

Assessing the Impact of Medical Ethics Education on Knowledge, Attitude, and Self-Reported Practice: A Vignette-Based Cross-Sectional Study of Doctors at a Tertiary Teaching Hospital in Nepal

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Abstract

Understanding and applying medical ethics is increasingly recognized as essential in medical education. This research comprised two studies: the first evaluated clinicians' knowledge, attitudes, and self-reported practices regarding medical ethics at Patan Academy of Health Sciences, a tertiary teaching hospital in Nepal, while the second compared these outcomes between doctors who had formal medical ethics training during their undergraduate studies and those who had not. Two cross-sectional surveys using self-administered questionnaires were performed. Study 1 involved 72 participants, including interns, medical officers, and consultants. Study 2 compared 54 medical officers with formal ethics training (Group 1) to 60 without such training (Group 2).

Doctors with postgraduate qualifications scored higher in knowledge ($p = 0.050$), practice ($p < 0.001$), and combined scores ($p = 0.011$). Ethics-educated participants demonstrated significantly better knowledge ($p < 0.001$), attitudes ($p = 0.001$), practices ($p < 0.001$), and overall performance ($p < 0.001$). Consulting colleagues was the preferred approach for handling ethical dilemmas, while awareness of the Declaration of Helsinki was low. A majority viewed physicians as the primary decision-makers in patient care (Study 1: 70.42 percent; Study 2, Group 1: 42.59 percent, Group 2: 80 percent). Participants struggled most with scenarios involving truth-telling, end-of-life care, HIV/AIDS treatment, managing minors, and reporting colleagues' errors. Formal medical ethics education correlates with higher knowledge, improved attitudes, and better self-reported practices. These findings support the integration of ethics education into core medical training. A supportive, non-punitive environment should encourage consultation with senior colleagues, and research ethics must be emphasized. Training should particularly address areas where physicians demonstrate ethical weaknesses, tailored to local healthcare contexts.

Keywords: Medical ethics education, Knowledge, Attitude, Self-reported

Introduction

Ethics provides the foundation for distinguishing right from wrong according to social and human values. In medicine, ethical principles guide clinical decisions,

professional behavior, and interactions with patients and society [1]. Bioethics broadly addresses moral issues across medicine, research, and biology, typically classified into clinical ethics, research ethics, professional ethics, and public policy ethics [2]. Medical ethics, a branch of professional ethics, focuses on dilemmas encountered in medical practice, while clinical ethics emphasizes patient-centered decision-making to enhance care quality [3].

Professional conduct is informed by ethical codes such as the Hippocratic Oath and national regulatory guidelines [2, 4]. Historical texts, including the Charaka Samhita (7th century BC), indicate a longstanding tradition of

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ethical reflection in medicine [5], which has evolved through modern frameworks like the Hippocratic Oath, Declaration of Geneva, and WMA International Code of Medical Ethics [6, 7]. Ethical decision-making methods, including Nijmegen, Dilemma, and Padova methods, and the Four Quadrant Approach, support structured deliberation in complex cases [8, 9]. Research ethics has similarly developed over time with instruments such as the Nuremberg Code, Declaration of Helsinki, Belmont Report, and Emanuel framework [6, 7]. Additional declarations, such as those of Tokyo, Hawaii, Malta, and wartime regulations, provide guidance on context-specific ethical issues [10]. Beauchamp and Childress' four principles—autonomy, beneficence, non-maleficence, and justice—remain a standard framework for ethical evaluation in clinical practice [4, 11]. Modern healthcare challenges, including strained doctor–patient relationships, rising litigation, technological advancements, and increasing demand for accountable care, highlight the need for robust ethics education [12, 13]. Such education aims to instill social values, ethical reasoning, and interpersonal skills, fostering doctors who are knowledgeable, skilled, and morally competent [6, 14]. The WMA recommends mandatory ethics education throughout undergraduate training, led by qualified faculty [15], beginning early in preclinical years and continuing through clinical rotations to enhance relevance and effectiveness [12]. Curriculum content, teaching strategies, and assessment methods vary widely between institutions and countries [14, 16], and local culture, laws, and healthcare context must be considered to develop meaningful, context-specific ethics training.

Medical ethics education in Nepal

Medical schools in Nepal operate under two main universities—Tribhuvan University (T.U.) and Kathmandu University (K.U.)—alongside two autonomous institutions: B.P. Koirala Institute of Health Sciences (BPKIHS) and Patan Academy of Health Sciences (PAHS). A World Health Organization (WHO) review highlighted that ethics instruction in South-East Asian medical schools, often integrated into forensic medicine, is generally insufficient [17]. In response, the Nepal Medical Council (NMC), responsible for overseeing and updating medical curricula, adopted the WHO's recommended model for medical ethics education, which stipulates a minimum of 15 hours of

theoretical teaching and six hours of interactive discussion [18, 19].

Tribhuvan University updated its curriculum in 2009 to include medical ethics, mandating its adoption across affiliated colleges [20]. However, rollout has been slow, and many institutions under T.U. have yet to implement the changes. Kathmandu University also lists medical ethics in its curriculum, though the responsibility for delivering the course remains unclear [21]. At BPKIHS, ethics and medical law are briefly addressed within forensic medicine, but the content does not align fully with international recommendations [22].

Medical ethics curriculum at PAHS

PAHS, a leading teaching hospital in Kathmandu, was founded in 2008 and admitted its first undergraduate MBBS students in 2010 [23]. From the outset, PAHS integrated medical ethics into its curriculum, aiming to help students identify, analyze, and discuss ethical challenges in everyday and complex clinical scenarios, including legal considerations. The curriculum employs a mix of lectures, problem-based learning (PBL), and case discussions distributed across the five-and-a-half-year MBBS program [23].

Ethics education begins in the introductory Introduction to Clinical Medicine (ICM) course during the first two months of medical school [24]. During the initial preclinical years, students attend frequent lectures covering topics such as professionalism, physician responsibilities, ethical principles, duty of care, end-of-life decision-making, human rights, and resource allocation. Ethical reasoning is reinforced through multiple PBL exercises, including a dedicated week-long PBL session focused entirely on ethics to encourage critical reflection and self-directed learning [24].

During clinical rotations, students are required to maintain a log of at least one ethically challenging case per eight-week rotation. Each year, students must present a case to peers under the supervision of a faculty member, followed by an in-depth discussion. Knowledge of medical ethics is assessed in exams through multiple-choice and problem-based questions [24].

