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Impact of Undergraduate Medical Ethics Education on Students: A Quasi-Experimental Study in Rural India

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Abstract

Traditional medical education often falls short in equipping undergraduates to address ethical dilemmas in healthcare. This quasi-experimental, pre-post study aimed to evaluate medical undergraduates' knowledge, attitudes, and practices regarding healthcare ethics (HCE) and to assess the impact of introducing HCE training on their ethical behavior at the Mahatma Gandhi Institute of Medical Sciences, Sevagram, India. All participants acknowledged the importance of understanding HCE. Post-intervention, there was a marked increase in HCE knowledge, reflected in improvements in both weighted mean scores and percentage consensus. In Phase I, absolute learning gain, relative learning gain, and normalized gain ("g") were significantly enhanced following the intervention. In Phase II, the intervention demonstrated low to moderate effectiveness in enhancing the affective and psychomotor domains and in students' ability to manage ethical issues, although no significant improvement was observed in communication skills. Feedback revealed that most participants felt that incorporating skill-based HCE from the first year of the curriculum is essential. Overall, the study indicates that structured HCE training can effectively enhance knowledge, affective and psychomotor abilities, and ethical decision-making among undergraduate medical students.

Keywords: Competency-based medical education, Professionalism, Healthcare ethics, Medical ethics, Indian medical graduates

Introduction

Traditional medical education often falls short in equipping undergraduate students with the skills needed to navigate complex ethical dilemmas they will face in clinical practice [1, 2]. Amid a rising wave of violence against doctors in India—amplified by intense social, print, and broadcast media coverage—there is an urgent need to sensitize medical students to issues of medical ethics and professionalism [3-5].

It is now widely accepted that ethical reasoning is fundamental to patient-centered care [6, 7]. Over the past two decades, structured ethics education has become standard in medical curricula in many Western countries [8, 9]. However, as medical technology advances, legal frameworks grow more intricate, societal values shift, and patients gain easy access to (sometimes unreliable) online health information, doctors increasingly face challenging situations. These may involve treatment decisions, delivering bad news, resource limitations, or end-of-life care. Despite global research, there remains no universal agreement on the best methods for teaching medical ethics.

Public distrust of healthcare professionals is evident in the growing number of consumer court cases and physical assaults on doctors [10]. Addressing this erosion of trust requires preparing future physicians early. A critical first step is to evaluate the baseline knowledge and attitudes of medical students toward ethics and professionalism.

Numerous studies have highlighted the inadequate training most physicians receive in ethics and law [6, 11, 12]. As medicine evolves, so must its ethical framework.

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Strengthening ethics education promises not only to foster better doctor–patient and doctor–community relationships but also to improve overall healthcare delivery.

In 2019, the National Medical Commission (formerly the Medical Council of India) introduced the Attitude, Ethics and Communication (AETCOM) module as a longitudinal, competency-based program across all phases of undergraduate training [13]. AETCOM emphasizes professionalism, bioethics, effective communication, teamwork, altruism, respect, and sensitivity to diversity in thought, socioeconomic status, and gender.

Historically, formal training in healthcare ethics has been underrepresented in Indian clinical education. This study aimed to (1) assess medical undergraduates' existing knowledge, attitudes, and practices regarding healthcare ethics and (2) evaluate the impact of a dedicated healthcare ethics (HCE) orientation program on their ethical awareness and behavior. Additionally, the study explored students' perceptions about incorporating such an orientation program into the formal medical curriculum.

Materials and Methods

Study design and participants

This study followed a quasi-experimental approach with pre-test and post-test evaluations. Unlike fully experimental designs, participants were not randomly assigned to groups, but the independent variable was introduced prior to measuring outcomes, addressing potential issues with causal direction. In this format, students' knowledge and behaviour were assessed both before and after the intervention.

The research was conducted over six months (October 2017 to March 2018) in the Department of Medicine at Mahatma Gandhi Institute of Medical Sciences (MGIMS), Sevagram, a 920-bed tertiary hospital linked to a rural medical college in Central India. The department itself has 192 beds and manages more than 12,000 outpatient visits annually. The target group comprised final-year medical students. Out of 63 invited students, 40 who agreed to participate and provided informed consent were included. The teaching faculty were members of the Department of Medicine who regularly instruct undergraduates.

Ethical approval

Prior to commencing the study, approvals were obtained from the institutional ethics committee and the curriculum committee. Written informed consent was obtained from all participants, detailing the study objectives and ensuring their right to withdraw at any stage without consequences.

