ORIGINAL RESEARCH

Evaluating Gaps in Ethical Knowledge and Professional Conduct: A Cross-Sectional Study Among Preclinical Medical Students and Faculty in a Tertiary Institution

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ABSTRACT
Background: Professionalism and ethics are foundational to medical practice, yet their development during the preclinical phase of medical education remains underexplored. Early assessment of these domains can offer insight into students' preparedness and help align curricular outcomes with faculty expectations. This study aimed to evaluate and compare ethical knowledge and professional behavior among first- and second-year MBBS students and teaching faculty at a tertiary institution. **Methods:** A cross-sectional, observational study was conducted at Parbhani Medical College, Maharashtra, involving 285 preclinical MBBS students and 88 faculty members. Ethics knowledge was assessed using a 20-item validated multiple-choice questionnaire (MCQ). Professionalism was evaluated using the Professionalism Mini-Evaluation Exercise (PMEX), a 24-item observational tool rated on a 4-point Likert scale. Data were analyzed using SPSS version 25. Descriptive statistics were calculated, and comparisons between groups were assessed using t-tests and ANOVA. Pearson's correlation was used to determine associations between knowledge and behaviour. **Results:** Faculty scored significantly higher in both domains (PMEX: 3.29 ± 0.30; MCQ: 15.6 ± 2.1) compared to second-year (PMEX: 2.70 ± 0.36; MCQ: 12.4 ± 2.4) and first-year students (PMEX: 2.54 ± 0.39; MCQ: 11.3 ± 2.6) ($p < 0.001$). Domain-wise PMEX analysis revealed lower scores in accountability and time management among students. A moderate positive correlation was found between ethics knowledge and professionalism ($r = 0.30$, $p < 0.001$). Nearly half of first-year students scored below expectations in professionalism. **Conclusion:** While professionalism and ethics improve modestly with academic progression, significant gaps remain when compared to faculty benchmarks. These findings support the need for early, structured ethics education and behavioral assessment using tools like PMEX in preclinical training.
Keywords: Medical professionalism, ethics education, PMEX, preclinical students, faculty comparison, medical ethics, medical education, MBBS curriculum

INTRODUCTION

Professionalism and medical ethics represent two foundational pillars of medical practice, embodying the values, responsibilities, and behaviors that define a competent and trustworthy physician. Professionalism in medicine is broadly defined as a set of values, behaviors, and relationships that underpin the trust the public has in doctors. These include integrity, accountability, compassion, empathy, respect, and excellence, among others[1]. Meanwhile, medical ethics provides a systematic approach to moral decision-making in clinical practice, traditionally organized around the four principles of autonomy, beneficence, non-maleficence, and justice[2].

The concept of professionalism has evolved alongside medical education itself. In the past, medical students acquired professional values through the "hidden curriculum"—informal modeling by senior clinicians[3]. However, over the last two decades, there has been a paradigm shift towards explicit, structured training in ethics and professionalism, driven by rising medico-legal disputes, declining public trust, and changing patient expectations[4]. Modern curricula, such as the Attitude, Ethics, and Communication

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(AETCOM) module introduced by the National Medical Commission (NMC) of India in 2019, have emphasized competency-based education that incorporates these domains longitudinally[5].

From a developmental perspective, early professional identity formation occurs in preclinical years, even before students encounter patients directly. These formative years represent a "critical window" during which ethical attitudes and behavioral expectations begin to take shape. If neglected, students may struggle to align theoretical knowledge with the moral demands of clinical practice later on[6]. Evidence also suggests that ethical reasoning skills and the ability to manage professional dilemmas can be instilled and enhanced with proper guidance and exposure[7].

Despite the recognized importance of early ethics education, most medical colleges, especially in resource-constrained regions, still face challenges in implementation. These include a lack of standardized assessment tools, insufficient faculty training, and cultural variations in interpreting ethical norms[8]. Furthermore, the assessment of professionalism remains subjective in many cases, relying heavily on faculty impressions rather than validated instruments[9]. Tools like the Professionalism Mini-Evaluation Exercise (PMEX) and standardized ethics MCQs offer a more objective and quantifiable approach, especially suited for early-stage learners[10].