Community-based learning (CBLE) exposes students to healthcare at multiple levels, from working with community health volunteers to district hospitals. One objective is to explore real-world ethical dilemmas in healthcare delivery. Students submit a reflective log of ethical challenges encountered during rural postings and

maintain a daily diary documenting these experiences [24, 25].

Study 1

WHO guidance emphasizes that clinical teachers serve as ethical role models, with students learning ethics largely through observation and imitation [6]. Ensuring that practicing clinicians demonstrate sound knowledge, attitudes, and ethical behavior is therefore essential for cultivating positive role models in medical training. Study 1 was designed to evaluate the knowledge, attitudes, and self-reported practices (KAP) of medical ethics among clinicians at PAHS.

Materials and Methods

Design, setting, and participants

This cross-sectional study was conducted at PAHS between August and September 2015. At the time, the first student cohort had not yet started internships. Participants included interns, medical officers, and consultants from six departments—surgery, medicine, pediatrics, orthopedics, gynecology/obstetrics, and emergency—selected because these areas account for substantial portions of the MBBS training [24].

Interns were defined as recent MBBS graduates completing their mandatory one-year rotational internship. Medical officers were graduates who had completed internship and were practicing independently, while consultants were postgraduate specialists. At the time, PAHS did not offer postgraduate programs.

Survey development

The questionnaire, administered in English, was developed after detailed discussions among the study team and a focus group of four national and international experts, including faculty from the pediatrics and general practice departments at PAHS.

Questionnaire content

The survey instrument consisted of four sections. Section A captured participants' sociodemographic and professional information, including age, gender, highest qualification, current designation, department of practice, years of clinical experience, institution, and country of undergraduate and postgraduate training where applicable.

Section B was adapted, with permission, from a study by Hariharan *et al.* in Barbados [26]. This section assessed

the frequency with which respondents encountered ethical dilemmas, their preferred sources of consultation for ethical issues, their background in ethics knowledge, opinions on the significance of medical ethics, self-rated knowledge, and familiarity with professional codes of ethics. Participants were also asked about the existence of a clinical ethics committee and legal advisory support at PAHS, as well as their views on who is best positioned to determine what is in the patient's best interest.

Section C contained ten clinical vignettes designed to reflect ethical challenges commonly encountered in Nepalese medical practice. Scenarios were developed using real cases shared by medical students during Clinical Year I ethical presentations and experiences reported by faculty, supplemented with reference to standard medical ethics texts [27–29]. Following the WMA Ethics Manual [2], the vignettes were organized into three domains: physicians and patients, physicians and society, and physicians and colleagues.

Within the physicians and patients domain, eight cases addressed issues such as informed consent (Case 1), truth-telling and disclosure (Case 2), confidentiality (Case 3), treatment of minors (Case 4), contraception (Case 9), and end-of-life decisions including Do Not Resuscitate (DNR), euthanasia, and withdrawal of treatment (Cases 5, 6, 7). The physicians and society domain included one scenario (Case 8) addressing ethics in managing reportable illnesses (HIV/AIDS). The physicians and colleagues domain included one case (Case 10) focused on professional relationships among doctors. No vignettes addressed research ethics.

Each vignette assessed knowledge, attitude, and reported practice (KAP). Reported practice was evaluated through a multiple-choice question asking participants what they would do if faced with the situation; four options were provided, with the most ethically appropriate response scored as one. While ethical decisions are rarely strictly right or wrong, the scoring reflected the best-practice approach emphasized in undergraduate ethics education. Ten questions measured practice across the vignettes.

Attitude was assessed by asking participants to rate how ethically appropriate they found the doctor's actions in each case using a four-point Likert scale. Responses were dichotomized into correct or incorrect ethical attitudes based on the scenario, with each correct response scoring one point. Ten items assessed overall attitude.

Knowledge was measured through two questions per vignette: (1) whether any ethical principle had been violated (Yes/No) and (2) identifying the main ethical

principle involved. The four core principles—autonomy, beneficence, non-maleficence, and justice—were assessed, with confidentiality considered a component of autonomy. For Case 8 (HIV/AIDS), two additional questions were included: (1) whether any ethical principle had been upheld (Yes/No) and (2) the primary principle followed. In total, 22 questions evaluated knowledge. Operational definitions of the ethical principles followed standard guidance [2]: autonomy refers to the patient's right to make healthcare decisions unless incompetent; justice refers to the equitable distribution of benefits and burdens of care; beneficence entails acting in the patient's and society's best interests; and non-maleficence refers to avoiding harm to the patient or society.

Section D comprised a short reflection survey in which participants evaluated whether reviewing the vignettes changed their perception of their knowledge in clinical ethics or its relevance to practice. Participants were also asked if they consulted any external resources while completing the questionnaire.

Questionnaire validation and reliability

The focus group reviewed the questionnaire to ensure it adequately reflected the intended content and appeared suitable for respondents. A pilot test was carried out with 12 doctors—two representatives from each of the six selected departments—randomly chosen to provide feedback. Participants' input on clarity, comprehension, and ease of understanding was collected and used to refine the questionnaire. Cronbach's alpha for the knowledge items, the primary outcome, was 0.715, indicating acceptable internal consistency, whereas reliability scores for attitude and practice items were below 0.7. Removing any individual item did not meaningfully change the results. Considering the content validation, face validity, and the small pilot sample, the finalized questionnaire was retained despite these lower reliability scores for some sections.

Sample size and participant selection

At the time the study was conducted, PAHS employed 174 doctors, including interns, medical officers, and consultants. The main outcome of interest was knowledge of the principal ethical concept in each scenario, which in the pilot test had a 51.5% correct response rate. Using this proportion to calculate sample size for a finite population, the minimum number of participants required was 63, with a 10% margin of error

and 95% confidence. To accommodate potential incomplete responses (estimated at 15%), the target sample was increased to 72. Pre-test participants and focus group members were excluded. Stratified random sampling was applied: participants were grouped by department, and a lottery method was used to select individuals from each stratum, proportional to department size.

Ethical approval and participant consent

The study protocol was approved by the PAHS Institutional Review Committee, Nepal (Reference No. std1508031078). All participants were briefed about the study's aims, voluntary participation, and the freedom to withdraw at any stage. Written informed consent was obtained prior to survey administration. Participant confidentiality was preserved using unique identification codes, with no personally identifying information collected.

Data collection and statistical analysis

Data were gathered through paper-based questionnaires administered individually, with all participants returning completed forms. Responses were entered into Epi-info 7 using unique codes, and statistical analyses were conducted in IBM SPSS Statistics v20 (IBM, Armonk, NY, USA). Missing values were handled via pairwise deletion, analyzing each variable with available responses.

