

Research Article

Assessment of Knowledge, Attitude and Practice Regarding Medico-Legal Cases, Informed Consent and Medical Negligence and its Association with Physiological Stress Response Among Medical Students and House Officers at Ayub Medical College, Abbottabad

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ABSTRACT

Background: Medical negligence awareness, informed consent, and comprehension of medical neglect is a vital feature in professional medical practice. Lack of knowledge and insufficient clinical practice can lead to confusion in ethically and legally complex scenarios that can affect the medical trainees' responses to psychological and physiological stress.

Objective: To assess knowledge, attitude, and practice regarding medico-legal cases, informed consent, and medical negligence and examine their association with perceived stress and physiological stress responses among medical students and house officers at Ayub Medical College, Abbottabad.

Methods: An analytical cross-sectional study was designed for a period of March to October 2025 in Ayub Medical College, Abbottabad and will include 81 medical students and house officers. The knowledge, attitude, and practices of medicos and lawyers was evaluated by a structured questionnaire. Perceived Stress Scale (PSS-10) was used to measure psychological stress and heart rate and blood pressure to measure physiological. Descriptive data, independent-samples t-tests, chi-square tests and correlation analyses were performed as appropriate, with the criterion of statistical significance being $p < 0.05$.

Results: The analysis included 81 participants, comprising 45 medical students and 36 house officers. The mean knowledge score was 8.27 ± 2.06 , with higher scores among house officers than medical students (9.25 ± 1.54 versus 7.49 ± 2.11 ; $p < 0.001$). House officers also demonstrated higher attitude and practice scores (both $p < 0.001$). Medical students had higher perceived stress scores (23.32 ± 5.54 versus 16.02 ± 5.71 ; $p < 0.001$) and a greater mean increase in heart rate following the simulated medico-legal scenario (16.55 ± 5.98 versus 11.15 ± 5.62 beats/minute; $p < 0.001$). Knowledge scores were negatively correlated with perceived stress ($r = -0.250$; $p = 0.024$) and change in heart rate ($r = -0.516$; $p < 0.001$).

Conclusion: The findings suggest that greater medico-legal knowledge and clinical exposure may be associated with better professional preparedness and lower stress responses. Structured medico-legal education, simulation-based training, and stress-management interventions may support the development of ethical competence and clinical confidence among medical trainees.

Keywords: Medico-Legal Cases, Informed Consent, Medical Negligence, Knowledge, Attitude And Practice, Physiological Stress, Medical Students, House Officers.

INTRODUCTION

Medico-legal duties form an integral part of the current practice of healthcare and have strong links with professional ethics, patients' safety,

clinical accountability, and the safeguarding of patients' rights. Healthcare professionals are expected to have knowledge of the legal consequences of clinical decisions, accurately

documented records, keeping confidentiality of the information, identification of medico-legal cases for reporting and adherence to the institution's procedures. As healthcare delivery becomes increasingly complex, the preparation of medical graduates to deal with ethical and legal issues along with their clinical cases has become more important. Medical education needs therefore to go beyond the acquisition of biomedical knowledge and skills to encompass professional judgment, ethical considerations, and communication and legal awareness. Poor knowledge about medico-legal responsibilities can be a cause of preventable issues, communication breakdown and wrong clinical decisions. Undergraduate education may be enhanced by the incorporation of medico-legal ideas in the discussion of cases, reflective learning, and hands-on practice, which can lead to the acquisition of skills needed for good professional practice. Ethical education and the need to build appropriate competencies in the undergraduate course are still significant issues in medical education institutions in Pakistan [1-3].

