

# ASSESSING STUDENT ENGAGEMENT IN FORENSIC MEDICINE IN AN INTEGRATED UNDERGRADUATE MEDICAL CURRICULUM: A CROSS-SECTIONAL STUDY AT A MEDICAL COLLEGE IN PAKISTAN

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## ABSTRACT

**Objective:** This study aimed to assess medical students' engagement levels and identify socio-demographic factors associated with participation.

**Materials and Methods:** A cross-sectional study was performed at a single medical college using self-reported surveys to assess student engagement across different age groups, genders, and academic years. Data were analyzed to determine the prevalence of "Good," "Neutral," and "Poor" engagement levels, with  $P < 0.05$  set as the cutoff for statistical significance.

**Results:** Most students (63.75%) exhibited a neutral level of engagement, while 20% demonstrated high engagement and 16.25% reported low engagement. Significant correlations were found between engagement and demographic variables ( $P < 0.05$ ); notably, high engagement was most common among 21-year-olds (47.7%) and third-year students (59.6%), whereas engagement decreased significantly in older students and those in their fourth year of MBBS. Female students also reported significantly higher "Good" engagement (36.9%) compared to their male counterparts (1.31%).

**Conclusion:** Engagement levels notably decline as students advance through their medical education and age. Although the study is limited by its single-center, cross-sectional design, these findings highlight the importance of targeted interventions to sustain student motivation in the later stages of medical training.

**Keywords:** Student engagement, Modular Teaching System, Impact of Assessment Weightage, student motivation

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## INTRODUCTION

Globally, teaching methods are continually evolving, encouraging educators to adopt more effective, student-centered approaches that improve students' understanding and retention of complex subjects. <sup>1</sup>

A well-structured curriculum is widely recognized

as crucial for achieving optimal learning outcomes; however, efforts to implement broad institutional reforms often overlook deeper, systemic barriers that impede education quality at the subject level. Specifically in the medical field, curriculum design must align with international standards while also addressing local healthcare needs. <sup>2</sup>

Forensic medicine, legal medicine, and forensic pathology are often used interchangeably to refer to a specialized field where detailed medical knowledge intersects with the legal and justice systems.

This intersection is essential for evidence-based legal decisions. More specifically, Clinical Forensic Medicine (CFM) focuses on examining and managing living individuals in legal contexts, such as victims of assault or

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sexual abuse, while forensic pathologists mainly work with deceased individuals to determine the cause and manner of death.<sup>4</sup>

Although CFM is gaining significant prominence and professional recognition worldwide, in countries like India, the crucial medico-legal responsibilities are unfortunately often assigned to undertrained general practitioners, highlighting the urgent need for structured, comprehensive undergraduate training in this discipline.<sup>5</sup>

Health sciences education today requires collaborative learning environments, practical exposure to real-world scenarios, and strong ethical competence, especially as emerging challenges like new infectious diseases and rapidly advancing digital technologies demand multidisciplinary approaches. Importantly, basic forensic training greatly enhances a future doctor's ability to identify abuse, ensure full compliance with legal procedures, and maintain accurate case documentation. Despite its importance, many medical institutions rely mainly on a theoretical, lecture-based pedagogical model, often failing to connect the subject to clinical practice.<sup>6</sup>

In contrast, several countries, such as Germany, Switzerland, Italy, and the UK, incorporate critical medico-legal skills into their undergraduate curricula, including hands-on experience in conducting post-mortem examinations and understanding legal procedures for certifying death.<sup>7</sup> Similarly, in Malaysia, forensic medicine is well-established as a core subject, where autopsy-based teaching actively supports simultaneous learning in anatomy and raises awareness of legal responsibilities. Even when teaching hours are limited, students recognize the high value of forensic medicine, although data often show that their active, voluntary participation remains consistently low.<sup>8</sup>

To improve this, virtual learning platforms offer a promising way to boost engagement, develop ethical decision-making skills, and build professional competence by providing safe, simulated learning environments. Additionally, educational models in countries like Russia focus on developing critical thinking and communication skills through modern blended learning strategies. These include innovative methods such as CLIL (Content and Language Integrated Learning), the flipped classroom model, and project-based learning.<sup>9</sup> Such modern approaches are vital for increasing student engagement and supporting lifelong learning, which are essential for medical pro-

fessionals.