Sociodemographic data (Section A) and general ethics questions (Section B) were summarized using frequencies and percentages. The Shapiro–Wilk test assessed the normality of KAP and subscale scores. Depending on data distribution, results were presented as means with standard deviations or medians with interquartile ranges. Associations between KAP scores/subscales and variables such as qualification, MBBS country, and use of reference resources were examined using independent-sample t-tests (parametric) or Mann–Whitney tests (non-parametric). Differences across designations and departments were analyzed using ANOVA (parametric) or Kruskal–Wallis tests (non-parametric). A p-value ≤ 0.05 indicated statistical significance. Spearman's correlation assessed relationships between years of clinical practice and KAP scores/subscales.

Study findings

Seventy-two doctors participated in the survey, achieving a 100% response rate. Key demographic details are presented in **Table 1**. The average age of participants was 29.7 years (SD \pm 6.26), with males constituting 65.71% (46/72). Mean duration of clinical practice was 4.0 years (SD \pm 5.55), and 65.28% (47/72) had completed their undergraduate medical training (**Table 1**).

Table 1. Demographic characteristics of participants in study 1

Characteristic	Category	n (%)
Age (years, N = 71)	20–25	14 (19.72)
	26–30	33 (46.48)
	31–35	17 (23.94)
	\geq 36	7 (9.86)
Sex (N = 70)	Male	46 (65.71)
	Female	24 (34.29)
Qualification (N = 72)	MBBS	47 (65.28)
	MD/MS	25 (34.72)
	Intern	11 (15.28)
Designation (N = 72)	Medical Officer	36 (50.00)
	Consultant	25 (34.72)
	Emergency	17 (23.61)
Department (N = 72)	Gynaecology/Obstetrics	14 (19.44)
	Medicine	16 (22.22)
	Orthopedics	5 (6.94)
	Pediatrics	11 (15.28)
	Surgery	9 (12.50)
MBBS Completed in (N = 70)	Nepal	26 (37.14)
	Abroad	44 (62.86)
Years of Practice After MBBS (N = 68)	<1 year	23 (33.82)
	1–5 years	26 (38.24)
	6–10 years	10 (14.71)
	>10 years	9 (13.24)

Note: Due to missing data, not all categories sum to the total number of participants.

N = number of respondents.

Overview of ethical perspectives

When participants were asked how they would respond to an ethical dilemma, over half (39, 54.9%) preferred to first consult their peers, while 32 (45.1%) would approach their department head for guidance. The largest proportion of respondents (46, 63.9%) identified practical work experience as their primary source of knowledge on medical ethics (**Table 2**). Participants considered medical ethics highly relevant to daily clinical

practice, assigning a median importance score of 8 (IQR \pm 3) on a 1-to-10 scale. Regarding the frequency of encountering ethical issues, 35 participants (48.6%) reported facing such situations at least monthly, whereas 16 (22.2%) had not yet encountered any ethical challenges. Universally, respondents endorsed the inclusion of medical ethics as a compulsory component of medical education.

Table 2. Sources of medical ethics knowledge among participants in study 1 (N = 72)

Source	n (%)
Books/literature	31 (43.05)
Work experience	46 (63.89)
Lectures during MBBS	44 (61.11)
Lectures during PG	11 (15.27)
Seminar/workshops/CME	19 (26.39)

Nearly all respondents (66, 92.96%) were familiar with the Hippocratic Oath and rated their own understanding moderately high, with a median score of 7 (IQR \pm 3) on a 10-point scale. More than three-quarters (54, 76.06%) knew about the Nepal Medical Council's code of ethics, rating their knowledge at a median of 6 (IQR \pm 3). Awareness of the Declaration of Helsinki was lower, with only 33 participants (46.48%) reporting familiarity and giving it a low knowledge rating (median 0, IQR \pm 4). At the time of the survey, Patan Hospital did not have a clinical ethics committee; nevertheless, 35 respondents (52.24%) were unaware of this but still assigned a high importance score to the idea of having such a committee (median 9, IQR \pm 3). Most participants (58, 85.30%) were aware of the hospital's legal advisor.

When asked who is most capable of determining the best course for a patient, only 21 participants (29.58%) believed the patient themselves were best placed, whereas 50 respondents (70.42%) thought that physicians were the most suitable decision-makers. A minority (13, 18.60%) reported consulting external references while completing the questionnaire, though this had no significant effect on knowledge scores ($p = 0.990$).

Evaluation of Knowledge, Attitude, and Reported Practice (KAP)

Longer clinical experience showed a positive correlation with participants' attitudes ($r = 0.262$, $p = 0.034$), practice patterns ($r = 0.476$, $p < 0.001$), and overall KAP scores (r

= 0.313, $p = 0.016$). Doctors with postgraduate qualifications scored significantly higher in knowledge ($p = 0.050$), reported practice ($p < 0.001$), and overall KAP ($p = 0.011$) compared to those with only undergraduate training, although differences in attitude were not statistically significant ($p = 0.061$) (Table 3).

Similarly, consultants performed better in practice scores ($p = 0.003$) relative to medical officers and interns, but knowledge ($p = 0.144$), attitude ($p = 0.158$), and total KAP scores ($p = 0.063$) did not differ significantly among the three groups (Table 3).

Table 3. Assessment of knowledge, practice, attitude and combined KAP of medical ethics for study 1