The medico-legal aspects of informed consent and medical liability for negligence recur as prominent points in the practice of medicine, where they have the potential to impact patient autonomy, professional liability and the doctor-patient relationship. Informed consent is a dialogue between the provider and patient(s) in which sufficient information is provided for patient(s) to make informed choices regarding their health care. It relies on the proper disclosure, understanding, decision making and absence of coercion. Similarly, medical negligence occurs when the qualified standard of care that can be applied is applicable and that standard is not met; and the care recipient suffers a legally recognized harm; in which case, the elements of a negligence claim are satisfied. Due to limited practical experiences, lack of knowledge about legal requirements and a lack of experience in dealing with complex clinical scenarios, medical students and house officers might find it hard to understand these responsibilities. Structured professional, ethical training is also paramount with issues such as confidentiality, patients as participants in clinical teaching, informed consent, and disclosure of medical errors. A new teaching model including supervised clinical training, communication skills and simulated moral issues can improve the conversion of theory into good clinical practice [4-6].

Yet another significant problem to be addressed is the psychological strain that medical students and house officers are undergoing at all times and as they bear ever increasing workload, clinical responsibilities, emotionally challenging situations and uncertainties in clinical decision making. Stress and anxiety can be further exacerbated if there is the possibility of a medical error, a patient complaint, documentation for medico-legal purposes, or if there is a situation which has an impact on a medical professional's accountability. These autonomic and neuroendocrine responses to a sudden exposure to high levels of psychological stress result in physiological changes in heart rate and blood pressure. The intensity of these reactions may vary depending on an individual's personality, experience, sense of control and kind of the stressor. Untreated, or untreated for a long time, stress can negatively impact focus, clinical practice, communication, and health. Physiological measures, such as heart rate and blood pressure, can be used as objective measures of cardiovascular reactivity, and validated psychological tools can be used to assess subjective experiences of stress. Psychological and physiological responses to the difficult work conditions can then be evaluated to provide a fuller understanding of medical trainees' reactions [7-9].

It is necessary to acquire the competence of the medico-legal aspects of medicine alongside psychological stability if the medical student and house officer are to be prepared for independent clinical work. Knowledge, attitude and self-reported practices regarding medical ethics and legal responsibilities are considered important learning outcomes, but the potential link between physiological stress response and these other outcomes should be further examined. A combined evaluation of these dimensions may be useful to identify educational needs, disparities in clinical competence, and possibly modifiable factors contributing to stress in the medico-legal setting. This evidence can help in implementing clinical scenarios, stress management, supervised clinical exposure, and targeted teaching sessions in medical curricula. Because clinical experience, workload, individual coping style and environmental factors can influence both the outcome and the association between medico-legal knowledge and physiological stress, it must be interpreted with caution. For this reason, the present study aimed to evaluate knowledge, attitude, practices (KAP) of medico-legal cases, informed consent and

medical negligence among the medical students and house officers of Ayub Medical College, Abbottabad, and to determine association of these with the perceived stress and physiological stress responses of the participants [10].

METHODOLOGY

Study Design, Setting, and Duration

An analytical cross-sectional study was designed to assess knowledge, attitude, and practice (KAP) regarding medico-legal cases, informed consent, and medical negligence and to examine their association with perceived stress and physiological stress responses among medical students and house officers at Ayub Medical College, Abbottabad, Pakistan. The study period extended from March 2025 to October 2025, covering eight months. The study focused on evaluating medico-legal awareness, professional attitudes, clinical practices, and stress-related physiological changes among participants at different stages of medical training.

Study Population and Sampling Technique

The study population consisted of the undergraduate medical students during their clinical training and house officers of Ayub Medical College and its affiliated teaching hospital. The total number of participants in the study was 81. The subjects were divided into two groups: Medical Students (n=45) and House Officers (n=36) for purpose of proposed analysis. Consecutive sampling was used for recruiting the sample. Approachable subjects were solicited during their academic and clinical duties and they were asked to join the study voluntarily. Informed consent was used to determine participation and confidentiality was maintained throughout the study.