Understanding the alignment or mismatch between student understanding and faculty expectations of professionalism is essential for curriculum planning. Faculty, who are expected to serve as role models, may unconsciously set benchmarks that students are unaware of or misinterpret. This perception gap can widen over time, leading to disillusionment, unprofessional behavior, or ethical erosion in future clinical settings[11].

In the context of Parbhani Medical College, located in a semi-urban region of Maharashtra, where students often come from diverse socioeconomic and educational backgrounds, it becomes especially important to assess whether students enter their medical training with adequate ethical awareness, and whether their behaviors align with the standards upheld by faculty. To the best of our knowledge, no study has previously quantified both ethical knowledge and professionalism behavior using validated instruments among preclinical students and faculty in this region.

Hence, this study aims to fill a critical gap by evaluating the knowledge of ethical principles through validated MCQs and the observable professional conduct through the PMEX tool among first- and second-year MBBS students, and comparing these outcomes with faculty standards. The findings of this study will serve as evidence for improving early ethics training and recalibrating professionalism benchmarks within the medical curriculum.

METHODOLOGY

This cross-sectional, observational, and quantitative study was conducted at Parbhani Medical College, Maharashtra, over a three-month period in early 2025. It aimed to assess and compare ethical knowledge and professional behavior among preclinical MBBS students and faculty members. The study included all first- and second-year MBBS students (n=300), of whom 285 consented and completed the study tools, as well as 88 faculty members from preclinical and paraclinical departments. Universal sampling was employed, with all eligible participants invited to participate voluntarily.

Inclusion criteria encompassed currently enrolled students in the first or second year and teaching faculty actively involved in undergraduate education. Participants unavailable during the study period or those submitting incomplete responses were excluded. Withdrawal was permitted at any stage without penalty.

Ethical knowledge was assessed using a 20-item multiple-choice questionnaire (MCQ) developed from validated sources, including the AETCOM module and ABIM's Project Professionalism. Each correct answer carried one mark. Professional conduct was evaluated using the Professionalism Mini-Evaluation Exercise (PMEX), a validated 24-item tool covering domains such as accountability, respect, communication, and teamwork. Responses were rated on a 4-point Likert scale. Student performance was observed by faculty during role-play scenarios, while faculty were assessed through peer ratings.

Data were anonymized, coded, and managed securely in Excel. Analysis was performed using IBM SPSS version 25. Descriptive statistics (mean, standard deviation) were calculated for both groups. Independent t-tests compared scores between students and faculty, and ANOVA was applied to assess differences between first- and second-year students. Statistical significance was set at $p < 0.05$.

RESULTS
Table 1: Comparison of Ethics Knowledge Scores (MCQs)

Group	N	Mean Score (out of 20)	Standard Deviation (SD)	Minimum Score	Maximum Score	p-value (vs. faculty)
First-Year Students	143	11.3	2.6	6	17	< 0.001
Second-Year Students	142	12.4	2.4	7	18	< 0.001
Faculty	88	15.6	2.1	10	19	—

Table 2: Comparison of Professionalism Scores (PMEX Tool)

Group	N	Mean PMEX Score (out of 4)	Standard Deviation (SD)	Minimum Score	Maximum Score	p-value (vs. faculty)
First-Year Students	143	2.54	0.39	1.7	3.3	< 0.001
Second-Year Students	142	2.70	0.36	1.9	3.4	< 0.001
Faculty	88	3.29	0.30	2.7	3.9	—

Table 3: Domain-Wise PMEX Score Analysis (Mean ± SD)

| PMEX Domain	First-Year Students	Second-Year Students	Faculty
Accountability	2.38 ± 0.41	2.60 ± 0.39	3.32 ± 0.29
Communication Skills	2.55 ± 0.36	2.71 ± 0.33	3.35 ± 0.27
Respect and Empathy	2.71 ± 0.35	2.84 ± 0.32	3.38 ± 0.25
Time Management	2.33 ± 0.37	2.54 ± 0.36	3.27 ± 0.28
Interpersonal Behavior	2.51 ± 0.38	2.68 ± 0.36	3.30 ± 0.26