Intervention

Baseline assessment

At the outset, participants' understanding of healthcare ethics (HCE) was evaluated using a structured, self-administered questionnaire with close-ended items, which had been pilot-tested. Their baseline professional behaviour in ethical situations was further assessed through an Objective Structured Clinical Examination (OSCE).

Designing the HCE programme

An institutional panel reviewed baseline results and helped determine the content of the HCE programme. Teaching sessions focused on ethical knowledge, the four fundamental principles of HCE, roles of ethics committees, and professional attitudes. Eight OSCE stations were designed to cover scenarios such as treatment withdrawal decisions, confidentiality, truth-telling, and women's health, addressing cognitive, psychomotor, affective, and communication domains. These informed the structure of the orientation programme.

Implementation of the programme

The first phase consisted of interactive lectures covering key ethical concepts. The second phase incorporated audio-visual materials, including videos and PowerPoint presentations, to develop participants' psychomotor, affective, and communication skills aligned with specific HCE principles.

Post-intervention evaluation

After completing the programme, students repeated the structured questionnaire and participated in OSCE stations, where each candidate performed specific tasks—such as focused counselling—with standardized scoring for each scenario.

Participant feedback

All students who completed both phases of the study took part in focus group discussions (FGDs) to provide their perspectives. The FGDs explored the students' views on

integrating HCE into the medical curriculum and its perceived utility for their professional development.

Focus group discussion procedure

Final-year medical students were briefed about the focus group discussion (FGD) and its objectives, and volunteers were invited to participate. Details regarding the date, time, and venue were communicated to the students. A total of 35 students volunteered, and the FGD was conducted in three groups comprising 12, 12, and 11 students, respectively, with each session lasting approximately 45 minutes. The facilitator outlined the purpose of the FGD and explained the discussion process to the participants.

Data analysis

To evaluate improvements in students' cognitive understanding of healthcare ethics (HCE) from pre-test to post-test, paired t-tests were used to compare questionnaire scores collected in phase I. Learning gains were calculated as follows: Absolute learning gain = (% post-test – % pre-test), Relative learning gain = [(% post-test – % pre-test) / % pre-test] × 100, and Normalized gain (g) = [(% post-test – % pre-test) / (100 – % pre-test)]. The effectiveness of the intervention was categorized as "Low" for g = 0–0.29, "Medium" for g = 0.30–0.69, and "High" for g = 0.70–1.00.

For assessment of psychomotor, affective, and communication skills, as well as the ability to address ethical issues, pre- and post-intervention OSCE scores were compared. Mean scores were calculated before and after the intervention, and percentages were derived using denominators of 5 for Likert scale items and 10 for OSCE checklist items.

Results and Discussion

This study evaluated the impact of basic HCE training on MBBS undergraduate students. All 40 consenting participants were assessed in phase I for knowledge of HCE before and after the intervention. The students attended a mini-workshop designed to introduce the fundamentals of HCE and its relevance to clinical practice. In phase II, their psychomotor, affective, and communication skills related to healthcare ethics were evaluated both before and after the training. Selected HCE topics were delivered using audio-visual aids **(Figure 1)**.

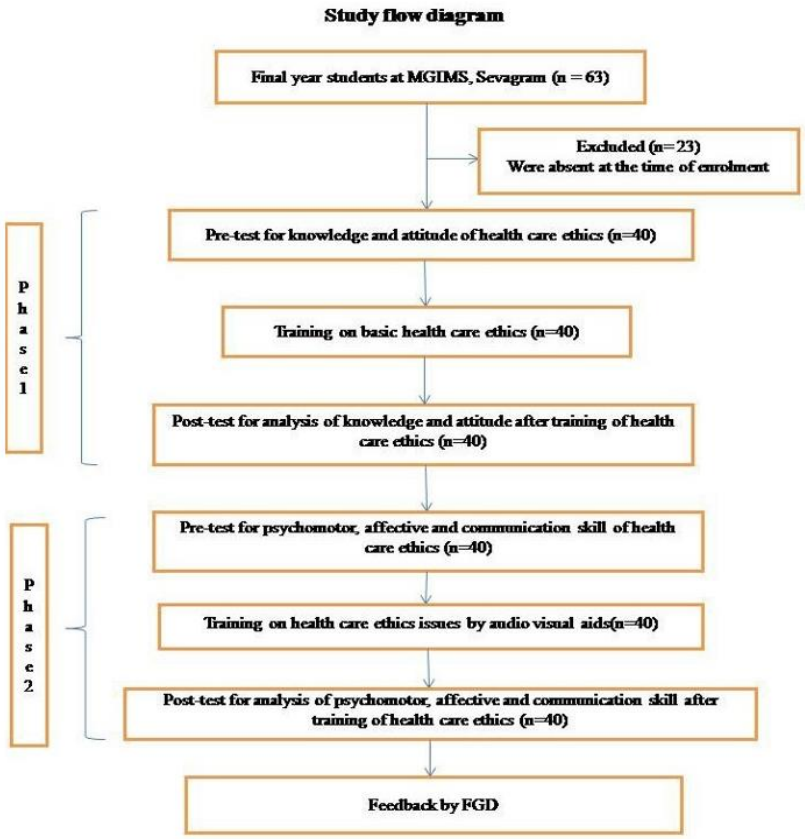

Figure 1. Flowchart illustrating the study participants.