Inclusion and Exclusion Criteria

Clinical years MBBS students and house officers were selected and included if they were willing to participate and had informed consent while they were on supervised clinical training. Those who were male and female were both eligible for participation. The analyses resulted in exclusion of students in the preclinical years, of those who were not willing to participate as well as of those participants who did not complete the questionnaire and/or did not have physiological measurements available. Participants who were suspected of having a condition that would significantly change the physiological stress measurements and/or an

acute illness were considered for exclusion to minimize the potential for confounding.

Data Collection and Assessment of Knowledge, Attitude, and Practice

A structured questionnaire was used, which comprised of sociodemographic, academic and clinical information, and questions to assess knowledge, attitude and practice (KAP) about the previous training in medico-legal responsibilities of the participants. The knowledge component comprised 12 questions related to identification and reporting of medico-legal cases, recording, informed consent requirements, patient confidentiality, professional duty of care and medical negligence. Answer 1 mark each (maximum of 12) – 0 marks were awarded for incorrect and ambiguous answers. Knowledge was categorized as poor (0–5), moderate (6–8), or good (9–12).

Attitudes were measured with 10 statements rated on a 5-point Likert scale (strongly disagree to strongly agree). The attitude scores ranged from 10 to 50 with higher scores indicating more positive attitudes on the medico-legal responsibilities, ethical practice, patient autonomy, and professional accountability. Reverse scoring was used for items which were worded negatively when appropriate. Eight areas of informed consent, clinical documentation, confidentiality, reporting of medico-legal issues and consultation with supervisors were evaluated. The items were rated according to the frequency scale (8 to 40). An increase in the score meant that more appropriate practices were associated with it. Questions related to practice were interpreted for the medical students based on their supervised clinical exposure with the assumption that they do not have any independent clinical responsibilities.

Assessment of Physiological and Psychological Stress

Heart Rate and Blood pressure were used to assess physiological stress response. Standardized clinical methods were used to determine resting HR, SBP and DBP. As a case scenario, a situation with clinical decision making, informed consent, documentation and/or potential medical negligence was created to evaluate a medico-legal stress response. Following the exposure to the scenario, the HR and BP were once again measured. Physiological measurements were compared to pre- and post-scenario measures for changes. The level of perceived stress in the

past month was assessed using the 10 item Perceived Stress Scale (PSS-10). The total score was maximum of 40 with higher score indicating greater perceived stress. Scores were categorized as low (0–13), moderate (14–26), and high (27–40). Logistical regression was used to examine the association between physiological measurements and psychological stress score separately with knowledge, attitude and practice.

Statistical Analysis

IBM SPSS Statistics version 26.0 was used for data analysis. Frequencies and percentages were used to describe categorical variables and means and standard deviations were used to describe continuous variables. Continuous variables were tested for normality using Shapiro–Wilk test. Independent-samples t-test (normally distributed variables) and Mann–Whitney U (non-normally distributed variables) tests were used to compare medical students with house officers with respect to knowledge, attitude, practices, perceived stress scores and physiological measurements. Pearson's chi

square test or Fisher's exact test was used to analyze the relationship of the categorical variables. Pearson's or Spearman's correlation coefficients were used to determine the relationships between KAP scores and perceived stress and physiological changes. P value < 0.05 was considered statistically significant. Two-tailed statistical tests were used.

RESULTS

There were 81 participants who were included in the analysis, which included 45 medical students (55.6%) and 36 house officers (44.4%). The overall mean age was 24.62 ± 2.09 years. House officers were older than medical students (26.22 ± 1.24 versus 23.35 ± 1.72 years; $p < 0.001$). Thirty-one participants (38.3%) reported previous training in medico-legal aspects and this was significantly more for house officers than for medical students (58.3% versus 22.2%, respectively; $p = 0.001$). This suggested that there had been some differences in educational and clinical experiences between the two groups.