	Knowledge			Attitude			Practice			Combined KAP		
	N	Mean \pm SD (n = 22 questions)	p value	N	Median \pm IQR (n = 10 questions)	p value	N	Median \pm IQR (n = 10 questions)	p value	N	Measure of Central tendency \pm dispersion (n = 42 questions)	p value
<i>Qualification</i>												
MBBS	43	12.00 \pm 2.96	0.050 ^c	46	7.00 \pm 2.00	0.061 ^f	47	6.00 \pm 3.00 ^b	0.001 ^f	42	24.52 \pm 4.20 ^a	0.011 ^c
MD/MS	21	13.67 \pm 3.45		24	8.00 \pm 2.50		24	7.00 \pm 2.00 ^b		19	28.00 \pm 5.84 ^a	
<i>Designation</i>												
Intern	10	11.80 \pm 3.19	0.144 ^d	11	7.00 \pm 2.00	0.158 ^e	11	6.00 \pm 4.00 ^b	0.003 ^e	10	24.50 \pm 10.00 ^b	0.063 ^e
Medical Officer	33	12.06 \pm 2.94		35	7.00 \pm 1.00		36	6.00 \pm 3.00 ^b		32	24.00 \pm 4.00 ^b	
Consultant	21	13.67 \pm 3.45		24	8.00 \pm 2.50		24	7.00 \pm 2.00 ^b		19	27.00 \pm 6.00 ^b	
<i>Department</i>												
Emergency	17	11.94 \pm 3.34	0.093 ^d	15	7.00 \pm 2.00	0.818 ^e	17	6.00 \pm 1.50 ^b	0.899 ^e	15	25.93 \pm 4.92 ^a	0.477 ^d
Gynae/Obs	12	11.58 \pm 3.58		14	7.00 \pm 1.25		13	6.00 \pm 3.00 ^b		11	23.73 \pm 5.71 ^a	
Medicine	14	11.79 \pm 2.01		16	7.00 \pm 2.00		16	6.00 \pm 1.00 ^b		14	24.86 \pm 3.48 ^a	
Orthopedics	3	13.00 \pm 2.00		5	7.00 \pm 1.50		5	7.00 \pm 4.50 ^b		3	24.67 \pm 3.06 ^a	
Pediatrics	11	15.00 \pm 3.07		11	7.00 \pm 1.00		11	4.00 \pm 4.00 ^b		11	28.00 \pm 5.70 ^a	
Surgery	7	13.14 \pm 3.63		9	6.00 \pm 1.50		9	6.00 \pm 3.50 ^b		7	26.00 \pm 5.97 ^a	
<i>MBBS completed from</i>												
Nepal	24	12.92 \pm 3.82	0.539 ^e	25	7.00 \pm 2.00	0.650 ^f	25	6.00 \pm 2.00 ^b	0.122 ^f	22	26.00 \pm 8.25 ^b	0.261 ^f
Abroad	38	12.39 \pm 2.81		43	7.00 \pm 2.00		44	6.00 \pm 3.00 ^b		37	25.00 \pm 7.50 ^b	

MBBS	43	12.00 ± 2.96	0.050 ^c	46	7.00 ± 2.00	0.061 ^f	47	6.00 ± 3.00 ^b	0.001 ^f	42	24.52 ± 4.20 ^a	0.011 ^c
MD/MS	21	13.67 ± 3.45		24	8.00 ± 2.50		24	7.00 ± 2.00 ^b		19	28.00 ± 5.84 ^a	
<i>Designation</i>												
Intern	10	11.80 ± 3.19	0.144 ^d	11	7.00 ± 2.00	0.158 ^e	11	6.00 ± 4.00 ^b	0.003 ^e	10	24.50 ± 10.00 ^b	0.063 ^e
Medical Officer	33	12.06 ± 2.94		35	7.00 ± 1.00		36	6.00 ± 3.00 ^b		32	24.00 ± 4.00 ^b	
Consultant	21	13.67 ± 3.45		24	8.00 ± 2.50		24	7.00 ± 2.00 ^b		19	27.00 ± 6.00 ^b	
<i>Department</i>												
Emergency	17	11.94 ± 3.34	0.093 ^d	15	7.00 ± 2.00	0.818 ^e	17	6.00 ± 1.50 ^b	0.899 ^e	15	25.93 ± 4.92 ^a	0.477 ^d
Gynae/Obs	12	11.58 ± 3.58		14	7.00 ± 1.25		13	6.00 ± 3.00 ^b		11	23.73 ± 5.71 ^a	
Medicine	14	11.79 ± 2.01		16	7.00 ± 2.00		16	6.00 ± 1.00 ^b		14	24.86 ± 3.48 ^a	
Orthopedics	3	13.00 ± 2.00		5	7.00 ± 1.50		5	7.00 ± 4.50 ^b		3	24.67 ± 3.06 ^a	
Pediatrics	11	15.00 ± 3.07		11	7.00 ± 1.00		11	4.00 ± 4.00 ^b		11	28.00 ± 5.70 ^a	
Surgery	7	13.14 ± 3.63		9	6.00 ± 1.50		9	6.00 ± 3.50 ^b		7	26.00 ± 5.97 ^a	
<i>MBBS completed from</i>												
Nepal	24	12.92 ± 3.82	0.539 ^e	25	7.00 ± 2.00	0.650 ^f	25	6.00 ± 2.00 ^b	0.122 ^f	22	26.00 ± 8.25 ^b	0.261 ^f
Abroad	38	12.39 ± 2.81		43	7.00 ± 2.00		44	6.00 ± 3.00 ^b		37	25.00 ± 7.50 ^b	
MBBS	43	12.00 ± 2.96	0.050 ^c	46	7.00 ± 2.00	0.061 ^f	47	6.00 ± 3.00 ^b	0.001 ^f	42	24.52 ± 4.20 ^a	0.011 ^c
MD/MS	21	13.67 ± 3.45		24	8.00 ± 2.50		24	7.00 ± 2.00 ^b		19	28.00 ± 5.84 ^a	

Due to missing data, not all category groups sum to 72

N number of participants

^aMean ± SD

^bMedian ± IQR

^cIndependent T-test

^dANOVA

^eKruskal–Wallis

^fMann–Whitney U

No meaningful differences were detected in knowledge ($p = 0.093$), practical application ($p = 0.899$), attitudes ($p = 0.818$), or the overall KAP scores ($p = 0.477$) when comparing doctors from different departments. Likewise, whether participants obtained their MBBS degree in Nepal or overseas did not significantly affect knowledge ($p = 0.539$), practice ($p = 0.122$), attitude ($p = 0.650$), or the combined KAP scores ($p = 0.261$) (**Table 3**).

Analysis of the ten ethical vignettes revealed that in eight scenarios, more than half of the respondents were able to

recognize whether an ethical breach had occurred. Despite this, the majority were unable to correctly identify the main ethical principle at play in most scenarios (**Table 4**). The cases in which at least half of the participants failed to select the most appropriate action involved issues of truth-telling (Case 2), euthanasia in end-of-life care (Case 6), management of patients with HIV/AIDS (Case 8), and addressing errors made by colleagues (Case 10) (**Table 4**).