Table 4: Correlation Between MCQ Knowledge Scores and PMEX Scores Among Students

Student Group	N	Pearson's Correlation (r)	p-value	Interpretation
First-Year Students	143	0.27	0.001	Weak to moderate positive correlation
Second-Year Students	142	0.33	<0.001	Moderate positive correlation
Combined Students	285	0.30	<0.001	Statistically significant relationship

A weak to moderate positive correlation was found between students' knowledge and their observed professional conduct, indicating some alignment between cognitive understanding and behavioral application.

Table 5: Distribution of Students by PMEX Performance Level

PMEX Score Range	Performance Level	First-Year (n=143)	Second-Year (n=142)	Total Students (n=285)
< 2.0	Below Expectations	17 (11.9%)	7 (4.9%)	24 (8.4%)
2.0 – 2.49	Needs Improvement	49 (34.3%)	31 (21.8%)	80 (28.1%)
2.5 – 2.99	Meets Expectations	61 (42.7%)	69 (48.6%)	130 (45.6%)
≥ 3.0	Exceeds Expectations	16 (11.1%)	35 (24.7%)	51 (17.9%)
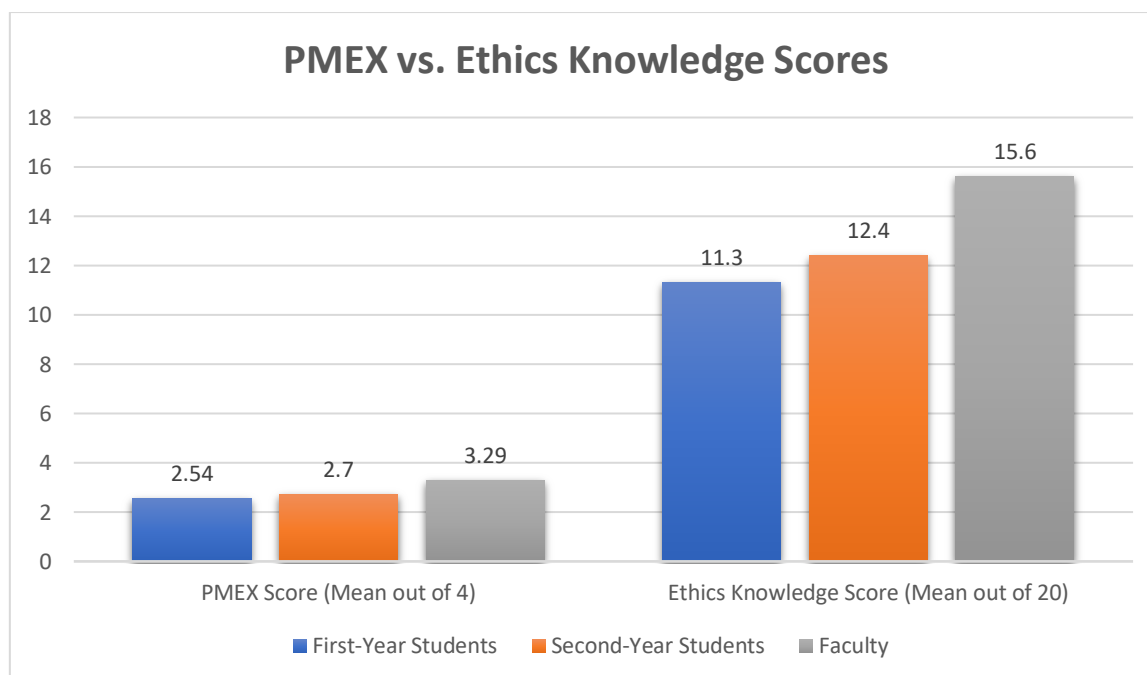
Figure 1: PMEX vs. Ethics Knowledge Scores

A total of 373 participants were included in the study, comprising 285 preclinical MBBS students (143 first-year, 142 second-year) and 88 faculty members. Ethics knowledge scores, assessed via MCQs, showed

a progressive increase across groups, with first-year students scoring 11.3 ± 2.6, second-year students 12.4 ± 2.4, and faculty 15.6 ± 2.1. These differences were statistically significant ($p < 0.001$), indicating improvement with academic level and a notable gap between students and faculty (Table 1).