Table 1. Sociodemographic and Academic Characteristics of Participants

Variables	Medical students (n=45)	House officers (n=36)	Total (n=81)
Age (years), mean $\pm$ SD	23.35 ± 1.72	26.22 ± 1.24	24.62 ± 2.09
Participant group	45 (100%)	36 (100%)	81 (100%)
Previous medico-legal training	10 (22.2%)	21 (58.3%)	31 (38.3%)
No previous medico-legal training	35 (77.8%)	15 (41.7%)	50 (61.7%)

The overall mean knowledge score was 8.27 ± 2.06 out of 12. The scores for knowledge were significantly higher for house officers than for medical students (9.25 ± 1.54 versus 7.49 ± 2.11 ; $p < 0.001$). 41 participants (50.6%) had good knowledge while 32 (39.5%) had moderate knowledge and eight (9.9%) had

poor knowledge. Medical students had less good knowledge compared to house officers (69.4%). The results indicated that there was higher knowledge about the medico-legal aspects among participants who had clinical experience.

Table 2. Knowledge Regarding Medico-Legal Cases, Informed Consent and Medical Negligence

Knowledge variables	Medical students (n=45)	House officers (n=36)	Total (n=81)
Mean knowledge score (0–12)	7.49 ± 2.11	9.25 ± 1.54	8.27 ± 2.06
Poor knowledge (0–5)	8 (17.8%)	0 (0.0%)	8 (9.9%)
Moderate knowledge (6–8)	21 (46.7%)	11 (30.6%)	32 (39.5%)
Good knowledge (9–12)	16 (35.6%)	25 (69.4%)	41 (50.6%)

Overall, mean attitude score was 38.27 ± 4.54 out of 50 points; which is regarded as good attitude toward the medico-legal roles and rights of the patients. There was a significant

difference between the house officers and medical students in their attitude scores (40.56 ± 3.95 ; 36.44 ± 4.18 ; $p < 0.001$). Similarly, the overall mean score on the practice was $25.84 \pm$

5.42 out of 40 points. Medical students (23.36 ± 5.13 points) had significantly lower practice scores than the house officers (28.94 ± 4.03 points) ($p < 0.001$). These differences were

representative of greater knowledge of informed consent procedures, documentation and medico-legal responsibilities among house officers.

Table 3. Attitude and Practice Scores Regarding Medico-Legal Responsibilities

Variables	Medical students (n=45)	House officers (n=36)	p-value
Attitude score (0–50)	36.44 ± 4.18	40.56 ± 3.95	<0.001
Practice score (0–40)	23.36 ± 5.13	28.94 ± 4.03	<0.001
Knowledge score (0–12)	7.49 ± 2.11	9.25 ± 1.54	<0.001

The average perceived stress score for all participants was 20.07 ± 6.67 . The mean stress level of the house officers (16.02 ± 5.71) was significantly lower than that of the medical students (23.32 ± 5.54) ($p < 0.001$). House officers had a lower resting heart rate than medical students (75.71 ± 8.10 vs 79.17 ± 7.22 beats per minute, respectively; $p = 0.048$). The

simulated standardized medico-legal scenario led to an increase in heart rate of medical students by 16.55 ± 5.98 beats/minute compared with 11.15 ± 5.62 beats/minute in non-medical students ($p < 0.001$). Likewise, in medical students, the rise in systolic blood pressure was more noticeable (12.51 ± 6.55 versus 8.37 ± 5.19 mmHg; $p = 0.002$).

Table 4. Physiological Stress Response Among Medical Students and House Officers

Physiological variables	Medical students (n=45)	House officers (n=36)	p-value
Perceived stress score (PSS-10)	23.32 ± 5.54	16.02 ± 5.71	<0.001
Baseline heart rate (beats/min)	79.17 ± 7.22	75.71 ± 8.10	0.048
Increase in heart rate (beats/min)	16.55 ± 5.98	11.15 ± 5.62	<0.001
Baseline systolic BP (mmHg)	115.41 ± 11.26	115.21 ± 8.22	0.928
Increase in systolic BP (mmHg)	12.51 ± 6.55	8.37 ± 5.19	0.002

Perceived stressors were found to be different between the two groups. Of the 81 participants, 11 (13.6%) demonstrated low stress, 54 (66.7%) moderate stress and 16 (19.8%) high stress. Medical students had a higher incidence

of perceived stress (33.3%), than house officers (2.8%). Low perceived stress was only noted among house officers (HOs), in contrast. Based on these results, the psychological stress burden was greater among medical students.

