1.12 in the post-test, with a mean difference of 0.16. This difference was not statistically significant ($t = 1.74$, $p = 0.084$).

For bioethics principles and consent application, the mean score increased from 5.33 ± 2.05 to 5.52 ± 1.98 , with a mean difference of 0.19. The improvement was not statistically significant ($t = 1.86$, $p = 0.065$).

The professional conduct and confidentiality score increased from 1.58 ± 0.62 to 1.66 ± 0.56 , with a mean difference of 0.08. This change was also not statistically significant ($t = 1.32$, $p = 0.189$).

The overall knowledge score increased from 15.84 ± 3.10 in the pre-test to 16.26 ± 2.94 in the post-test, with a mean difference of 0.42. Although the post-test score was higher, the difference was not statistically significant ($t = 1.91$, $p = 0.058$), indicating that participants had a high level of baseline awareness and understanding of AETCOM concepts before the educational sessions were conducted. (Table 1)

Table 1: Pre- and Post-Intervention Knowledge Scores Across Core AETCOM Domains (N = 171)

Core AETCOM domain	Questions included	Pre-test score (Mean $\pm$ SD)	Post-test score (Mean $\pm$ SD)	Mean difference	t-value	p-value
Doctor-patient communication & rapport	Q1–Q6, Q10–Q13 (10 items)	8.92 ± 1.18	9.08 ± 1.12	0.16	1.74	0.084
Bioethics principles & consent application	Q7–Q9, Q14–Q18 (8 items)	5.33 ± 2.05	5.52 ± 1.98	0.19	1.86	0.065
Professional conduct & confidentiality	Q19–Q20 (2 items)	1.58 ± 0.62	1.66 ± 0.56	0.08	1.32	0.189
Overall knowledge score	Total (20 items)	15.84 ± 3.10	16.26 ± 2.94	0.42	1.91	0.058

Perceptions toward the AETCOM module were favorable both before and after the educational sessions. Agreement increased across all perception constructs, including the usefulness of AETCOM sessions in CBME (81.9% to 85.4%), confidence in future patient communication (84.2% to 87.7%), understanding of ethical trade-offs (76.6% to 80.1%), professional conduct and clinical composure (91.2% to 93.0%), and the usefulness of role-plays in clarifying clinical practice (84.2% to 87.1%).

Although agreement improved in the post-assessment, the differences were not statistically significant ($p > 0.05$). (Table 2).

Discussion

The introduction of the Attitude, Ethics, and Communication (AETCOM) module under the Competency-Based Medical Education (CBME) curriculum represents an important initiative to strengthen

ethical reasoning, communication skills, and professionalism among undergraduate medical students. The present study assessed second-year MBBS students' knowledge and perceptions before and immediately after structured AETCOM sessions. Participants demonstrated high baseline knowledge across all assessed domains and favorable perceptions toward AETCOM. Although post-test scores and perception ratings showed modest improvements following the intervention, these changes were not statistically significant.

A key finding was the high baseline knowledge score (15.84 ± 3.10 out of 20), indicating that students had substantial theoretical awareness of communication, ethics, and professionalism prior to formal AETCOM instruction. Baseline scores were high across doctor-patient communication and rapport, bioethics principles and consent application, and professional conduct and confidentiality. Following the educational sessions, mean scores

increased across all domains, with the overall knowledge score improving from 15.84 ± 3.10 to 16.26 ± 2.94 . Despite this positive trend, the differences were not statistically significant, suggesting that the intervention produced only modest short-term gains in written knowledge assessment.

The relatively small improvement observed after the intervention may be explained by the high baseline knowledge of the participants. Students had already achieved nearly 80% of the maximum attainable score before the intervention, limiting the potential for substantial measurable improvement over a short educational period. This pattern is consistent with a ceiling effect, which is commonly encountered in educational interventions involving participants with relatively high baseline competence. The high baseline knowledge observed in this study may be explained by the increasing em-

phasis on professionalism and communication during undergraduate medical training. Through Early Clinical Exposure (ECE), bedside teaching, and interactions with clinical faculty, students are exposed to patient-centered communication, ethical conduct, confidentiality, and professional behavior even before formal AETCOM sessions. In addition, many communication-related concepts, such as empathy, respect for patient autonomy, and confidentiality, are closely aligned with accepted professional norms, which may contribute to high baseline performance on knowledge-based assessments.

Participants also demonstrated favorable perceptions toward the AETCOM module. More than four-fifths of students agreed that AETCOM sessions were useful within the CBME curriculum, role-plays were educationally valuable, and they felt confident about future patient communication.