General characteristics of participants

The 40 students included in the study had a mean age of 22.09 years (± 2.13). Among them, 85% had never previously attended a workshop on ethics.

Students' knowledge in the cognitive domain of healthcare ethics

Table 1 presents the scores of the participants on the topic of the significance of ethics knowledge, before and after the intervention. All students recognized the importance of understanding healthcare ethics in their professional practice and were aware of the requirement for obtaining informed consent. Following the intervention, knowledge regarding the Hippocratic Oath and the ICMR guidelines showed marked improvement, with the number of students correctly identifying their content rising from 9 (22.5 percent) to 39 (97.5 percent) for the Hippocratic Oath, and from 2 (5 percent) to 34 (85 percent) for the ICMR guidelines, as illustrated in **Table 1.**

Table 1. Students' performance in the cognitive domain of healthcare ethics on the importance of knowledge of ethics

Statement	Pre-test n (%)	Post-test n (%)
2.1 Do you consider knowledge of ethics important in your professional practice?	Yes: 40 (100) No: 0 (0)	Yes: 40 (100) No: 0 (0)
2.2 Are you familiar with the main principles of the Hippocratic Oath?	Yes: 9 (22.5) No: 31 (77.5)	Yes: 39 (97.5) No: 1 (2.5)
2.3 Are you aware of the key points of ICMR guidelines?	Yes: 2 (5) No: 38 (95)	Yes: 34 (85) No: 6 (15)
2.4 Do you address patients' questions during bedside rounds? *	Yes: 32 (82.1) No: 7 (17.9)	Yes: 36 (90) No: 4 (10)
2.5 Have you previously received training in bioethics? *	Yes: 6 (15) No: 34 (85)	Yes: 13 (33.3) No: 26 (66.7)
2.6 Are you knowledgeable about informed consent?	Yes: 40 (100) No: 0 (0)	Yes: 40 (100) No: 0 (0)
2.7 Do patients ask about their diagnosis during bedside visits? *	Yes: 37 (94.9) No: 2 (5.1)	Yes: 37 (92.5) No: 3 (7.5)

*Note: Responses for one student were missing for statements marked with an asterisk.

Students' achievement in the cognitive aspect of healthcare ethics

Table 2 presents the weighted mean and percentage agreement of students before and after the intervention, with the changes in percentage consensus showing statistically significant differences across all items related to ethics committees and attitudes toward HCE following the intervention.

Table 2. Statistical analysis of students' performance in the cognitive domain of healthcare ethics before and after intervention

Cognitive Domain	Post-Test		Pre-Test	
	Weighted Mean	Consensus (%)	Weighted Mean	Consensus (%)
Responses regarding ethics committees (EC)				
3.1 Is there an EC in your institution?	4.9	98.1	4.2	60.2
3.2 EC provides guidance to healthcare staff on ethical issues	4.7	79.4	3.6	62.6
3.3 EC reviews and approves research projects	4.9	94.1	4.3	72.4
3.4 EC offers medical ethics education to students	4.4	56.1	3.2	50.8

3.5 EC organizes bioethics conferences	4.5	68.9	4.1	68.9
Participants' attitudes towards healthcare ethics				
4.1 Doctors' decisions are always correct, regardless of patients' views	4.9	71.5	3.2	57.5
4.2 Patients' preferences should consistently be respected	4.03	71.5	3.3	57.5
4.3 Consent is necessary only for surgical procedures, not for tests or medications	2.02	45.3	11.5	63.8
4.4 Obligated to treat all patients who seek care	3.9	55.8	3.46	42.6
4.5 Children must not be treated without parental consent	4.1	63.5	3.87	49.6
4.6 Close relatives should always be informed of the patient's condition	3.8	47.75	3.73	38.5
4.7 Promoting practice through advertising	1.9	53.1	1.95	52.9
4.8 If legal, doctors cannot refuse to perform an abortion	2.8	36.6	2.85	47.7
4.9 Assisting a patient in dying if requested	3.35	29.3	2.35	55.9

Effectiveness of Phase I intervention on students' cognitive performance in healthcare ethics

Following the intervention, the mean pre-test scores increased from 3.2 to 3.78, as presented in **Table 3,** and the normalized gain (g) was calculated as 0.32, suggesting that the intervention had a moderate impact on enhancing students' cognitive understanding of HCE.