Table 5. Distribution of Perceived Stress Levels

Perceived stress category	Medical students (n=45)	House officers (n=36)	Total (n=81)
Low (0–13)	0 (0.0%)	11 (30.6%)	11 (13.6%)
Moderate (14–26)	30 (66.7%)	24 (66.7%)	54 (66.7%)
High (27–40)	15 (33.3%)	1 (2.8%)	16 (19.8%)

According to the results of the correlation analysis, the perceived stress was significantly negatively correlated with the knowledge score ($r = -0.250$; $p = 0.024$). Moreover, knowledge was moderately and negatively correlated with the HR increment following the presentation of the medico-legal scenario ($r = -0.516$; $p < 0.001$), suggesting the association that the more the knowledge levels increased, the less was the HR increment. In addition, there was a

negative correlation between attitude scores and perceived stress ($r = -0.223$; $p = 0.046$) and between practice scores and perceived stress ($r = -0.241$; $p = 0.030$). The correlation between attitude score and practice score, and correlation between attitude score and change in heart rate were not statistically significant, however. Likewise, there was no significant correlation between any of the 3 KAP domains and changes in SYS blood pressure.

Table 6. Association Between Knowledge, Attitude, Practice and Physiological Stress Response

KAP domain	Stress indicator	Pearson's r	p-value
Knowledge	Perceived stress score	-0.250	0.024

Knowledge	Change in heart rate	-0.516	<0.001
Knowledge	Change in systolic BP	-0.074	0.514
Attitude	Perceived stress score	-0.223	0.046
Attitude	Change in heart rate	-0.198	0.076
Attitude	Change in systolic BP	-0.094	0.406
Practice	Perceived stress score	-0.241	0.030
Practice	Change in heart rate	-0.195	0.081
Practice	Change in systolic BP	-0.178	0.112

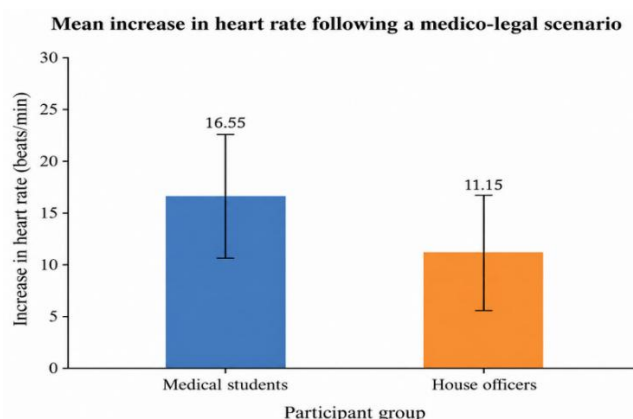


Fig. 1: Comparison Of Mean Heart Rate Increase Following a Standardized Medico-Legal Scenario Among Medical Students and House Officers.

DISCUSSION

Medico-legal knowledge, ethical awareness, and professional accountability are essential components of undergraduate and postgraduate medical training. Understanding medico-legal responsibilities enables healthcare professionals to recognize situations requiring legal documentation, obtain valid informed consent, protect patient confidentiality, and minimize preventable medical errors. Inadequate knowledge of legal obligations may expose healthcare professionals to professional disputes and compromise the quality of patient care. Medical students and house officers represent important groups for medico-legal education because they are progressively introduced to clinical decision-making and patient management responsibilities. Although theoretical knowledge provides the foundation for ethical practice, effective application requires clinical experience, communication skills, and awareness of institutional procedures. The integration of medico-legal education into undergraduate curricula, supported by practical demonstrations, clinical supervision, and scenario-based learning, may strengthen professional competence and promote safer healthcare delivery. A comprehensive understanding of medical negligence and informed consent is particularly important in maintaining patient autonomy,

professional accountability, and public trust in healthcare institutions [11-14].