Table 2: Pre- and Post-Intervention Distribution of Student Perceptions Regarding AETCOM Modules (N=171)

Item No.	Perception statement / construct	Evaluation phase	Agree / strongly agree (n, %)	Neutral (n, %)	Disagree / strongly disagree (n, %)	p-value*
Q21	Curriculum utility: AETCOM sessions are useful in CBME	Pre	140 (81.9%)	27 (15.8%)	4 (2.3%)	0.317
		Post	146 (85.4%)	22 (12.9%)	3 (1.8%)	
Q22	Self-efficacy: Confidence in future patient communication	Pre	144 (84.2%)	25 (14.6%)	2 (1.2%)	0.248
		Post	150 (87.7%)	20 (11.7%)	1 (0.6%)	
Q23	Ethical trade-offs: Patient autonomy vs. rapid clinical decisions	Pre	131 (76.6%)	34 (19.9%)	6 (3.5%)	0.401
		Post	137 (80.1%)	29 (17.0%)	5 (2.9%)	
Q24	Professional conduct: Comprehensive knowledge promotes clinical composure	Pre	156 (91.2%)	13 (7.6%)	2 (1.2%)	0.564
		Post	159 (93.0%)	10 (5.8%)	2 (1.2%)	
Q25	Pedagogical utility: Role-plays clarify good vs. bad clinical practice	Pre	144 (84.2%)	23 (13.5%)	4 (2.3%)	0.289
		Post	149 (87.1%)	19 (11.1%)	3 (1.8%)	

*Analyzed using the McNemar-Bowker test for paired categorical data. Where pre- and post-test response distributions are identical (0% shift across off-diagonal cells), $p = 1.000$ indicates no statistically significant difference.

Agreement increased across all perception constructs following the intervention, including curriculum utility, self-efficacy in patient communication, ethical decision-making, professional conduct, and the pedagogical value of role-plays. The highest agreement was observed for the perception that comprehensive knowledge promotes clinical composure. Although these improvements were not statistically significant, the consistent increase in agreement across all domains suggests that the AETCOM sessions reinforced positive attitudes

toward communication, ethics, and professionalism. These findings are consistent with previous studies reporting positive attitudes toward communication skills training among medical students. Nayak and Kadeangadi [9] reported a strong positive baseline attitude toward learning communication skills among undergraduate students, while Acharya et al. [10] observed very high acceptance of communication training among second-year MBBS students. The modest improvement in perceptions observed in the present study suggests that formal AETCOM sessions may reinforce and

strengthen existing positive attitudes rather than substantially transform them over a short period.

Comparison with published literature highlights an important distinction between cognitive knowledge assessments and behavioral competency assessments. Studies using written pre- and post-tests have generally reported significant improvements when baseline knowledge is relatively low. Sharma et al. [1] demonstrated a significant increase in knowledge scores among second-year MBBS students following AETCOM instruction, with baseline scores considerably lower than those observed in the present study. In contrast, the high baseline knowledge in our cohort resulted in only modest post-test improvements that did not achieve statistical significance, emphasizing the limited sensitivity of written assessments when participants already possess substantial theoretical understanding.

A different pattern emerges in studies evaluating communication skills through observational methods. Investigations using the Kalamazoo Essential Elements Communication Checklist (KEECC) have consistently demonstrated significant improvements in practical communication performance following structured training. Acharya et al., Nayak and Kadeangadi, and Jain et al. [8-10] reported marked gains in relationship building, information gathering, and patient-centered communication after communication skills interventions. These findings suggest that AETCOM training may have a greater impact on behavioral competencies than on theoretical knowledge when evaluated using performance-based assessment tools.

The findings of this study have important implications for AETCOM assessment strategies. Written knowledge tests primarily assess lower levels of competence within Miller's pyramid, whereas communication, ethics, and professionalism are fundamentally behavioral competencies that require demonstration in clinical settings. Performance-based assessments such as Objective Structured Clinical Examinations (OSCEs), Mini-Clinical Evaluation Exercises (Mini-CEX), standardized patient encounters, and validated communication checklists are likely to provide a more sensitive evaluation of AETCOM outcomes. [11]

Another notable observation was that baseline performance was comparatively lower in the bioethics principles and consent application domain than in communication and professionalism. Although this domain showed a modest post-intervention improvement, the increase was not statistically significant. This suggests that students may possess a stronger intuitive understanding of interpersonal communication than of complex ethical reasoning, informed consent, autonomy, and ethical decision-making. Greater curricular emphasis on contextual ethical dilemmas, consent challenges, and struc-

tured ethical case discussions may therefore enhance learning in this domain.

The implementation of AETCOM also requires appropriate faculty preparation and assessment capacity. Soundariya et al. [12] highlighted challenges related to small-group teaching, self-directed learning, curriculum integration, and objective assessment within the CBME framework. The present findings support the need for faculty development programs that strengthen role-play facilitation, reflective learning, feedback delivery, and behavioral assessment across clinical departments.

The study has several strengths. The paired pre-post design enabled within-student comparison, minimizing inter-individual variability, and the domain-specific analysis provided a detailed understanding of communication, bioethics, and professionalism separately. However, the study was conducted at a single institution, which may limit generalizability, and the 20-item written assessment measured short-term cognitive knowledge rather than long-term behavioral application in clinical practice. Future studies should incorporate longitudinal follow-up and performance-based assessment methods to determine whether AETCOM training results in sustained improvements in communication, ethical decision-making, and professional behavior in real clinical settings.

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