Table 3. Impact of phase I intervention on students' cognitive performance in healthcare ethics

Domain	Mean Post-Test Score	Mean Pre-Test Score	RLG	ALG	"g"	Interpretation
Students' performance in the cognitive domain of healthcare ethics	3.78	3.2	18	11.6	0.32	Intervention demonstrated moderate effectiveness

Note: ALG = Absolute Learning Gain, RLG = Relative Learning Gain, "g" = Normalized Gain

Impact of interactive lectures and audio-visual aids on affective, psychomotor, and communication skills, and competence in managing ethical dilemmas in healthcare ethics (post-phase II results)

In Phase II, the combined use of interactive lectures and audio-visual tools was assessed through absolute, relative, and normalised learning gains (g). The strategy produced only modest improvements in overall OSCE performance (g = 0.26, indicating low effectiveness) and a reasonable enhancement in students' ability to navigate ethical challenges (g = 0.41, moderate effectiveness). Communication skills, however, showed no detectable progress after the intervention **(Table 4).**

Table 4. Impact of the intervention (Interactive Lectures + Audio-Visual Aids) on affective, psychomotor, and communication skills, and on competence in managing ethical issues in healthcare ethics – phase II results

Domain	Post-test Mean	Pre-test Mean	Absolute Learning Gain (ALG)	Relative Learning Gain (%)	Normalised Gain (g)	Interpretation
Overall OSCE Performance	5.50	3.90	1.60	41.03	0.26	Low effectiveness of the intervention
Communication Skills	2.23	2.19	0.04	1.83	0.02	No effectiveness – communication skills showed virtually no improvement

Ability to Manage Ethical Issues	3.17	1.89	1.28	67.72	0.41	Moderate effectiveness in developing competence to address ethical dilemmas

Notes: ALG = Absolute Learning Gain, RLG = Relative Learning Gain, g = Normalised gain, OSCE = Objective Structured Clinical Examination

Feedback from the FGD

Student participants' perceptions on integrating healthcare ethics into the curriculum

Participants emphasized that incorporating healthcare ethics (HCE) into the medical curriculum is timely and essential. They recommended introducing it from the first year, accompanied by sensitization sessions highlighting the relevance of medical ethics. One student commented: "Previously, we received no formal education on medical ethics; these sessions will now support our clinical practice. Given the evolving healthcare landscape, it is crucial that all medical graduates are familiar with medical ethics."

Students suggested that communication skills should be introduced in the second year when clinical bedside postings begin, as it would enhance their confidence in interacting with patients and their families. Another participant noted:

"Students should be guided to treat cadavers with respect during Anatomy dissection sessions."

Regarding HCE teaching methods, students felt that instruction should be practical, skill-based, and rooted in real-life clinical scenarios, ideally integrated into clinical ward teaching. They recommended organizing workshops and involving external experts to provide specialized instruction. The institution's Bioethics wing should take responsibility for HCE education, employing a dedicated module for this purpose. Participants also highlighted that beyond medical students, all healthcare staff—including professionals in government institutions—should be sensitized to ethics across all levels, which would promote teamwork, empathy, and cooperative patient care.

Student participants' perceptions of the benefits of learning healthcare ethics

Students expressed that understanding HCE would enhance their communication with patients and motivate ethical behavior toward patients and colleagues. One female student remarked:

"Learning about medical ethics has given us a new perspective; we will now be more careful in patient care and respect patients' viewpoints."

Another student highlighted the practical benefits:

"Ethical knowledge will help us handle problems in healthcare settings more smoothly. We will feel more at ease practicing ethically. The National Medical Council should have integrated medical ethics into the curriculum earlier."

During the discussion, students shared that HCE training would increase their confidence, responsibility, and satisfaction in crisis situations and improve interactions with patients and families. They believed it would foster patient trust and respect for healthcare providers and assist in managing medico-legal cases.

A final consensus among participants was that incorporating HCE into the medical curriculum is urgently needed in India, with training starting from the first year and continuing throughout the course.

In 2019, the Medical Council of India revised the undergraduate medical curriculum to a competency-based medical education (CBME) framework, aiming to prepare Indian Medical Graduates (IMGs) to uphold "Health for all" as a national objective. The revised curriculum outlines the competencies expected of students to perform effectively in the roles of clinician, professional, leader, communicator, and lifelong learner [1]. Professionalism remains a fundamental element of the doctor-patient relationship and has garnered increasing attention over the past decade. Healthcare ethics (HCE) is regarded as a crucial aspect of professional conduct, particularly in fostering communication skills and patient-centered care.