Consent should be more than just signing a form it is an ethical and legal obligation of practitioners. Valid informed consent involves making sure that essential information is communicated, evaluating decision-making capacity, confirming understanding of risks and benefits, sharing reasonable options, and ensuring voluntary engagement in care decision making. These principles may be challenging for medical students and house officers, given their limited clinical experience, communication issues, time constraints, and confusion about their responsibilities. Likewise, poor documentation, missed reporting of cases which are medically and legally reportable and the unwillingness to report medical errors can lead to poor professional practice. Positive attitudes in the professional world do not always mean positive clinical behaviour without the aid of effective training and supervision. Communication competence and strengthening patient-centred care can be reinforced through structured educational interventions such as simulated patient encounters, workshops, supervised consent discussions, and reflective learning. So, there is a need to focus on ongoing evaluation of ethical knowledge and skills rather than just classroom teaching in medical institutions [15-17].

Psychological and physiological stress is a significant issue in medical education especially when the student or junior doctor is faced with ethical dilemmas that involve claims of medical negligence, complaints by patients, unanticipated clinical outcomes or legal liability. Under stressful clinical conditions, the sympathetic nervous system can become activated and measurable physiological changes occur such as an increase in heart rate and blood pressure. Perceived responsibility, uncertainty, clinical confidence, prior experience, and individual coping mechanisms can play a role in these responses. Medical students might be especially vulnerable to stress as they learn to make decisions in an increasingly challenging clinical world. A significant amount of stress is also linked to the workload, clinical duties, time constraint, and adverse outcomes of house officers. Long-term psychological stress can have a detrimental impact on concentration, communication, decision-making and working life. Physiological measures, such as heart rate and cardiovascular reactions, can also be used to gain further insight into acute stress reactivity, but should be considered in combination with psychological measures and clinical factors. The integration of stress-management techniques, supportive supervision and realistic simulation exercises in medical education can help to prepare students for difficult medico-legal scenarios [18, 19].

There are important implications for curriculum development and healthcare quality with regards to the relationship between medico-legal knowledge, professional attitudes, clinical practices, and physiological stress. Knowledge of the legal aspects can increase the confidence that an individual would have in challenging difficult clinical situations and experience can boost how well healthcare trainees handle informed consent, negligence, and patient complaints. However, stress can still exist despite a person's medico-legal knowledge as physiological responses are multifactorial and can be affected by academic burden, personality type, previous clinical experience, and institutional support. Medico-legal education should thus be combined with communication training, ethical analysis, patient safety education, and psychological support in the educational strategies. Frequent workshops, supervised clinical work, simulation-based evaluations, and mentorship might enhance the professional readiness and promote the adoption of the right attitudes to

deal with medico-legal dilemmas. Cross sectional studies have the following limitations: They can not determine cause-effect relationships; There may be response bias due to self-reported practices; They may have limited generalisability to the single institution; Physiological variation due to environmental and individual factors. Further multicentre longitudinal studies would be recommended in the future using validated assessment instruments, standardized physiological parameters and educational, structured interventions to elucidate these relationships and assess the long-term impact of medico-legal education [20].

CONCLUSION

Medico-legal knowledge, professional attitudes, and appropriate clinical practices are fundamental to safe and ethically responsible healthcare delivery. Understanding informed consent, medical negligence, and medico-legal responsibilities is particularly important for medical students and house officers as they progress toward independent clinical practice. Psychological stress and physiological responses to challenging clinical situations should also be considered when developing educational strategies. Integration of structured medico-legal training, practical simulation, effective supervision, and stress-management interventions into medical curricula may improve professional preparedness, strengthen ethical decision-making, and promote patient safety.

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