Table 4. Performance of study participants in each ethical case scenario (Study 1)

Case	Ethical Issue	N	Recognition of Ethical Breach, n (%)	N	Identification of Main Ethical Principle, n (%)	N	Attitude Correct, n (%)	N	Practice Correct, n (%)
1	Informed consent	72	64 (88.89)	71	54 (75.00)	71	68 (94.44)	72	69 (95.83)
2	Truth-telling	72	64 (88.89)	70	24 (33.33)	72	63 (87.50)	72	22 (30.56)
3	Confidentiality	71	50 (69.44)	72	57 (79.17)	72	59 (81.94)	72	61 (84.72)
4	Treating minors	72	32 (44.44)	71	23 (31.94)	72	36 (50.00)	72	37 (51.39)
5	End-of-life decisions (DNR)	72	37 (51.39)	71	32 (45.07)	72	36 (50.00)	72	49 (68.06)
6	End-of-life decisions (euthanasia)	72	53 (73.61)	71	32 (44.44)	72	64 (88.89)	72	35 (48.61)
7	End-of-life decisions (withdrawal of treatment)	72	44 (61.11)	71	33 (45.83)	72	41 (56.94)	71	55 (76.38)
8a	Reportable illness (HIV/AIDS)	71	38 (52.78)	69	31 (43.05)	72	50 (69.44)	72	34 (47.20)
8b	Reportable illness (HIV/AIDS)	71	57 (79.16)	70	26 (36.11)	-	-	-	-
9	Contraception	72	29 (40.28)	71	40 (55.56)	72	31 (43.06)	72	40 (55.60)
10	Physician–colleague relationship (reporting error)	72	52 (72.22)	71	29 (40.28)	71	59 (81.94)	72	28 (38.90)

Abbreviations: N = number of participants; percentages calculated based on available data. Some totals may not sum to 72 due to missing responses.

Study 2

At Patan Academy of Health Sciences (PAHS), the undergraduate medical curriculum includes ethics education through structured lectures, problem-based learning exercises, ethical case discussions, and presentations spread across the five-and-a-half-year course. Students' understanding of medical ethics is also evaluated through examinations. However, evidence is limited on whether formal ethics instruction during undergraduate training translates into improved ethical knowledge, attitudes, or practices among practicing physicians. Study 2 was therefore designed to compare the knowledge, attitudes, and self-reported practices of medical ethics between physicians who received formal ethics instruction during their MBBS and those who did not.

Design, setting, and participants

This was a comparative cross-sectional study involving two groups of medical officers. Group 1 included PAHS graduates from 2016 and graduates from other medical schools who reported receiving structured ethics training during their MBBS. Group 2 comprised medical officers from other institutions who did not receive formal ethics education during their undergraduate studies. Initially, it was assumed that only PAHS 2016 graduates had formal

ethics education; however, some graduates from Kathmandu University School of Medical Sciences (KUSMS) and KIST Medical College also reported comprehensive ethics training beyond forensic medicine, and they were included in Group 1. Data collection occurred between March and April 2017.

Sample size and sampling

At the time, PAHS employed 54 recent graduates, 14 of whom worked as medical officers at PAHS. An additional 95 medical officers had graduated from other institutions. Sample size calculation, based on the mean KAP scores from Study 1, determined that at least 50 participants per group were needed to detect a 5-point difference in KAP scores with 80% power and 10% significance. To account for potential incomplete responses, the target sample size was increased to 60 per group. Participants were recruited via email invitations using convenience sampling.

Data collection and analysis

The questionnaire from Study 1 was adapted by removing items related to postgraduate education and adding five questions about MBBS ethics teaching. Data were collected online using Google Forms. Informed

consent was included on the first page, and participants could only submit the form once. Responses could be reviewed before submission. Data collection continued until both groups reached the target sample size. Participant confidentiality was ensured using unique identifiers.

SPSS version 20 was used for data analysis. Categorical data from Part A and Part B of the questionnaire were summarized as counts and percentages. Shapiro–Wilk tests assessed normality of KAP and subscale scores. Chi-square tests compared categorical variables (e.g., country of MBBS completion), and Mann–Whitney tests assessed differences in continuous variables (e.g., age, months of clinical practice). Independent t-tests or Mann–Whitney tests compared KAP scores between groups depending on data distribution. Incomplete responses (6/120, 5%) were excluded from analysis.

Results and Discussion

Table 5. Sociodemographic profile of participants in Study 2

Characteristic	Category	Group 1 (Ethics education, n = 54)	Group 2 (No ethics education, n = 60)	p-value
Age (years)	20–25	25 (46.30%)	29 (48.33%)	0.913 ^a
	26–30	29 (53.70%)	30 (50.00%)	
	31–35	0 (0.00%)	1 (1.67%)	
Sex	Male	35 (64.81%)	32 (53.33%)	0.214 ^b
	Female	19 (35.19%)	28 (46.67%)	
MBBS graduation location	Nepal	54 (100.00%)	22 (36.67%)	<0.001 ^b
	Abroad	0 (0.00%)	38 (63.33%)	
Duration of clinical practice after MBBS (months)	< 5	38 (70.37%)	17 (28.33%)	<0.001 ^a
	6–11	13 (24.07%)	26 (43.34%)	
	> 12	3 (5.56%)	17 (28.33%)	

^aMann–Whitney test

^bChi-square test

Perspectives on ethical practice

When faced with ethical dilemmas, most respondents in Group 1 (72.22 percent, 39) indicated they would first seek guidance from colleagues, whereas in Group 2, only half (50%, 30) preferred this approach; consultation with the department head was chosen by 20.37% (11) in Group 1 and 38.33% (23) in Group 2. The main source of ethical knowledge for participants in both groups was MBBS coursework (Group 1: 92.59 percent, 50; Group 2: 70 percent, 42), supplemented by practical experience, while Group 2 relied mainly on a few lectures in forensic medicine due to lack of formal ethics education.

A total of 114 medical officers participated. Group 1 included 54 participants (47.4%) who received formal MBBS ethics training, while Group 2 had 60 participants (52.6%) without such training. Among Group 1, 37 (68.5%) were PAHS graduates.

Table 5 presents the participants' sociodemographic data. Most respondents were male in both groups (Group 1: 35, 64.8%; Group 2: 32, 53.3%). Mean age was similar between groups (Group 1: 25.8 ± 1.41 years; Group 2: 25.7 ± 1.38 years), with no significant differences in age ($p = 0.913$) or gender ($p = 0.214$). All Group 1 participants completed MBBS in Nepal, whereas 38 (63.3%) of Group 2 had studied abroad. Average clinical experience after MBBS was 5.57 ± 3.08 months in Group 1 and 10.12 ± 8.90 months in Group 2. Significant differences were found in MBBS country ($p < 0.001$) and clinical experience ($p < 0.001$) between the groups.

Regarding the frequency of encountering ethical challenges, the majority of Group 1 (36, 66.67 percent) reported facing such situations weekly, in contrast to Group 2, where most participants (23, 38.33%) encountered dilemmas monthly. Notably, 31.67% (19) of Group 2 had never encountered an ethical dilemma, compared to only 3.70 percent (2) in Group 1 (**Figure 1**). All participants affirmed the importance of including medical ethics in medical education, and nearly all expressed willingness to participate in future ethics-related workshops or seminars (Group 1: 96.30%, 52; Group 2: 98.33%, 59).