The four foundational principles of medical ethics guiding a doctor's duties toward patients and society include: (a) respect for patient autonomy, (b) non-maleficence, the duty to avoid harm, (c) beneficence, the obligation to act for the patient's benefit, relieve suffering, and preserve life when possible, and (d) justice, ensuring fairness in healthcare delivery [14]. These principles serve as a framework for addressing ethical dilemmas [15].

As professionals, IMGs are expected to possess adequate HCE knowledge and demonstrate competence in recognizing ethical challenges during patient care, applying clinical ethical judgment, and making decisions grounded in bioethical principles. CBME is designed to ensure that medical graduates can understand and apply

bioethics and legal principles, engage in clinical reasoning, provide care within healthcare systems, demonstrate empathy and human values, communicate effectively with patients and families, and integrate medical knowledge and research into patient care. IMGs are also expected to respond to situations professionally, compassionately, and ethically.

In this study, undergraduate students participated in mini-workshops focused on HCE principles to enhance their knowledge, attitudes, psychomotor, affective, and communication skills. Following the intervention, students demonstrated improved abilities to resolve ethical issues and provide feedback. Absolute learning gain, relative learning gain, and normalized gain (g) increased across nearly all domains except communication skills. These improvements suggest that HCE-related knowledge, attitudes, psychomotor, affective, and communication competencies can be developed through targeted training, although gains may also be influenced by prior experiences, medical training, or other unmeasured factors. A larger, multi-center cohort study could provide more definitive insights into the impact of HCE training on these skills among IMGs.

In phase I of the study, absolute learning gain, relative learning gain, and normalized gain were significantly higher post-intervention, indicating moderate effectiveness in enhancing the cognitive domain of HCE. In phase II, the use of audio-visual aids showed limited effectiveness: normalized gain for affective and psychomotor skills was 0.26, while the ability to handle ethical issues improved moderately (normalized gain 0.41), and no significant improvement was observed in communication skills.

Research from Australia highlights that a core ethics curriculum should cover both fundamental principles and specific ethical topics. Teaching ethics requires developing knowledge, skills, and attitudes through diverse instructional and assessment strategies [16]. Previous studies have reported improvements in learner awareness [17], attitudes [18], knowledge [19], confidence [20], decision-making [21], moral reasoning [22], and communication of bad news [23]. Nonetheless, stronger evidence is needed to clarify the links between medical ethics education, physician performance, and patient outcomes.

Comparing the current findings with existing literature is challenging, as few studies have focused on enhancing psychomotor and communication skills in HCE among medical undergraduates. However, our results align with prior evidence indicating that HCE knowledge can be improved through structured interventions. While there is widespread support for teaching medical ethics and professionalism to future physicians, there is no consensus regarding specific learning objectives or the most effective methods for instruction and assessment.

Limitations

This study has several limitations. The participants' mood, level of engagement, and motivation at the time of participation may have influenced the outcomes. The use of self-administered questionnaires posed inherent limitations, as some questions addressed HCE scenarios that students may not have encountered yet. Certain items required participants to consider hypothetical situations and indicate how they would respond, introducing the possibility of reporting bias. Additionally, the study sample was drawn from a single medical college, limiting the external generalizability of the results. The absence of a control or comparison group makes it difficult to attribute all observed improvements in knowledge, attitude, psychomotor, and affective skills exclusively to the intervention.

Several challenges were encountered in providing medical ethics education:

a. There is no standardized agreement on the learning objectives for medical ethics and professionalism within traditional medical curricula.
b. While various pedagogical approaches show some benefit, supporting evidence is limited, and teaching strategies vary widely across institutions and programs.
c. Faculty face pressure to demonstrate measurable effectiveness, which is challenging because ethics education does not always yield immediate, quantifiable improvements.
d. Faculty require sensitization and training regarding the importance of HCE and professionalism, necessitating substantial resources and expertise for faculty development.

Addressing these challenges requires a committed, structured, and interdisciplinary effort. Although this is a complex undertaking, future studies should aim to explore and overcome these issues.

Conclusion

The findings of this study indicate that formal training in HCE can enhance undergraduate medical students' knowledge, affective and psychomotor skills, and their ability to address ethical issues. The results highlight critical considerations for ethics education in medical training and the promotion of professional ethical conduct in healthcare. The study underscores the need for appropriate training programs for both students and faculty, along with strategies to increase awareness and sensitivity to ethical issues in clinical practice.

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