Similarly, PMEX professionalism scores followed a comparable pattern. First-year students averaged 2.54 ± 0.39, second-years 2.70 ± 0.36, and faculty 3.29 ± 0.30 ($p < 0.001$), suggesting development of professional conduct with experience (Table 2). Domain-wise PMEX analysis revealed that students scored lowest in accountability and time management, while faculty consistently scored higher across all domains, particularly in interpersonal behavior and respect (Table 3).

A moderate positive correlation was observed between ethics knowledge and professionalism among students ($r = 0.30$, $p < 0.001$), indicating partial alignment between cognitive understanding and behavioral application (Table 4). When categorized by PMEX performance levels, 46.2% of first-year students required improvement or performed below expectations, compared to 26.7% of second-years. Conversely, 24.7% of second-years exceeded expectations versus only 11.1% of first-years (Table 5).

These trends were further visualized in a clustered bar graph (Figure 1), which clearly illustrated the ascending trajectory of both knowledge and professionalism from first-year to faculty. The findings reflect meaningful, though moderate, academic progression and underscore the performance gap between students and institutional role models.

DISCUSSION

This study revealed a progressive increase in both ethical knowledge and professionalism from first-year to second-year students, with faculty consistently scoring highest. As shown in Table 1, ethics knowledge improved modestly between academic years, aligning with findings by Shaikh et al., who observed better ethical understanding in clinical students due to exposure and maturity[1]. Similarly, Madhukumar et al. found that postgraduate trainees showed stronger ethical awareness than undergraduates, though much of it was acquired through informal learning[2]. Our results suggest that even within the preclinical phase, knowledge improves incrementally, though still far below faculty standards, echoing gaps reported in Indian institutions lacking robust AETCOM implementation[3].

Table 2 reflects a similar trend in professionalism scores, with faculty scoring highest and students trailing significantly. These findings mirror the "hidden curriculum" phenomenon described by Hafferty, where informal behaviors rather than formal instruction shape student conduct[4]. Shrivastava et al. also noted that professionalism teaching in India remains fragmented and inconsistently assessed[5].

Table 3 highlights that students performed relatively well in interpersonal domains but lagged in accountability and time management—patterns also noted by Ahmed et al., who found students less aligned with faculty expectations in these areas[6]. Devi et al. emphasized that students often associate professionalism with communication and subject mastery rather than deeper responsibilities[7].

A moderate positive correlation between ethics knowledge and professional behavior ($r = 0.30$, Table 4) supports Jha et al.'s assertion that knowledge alone is insufficient without contextual and experiential learning[8]. Subhaprada's use of PMEX showed similar benefits in behavior change following structured exposure[9].

Performance categories in Table 5 showed that nearly half of first-year students required improvement, while a quarter of second-years exceeded expectations—indicating developmental progression, yet reinforcing the need for early intervention.

The clustered bar graph (Figure 1) reinforced these trends, visually depicting the gradual alignment of knowledge and behavior with academic progression. Cruess et al. advocate for such staged professionalism development integrated throughout training[10], while Ho et al. stress the value of culturally grounded, faculty-modeled ethical standards[11].

CONCLUSION

This study demonstrates that both ethical knowledge and professional behavior improve modestly from first-year to second-year medical students, yet remain significantly below faculty standards. The moderate correlation between knowledge and behavior highlights the need for integrated, early ethics training that goes beyond theory. These findings reinforce the importance of structured modules like AETCOM and tools like PMEX in fostering ethical competence and professional identity from the preclinical stage onward. Closing the gap between student performance and faculty expectations will require sustained curriculum reform, active role modeling, and continuous formative assessment.

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