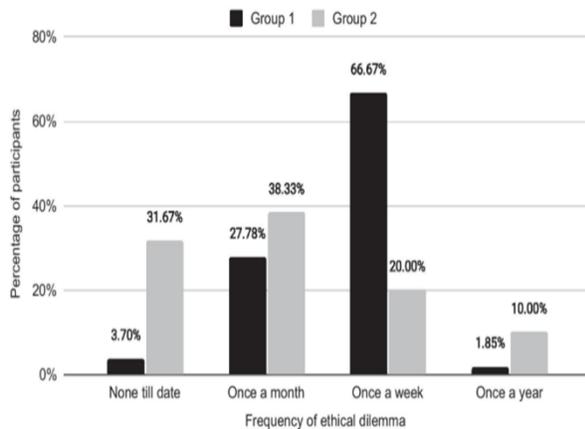


Figure 1. Frequency of ethical dilemmas encountered by participants in Study 2 (Group 1 n = 54, Group 2 n = 60)

Awareness of ethical guidelines varied markedly between the groups. A larger proportion of Group 1 participants reported familiarity with the Hippocratic Oath and the Nepal Medical Council (NMC) code of ethics, whereas both groups showed low awareness of the Declaration of Helsinki. Knowledge about the nonexistence of a clinical ethics committee at PAHS was limited, with only 18.52 percent (10) of Group 1 recognizing this gap, compared to 48.33% (29) in Group

2; notably, most PAHS graduates in Group 1 (94.59 percent, 35) were unaware. Regarding the presence of a legal advisor, 75.93 percent (41) in Group 1 and 53.33 percent (32) in Group 2 confirmed awareness. Both groups assigned high importance to establishing a clinical ethics committee, with median scores of 8 (Group 1 IQR = 2; Group 2 IQR = 23) on a 10-point scale. When asked who is most capable of determining the best course for patients, 51.85% (28) of Group 1 believed patients themselves, whereas only 11.67% (7) of Group 2 shared this view. Self-assessed knowledge of medical ethics was higher in Group 1 (median = 7, IQR = 1) than in Group 2 (median = 5, IQR = 3).

Comparison of Knowledge, Attitude, and Practice (KAP) scores

Analysis revealed clear differences between groups across all domains. Group 1 outperformed Group 2 in knowledge ($p < 0.001$), attitude ($p = 0.001$), practice ($p < 0.001$), and the combined KAP score ($p < 0.001$) (Table 6). A minority of participants (14.91 percent, 17) reported consulting external resources while completing the questionnaire; however, this did not significantly affect knowledge scores ($p = 0.845$).

Table 6. Comparison of Knowledge, Attitude, Practice, and overall KAP scores in study 2

Domain	Group	Participants (N)	Central Tendency ± Dispersion	Significance (p)
Knowledge (22 questions)	Group 1	54	14.00 ± 4.00 (median ± IQR)	< 0.001 (Mann–Whitney U)
	Group 2	60	12.00 ± 4.00 (median ± IQR)	
Attitude (10 questions)	Group 1	54	8.00 ± 2.00 (median ± IQR)	0.001 (Mann–Whitney U)
	Group 2	60	6.00 ± 2.00 (median ± IQR)	
Practice (10 questions)	Group 1	54	7.00 ± 3.00 (median ± IQR)	< 0.001 (Mann–Whitney U)
	Group 2	60	5.00 ± 2.00 (median ± IQR)	
Combined KAP (42 questions)	Group 1	54	28.31 ± 5.39 (mean ± SD)	< 0.001 (Independent T-test)
	Group 2	60	23.31 ± 4.07 (mean ± SD)	

Notes:

- N = number of participants
- Median ± IQR used for non-parametric data
- Mean ± SD used for total KAP score
- Statistical tests: Mann–Whitney U for non-parametric scores, Independent T-test for parametric scores

Table 7 summarizes how participants performed across the ethical case scenarios. In the majority of the scenarios (9 out of 10), participants in Group 1 demonstrated higher accuracy in selecting the correct course of action. The only scenarios where fewer than half of Group 1

participants chose the most appropriate practice were: managing ethical issues with minors (Case 4), euthanasia-related end-of-life decisions (Case 6), and contraception (Case 9). In contrast, for Group 2, under half of the participants correctly handled the following

scenarios: truth-telling (Case 2), treating minors (Case 4), DNR and euthanasia decisions (Cases 5 and 6), and handling physician-colleague ethical conflicts, such as reporting a colleague's error (Case 10) (Table 7).

Table 7. Comparison of Knowledge, Attitude, Practice, and overall KAP scores in study 2

Case	Ethical issues related to	Knowledge of presence of breach of ethics n (%)		Knowledge on principle of ethics involved n (%)		Attitude n (%)		Practice n (%)	
		Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
		(n = 54)	(n = 60)	(n = 54)	(n = 60)	(n = 54)	(n = 60)	(n = 54)	(n = 60)
1	Informed consent	54 (100.00)	51 (85.00)	49 (90.74)	37 (61.67)	50 (92.59)	55 (91.67)	51 (94.44)	51 (85.00)
2	Truth-telling	52 (96.30)	53 (88.33)	42 (77.78)	27 (45.00)	47 (87.04)	41 (68.33)	37 (68.52)	6 (10.00)
3	Confidentiality	43 (79.63)	35 (58.33)	49 (90.74)	50 (83.33)	46 (85.19)	44 (73.33)	46 (85.19)	47 (78.33)
4	Treating minors	30 (55.56)	27 (45.00)	17 (31.48)	17 (28.33)	24 (44.44)	20 (33.33)	23 (42.59)	19 (31.67)
5	End-of-life decisions (DNR)	26 (48.15)	29 (48.33)	28 (51.85)	22 (36.67)	27 (50.00)	26 (43.33)	41 (75.93)	26 (43.33)
6	End-of-life decisions (euthanasia)	45 (83.33)	47 (78.33)	18 (33.33)	27 (45.00)	49 (90.74)	55 (91.67)	24 (44.44)	21 (35.00)
7	End-of-life decisions (withdrawal of treatment)	46 (85.19)	35 (58.33)	41 (75.93)	27 (45.00)	38 (70.37)	23 (38.33)	45 (83.33)	48 (80.00)
8 Part 1	Reportable illness (HIV/AIDS)	29 (53.70)	24 (40.00)	25 (46.30)	12 (20.00)	46 (85.19)	51 (85.00)	38 (70.37)	30 (50.00)
8 Part 2	Reportable illness (HIV/AIDS)	46 (85.19)	56 (93.33)	20 (37.04)	27 (45.00)	-	-	-	-
9	Contraception	23 (42.59)	22 (36.67)	36 (66.67)	18 (30.00)	25 (46.30)	24 (40.00)	23 (42.59)	33 (55.00)
10	Physician and colleague relationship (reporting error)	32 (59.26)	38 (63.33)	25 (46.30)	26 (43.33)	42 (77.78)	47 (78.33)	31 (57.41)	25 (41.67)

In most scenarios, participants could accurately detect whether an ethical violation had occurred; however, they found it challenging to pinpoint the fundamental ethical principle in cases involving minors (Case 4), end-of-life decisions such as DNR orders, euthanasia, or treatment withdrawal (Cases 5–7), management of patients with HIV/AIDS (Case 8), contraception (Case 9), and professional relationships among physicians and colleagues (Case 10) (Table 7).

Almost twenty years after medical ethics became a standard part of the curriculum in most American medical schools, Pellegrino [30] in 1989 raised the

question of whether ethics education had a measurable impact on physicians' behavior, noting that evidence supporting its effectiveness was limited, similar to other subjects taught in medical school. For instance, there is little proof that learning biochemistry directly improves clinical performance, largely because such training is assumed and rarely studied [30]. Although this rationale influenced the early adoption of ethics instruction, efforts to demonstrate its practical importance continue.

A 2004 review highlighted two main objectives for teaching medical ethics: first, to nurture morally responsible and virtuous physicians, and second, to

provide them with analytical tools to navigate ethical dilemmas [31]. Whether current pedagogical approaches achieve these aims remains debated [31], yet there is broad agreement on the necessity of medical ethics within the curriculum [31–33]. A survey of U.S. and Canadian medical school deans found that 94% supported making ethics courses mandatory [34], and a 2006 inquiry across 22 U.K. medical schools confirmed that ethics education is widely recognized as an integral part of medical training and should be embedded throughout the program [35].

In our first study, participants overwhelmingly rated medical ethics as highly relevant to clinical practice (median $8 \pm$ IQR 3 on a 10-point scale). A similar study in a tertiary care hospital in Barbados, a setting culturally comparable to Nepal, reported that all participating physicians considered ethics essential in their work [26]. In line with these results, every participant in our study agreed that ethics should be a core component of medical education, echoing findings from Barbados [26] and Northern India [36], where 100% and 85% of respondents, respectively, supported ethics teaching.

Current assessments of knowledge, attitudes, and practices in medical ethics suggest that existing teaching methods may not be fully effective. Several studies have documented significant gaps in clinical ethics knowledge among medical graduates [37, 38], with similar findings reported in India [39], Nepal [40], and Sri Lanka [41].

Physicians often lack awareness of historical ethical codes and the presence of institutional ethics committees. In Manipur, India, over half of physicians surveyed (54%) could not recall any content from the Hippocratic Oath [38], whereas only 11% of respondents in Barbados were unfamiliar with it [26]. In our study, most participants were aware of the Hippocratic Oath (Study 1: 66, 93%; Study 2 Group 1: 52, 96.3%; Group 2: 50, 83.3%), though their understanding of its details was not examined. Awareness of the Declaration of Helsinki was low, with only 22.22% of Group 1 and 18.33% of Group 2 in Study 2 having heard of it, compared with 46.48% of participants in Study 1. These findings highlight the need for more targeted training and workshops on ethical codes and their application in practice.

Regarding institutional ethics committees, a Barbados study reported that 29% of physicians were unaware of their existence [26]. In our study, the proportion was even higher: 52.24% in Study 1, 81.48% in Study 2 Group 1, and 51.67% in Group 2 were unaware that PAHS lacks a clinical ethics committee, although it does have a

research ethics committee. Unlike research committees that review studies, clinical ethics committees support healthcare professionals in handling complex patient-related ethical issues [42, 43]. Notably, 94.59% of PAHS graduates in our study did not know about the absence of a clinical ethics committee, likely due to confusion with the research ethics committee. This underscores the importance of explicitly distinguishing between clinical and research ethics committees in ethics education.

In a survey from Manipur, nearly half of the physicians (47.6%) reported that they would turn to a lawyer, department head, or ethics committee when faced with ethical or legal dilemmas [38]. In contrast, doctors in Barbados generally preferred consulting their immediate supervisors first [26]. In our own research, however, most participants indicated that they would seek guidance from colleagues before anyone else (Study 1: 39, 54.9%; Study 2 Group 1: 39, 72.22%; Group 2: 30, 50%). This tendency might be explained by the absence of a clinical ethics committee at PAHS, suggesting that informal peer consultation fills the gap. The reasons why physicians favor peer advice over senior staff or departmental leaders in ethical decision-making deserve further exploration, and fostering a non-punitive environment where junior doctors can raise ethical questions may strengthen ethical practice.

Our findings also show that participants largely consider physicians themselves as the primary authority on what is best for patients, emphasizing the need to better integrate the concept of patient autonomy into medical training. In Study 2, exposure to formal ethics education appeared to influence perceptions of patient decision-making capacity, with 51.85% of Group 1 participants recognizing patients' autonomy compared to only 11.67% in Group 2. Prior studies by Brogen *et al.* [38] and Chopra *et al.* [36] have similarly found that doctors often favor informing close relatives over patients directly. In Case 2 of our survey, a patient's son requested that his father's cancer diagnosis not be disclosed. Many participants opted to counsel the son while still informing the patient (Study 1: 33, 45.83%; Study 2 Group 1: 13, 24.07%; Group 2: 36, 60%), whereas the most ethically appropriate option—asking the patient if they wished to know—was selected by fewer participants (Study 1: 22, 30.56%; Study 2 Group 1: 37, 68.52%; Group 2: 6, 10%). This pattern likely reflects Nepalese cultural norms where the family head commonly makes decisions on behalf of the patient, complicating the application of autonomy in clinical practice.

Case 4, involving an unmarried 15-year-old seeking contraceptive advice, revealed further ethical uncertainty. Participants were divided between providing contraceptive counseling (Study 1: 37, 51.39%; Study 2 Group 1: 23, 42.59%; Group 2: 19, 31.67%) and advising the patient to involve her parents (Study 1: 29, 40.28%; Study 2 Group 1: 21, 38.89%; Group 2: 31, 51.67%). This divergence suggests that participants may have limited understanding of the ethical considerations surrounding the care of emancipated minors.

Medical ethics education

There remains ongoing debate about the most effective methods for teaching, learning, and assessing medical ethics [32, 33]. Evidence from 1989 indicated that students' moral reasoning improved regardless of whether ethics was taught via lectures or case-based methods [44]. More recent studies highlight simulation-based learning as a particularly effective way to teach ethical decision-making [45, 46]. In terms of evaluation, the University of Toronto demonstrated that clinical vignettes are valuable tools for assessing ethical sensitivity—the ability to recognize moral issues in clinical scenarios [47].

Although most medical schools in Nepal offer some form of ethics education, there is considerable variation in curriculum content, teaching approaches, time allocation, and evaluation methods, pointing to the absence of standardized guidelines. In fact, one study found that half of Nepalese medical students considered ethics education inadequate [48]. Internationally, approaches to teaching ethics also vary widely. In our Study 1, no significant differences were observed in knowledge, attitudes, or practices between practitioners trained in Nepal versus abroad ($p = 0.261$). Similarly, medical schools in the U.S. and Canada show a lack of consensus regarding content, teaching methodology, and assessment in ethics education [34]. One potential solution is the development of standardized tools to measure the impact of ethics education.

Evaluating the outcomes of ethics education is inherently challenging. Multiple studies have attempted to determine whether ethics courses cultivate morally responsible physicians and support professional ethical behavior. Early research in 1981 demonstrated that students exposed to ethics instruction showed a significant increase in moral reasoning [44]. Another study, using Rest's Defining Issues Test, also found

measurable improvements in students' moral reasoning following an introductory ethics course [49].

A review of 100 articles and three books on medical ethics published between 1978 and 2004 identified two major shortcomings in the literature [31]. First, only a small number of studies attempted to measure outcomes, and when they did, the educational objectives against which these outcomes were assessed were often unclear [31]. Second, the tools used to evaluate moral reasoning were frequently adapted from populations outside of medical education, limiting their relevance [31]. One way to address these limitations is to develop assessment tools in collaboration with the institution's ethics review board, tailored to the context in which they will be applied. In our study, the questionnaire was designed with ethical vignettes drawn from real-life scenarios reported by medical students during their clinical year I assessments, with the explicit goal of evaluating knowledge, attitude, and practice (KAP) aligned with the PAHS medical ethics curriculum [24].

It is generally accepted that moral reasoning improves with professional experience. In Study 1, we observed a positive but modest correlation between years of practice and KAP scores ($r = 0.313$, $p = 0.016$). Nevertheless, our findings do not conclusively indicate that training or experience alone accounts for ethical knowledge. Most participants in Study 1 reported gaining their understanding primarily through work experience (46, 63.89%) and through their MBBS training (44, 61.11%). When comparing participants based on education level, Study 1 revealed that postgraduate doctors scored significantly higher than MBBS-only graduates in knowledge ($p = 0.050$), practice ($p < 0.001$), and overall KAP ($p = 0.011$). This difference may partially reflect the role of postgraduates in teaching clinical ethics at PAHS. Similarly, a study in Manipur found senior doctors demonstrated greater knowledge of medical ethics, attributing this to experience and participation in continuing medical education (CME), workshops, and conferences [38]. In contrast, a German study reported that longer practice duration did not correlate with better recognition of patients' decision-making capacity [50]. In our Study 2, participants who received formal medical ethics education had significantly higher knowledge ($p < 0.001$), attitude ($p = 0.001$), practice ($p < 0.001$), and overall KAP scores ($p < 0.001$) compared to those without such training. These findings are consistent with a Brazilian study showing that undergraduates exposed to ethics lectures provided more correct responses than

those who were not [51]. Whether formal ethics instruction accelerates experiential learning or deepens ethical understanding remains a topic for further investigation.

Limitations

Several limitations should be acknowledged. First, the study relied on self-reported practice rather than direct observation. Second, Cronbach's alpha for the practice and attitude items was low, indicating the need for testing and possible revision in larger populations. Third, the questionnaire focused primarily on clinical ethics, with minimal coverage of research ethics; participants were only asked if they had heard of the Declaration of Helsinki, and many were unaware of it, highlighting the need to incorporate research ethics more comprehensively. Fourth, although multiple ethical principles can apply to a given case, our study assessed only whether participants could identify the primary principle, despite ongoing debates about prioritization. Fifth, although awareness of ethical codes and oaths was assessed, participants' knowledge of their contents was not evaluated. Sixth, participant selection in Study 2 used convenience sampling, introducing potential bias. Finally, both studies were conducted solely at PAHS, limiting generalizability; multicenter studies are needed to extend findings to the broader Nepalese medical community.

Conclusion

Our findings indicate that formal medical ethics education improves knowledge, attitudes, and reported practices. This supports the inclusion of medical ethics training as a core component of the MBBS curriculum. Most participants reported preferring to discuss ethical dilemmas with colleagues, suggesting the need to establish a supportive environment where seniors or department heads are approachable, providing guidance in a non-punitive setting. Such an environment could also encourage junior doctors to report unethical conduct and seek advice on complex cases. Establishing a clinical ethics committee within hospitals could further facilitate structured ethical guidance. Awareness of the Declaration of Helsinki was low among participants, underscoring the importance of integrating research ethics into medical ethics education. Moreover, many participants, including PAHS graduates, were unaware that no clinical ethics committee exists at PAHS,

emphasizing the need to clarify the distinction between clinical and research ethics committees during ethics training. Participants demonstrated deficiencies in handling ethical issues related to truth-telling, end-of-life care, managing HIV/AIDS patients, treating minors, and reporting colleagues' errors. Therefore, these topics should be prioritized in medical ethics teaching, contextualized to the country-specific setting.

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Conflict of Interest: None

Financial Support: None

Ethics Statement: Ethical approval was obtained for both studies. Study 1 was approved by the Institutional Review Committee—Patan Academy of Health Sciences. Study 2 was a quality improvement project and ethical approval for electronic data collection was obtained from the elective committee at PAHS. Informed consent was collected for both studies. Study 1 was a paper-based survey where we collected written informed consent from all the participants. Study 2 was a web-based survey done using Google Form where the first page contained the consent form. Below the statement, a question asking the participants if they agreed to participate was placed. Participants willing to participate could proceed to the questionnaire by clicking "Next." Data protection was ensured by storing the data in a password protected google drive accessible to investigators only. IP addresses were not tracked and cookies were not used. In both studies, the consent form clearly stated the purpose of the study, the investigators involved, the voluntary nature of participation, the right

to refuse participation or withdraw their responses at any time, with no benefits from participation mentioned. The informed consent form is attached along with the questionnaire. The confidentiality of the participants was assured by the use of unique codes and no personal identifiers were collected

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