While integrated medical curricula generally correlate with improvements in student satisfaction and knowledge retention, most research to date has focused on the overall curriculum rather than on engagement within specific subjects. As a result, there remains a significant research gap in fully understanding how student engagement in Forensic Medicine is specifically shaped and influenced within these integrated curricular models. Factors such as the chosen teaching methodology (e.g., problem-based learning, in-depth case discussions, or simulation exercises), institutional assessment practices, and students' perceived clinical relevance of the subject significantly affect their overall engagement.<sup>10</sup>

This study, therefore, aims to examine the key factors among undergraduate medical students, providing targeted, practical insights to improve forensic medicine education within the integrated curriculum.

## OBJECTIVES

To assess students' engagement in forensic medicine within an integrated undergraduate medical curriculum and identify factors that influence this engagement.

To determine the association between student engagement and variables such as gender, academic year, and assessment weightage.

## MATERIALS AND METHODS

This cross-sectional study was conducted among 3rd- and 4th-year MBBS students at Khyber Medical College, Peshawar. A total of 160 students were selected using an online sample size calculator, based on data from Vidua et al. (2020). Probability random sampling was used to recruit participants. All students in 3rd and 4th year were eligible for inclusion, while those who did not give consent were excluded.<sup>11</sup> Written informed consent was obtained from all participants. Confidentiality was maintained by anonymizing all collected data.

Data were collected using a structured Student Engagement Questionnaire (Annexure II), which assessed participants' engagement and interest in forensic medicine learning activities. The questionnaire had three sections: The first three variables—Student Motivation, Modular Teaching System Feedback, and Impact of Assessment Weightage—are each measured by summing the scores of three dedicated questions.

For each section, the total possible score ranges

from 3 to 15. A high score of 10–15 indicates a positive outcome (high motivation, positive feedback, or strong perceived impact), while a score of 6–9 reflects neutral responses. Scores below 5 signify poor motivation, negative feedback, or a negative perceived impact of assessment weightage, respectively.

Each section included three items, totaling nine questions, all rated on a 5-point Likert scale from “Strongly Disagree” (1) to “Strongly Agree” (5). A demographic section was also included to record age, gender, and academic year. This aggregate score is calculated by summing the responses to all nine questions, yielding a total score of 9 to 45. Overall engagement is categorized into three tiers:

Good Engagement: 35–45

Neutral Engagement: 20–34

Poor Engagement: Below 19

Data analysis was performed using SPSS version 22. Descriptive statistics, including means, standard deviations, frequencies, and percentages, summarized the data. Comparative analyses were conducted with the Chi-square test to examine the relationship between academic year (3rd vs. 4th) and address the study objective. Associations between student engagement and variables such as gender and academic year were also analyzed using the Chi-square test. A p-value of less than 0.05 was

deemed statistically significant.

## RESULTS

A total of 160 MBBS students participated in the study, with complete data for all variables. The average age of the participants was  $21.99 \pm 0.99$  years. Most students were 21 years old (40.6%), followed by 22 years old (28.1%), indicating that the majority of respondents were in the early stage of their medical education (Table 1).

Regarding gender distribution, 76 (47.5%) participants were male and 84 (52.5%) were female. Overall, 32 students demonstrated high engagement, 102 showed neutral engagement, and 26 showed poor engagement (Figure 1). Figure 2 shows student engagement levels, with 63.75% having a neutral engagement. Higher engagement accounts for 20.00% of students, while 16.25% are categorized as having low engagement.

Table 2 indicates that student engagement is significantly affected by demographic and academic factors, with p-values less than 0.05 across all categories. While the overall population is mostly neutral at 63.75%, higher engagement is significantly more common among younger students, particularly those aged 21 (47.7%), and among female students (36.9%). Conversely, engagement seems to decrease sharply with age and academic progress; 92.8% of 24-year-old students and 24.07% of fourth-year MBBS students report “poor” engagement, compared to 0% in both the 21-year-old and third-year groups. Overall, the findings show significant links among MBBS students between student engagement level and gender, age, and academic year.

**Table No 1: Frequency Distribution of Ages in Years**

Age in years	Frequency	Percent
21	65	40.6
22	45	28.1
23	36	22.5
24	14	8.8
Total	160	100.0

**Table No 2: Association of students’ engagement with different variables**

variables	Categories	Engagement			P value
		Good	Neutral	Poor	
Age	21 years	31 (47.7 %)	34 (52.3 %)	0 (0.00 %)	< 0.05
	22 years	0 (0.00 %)	32 (71.1 %)	13 (28.9 %)	
	23 years	1 (2.77 %)	35 (97.2 %)	0 (0.00 %)	
	24 years	0 (0.00 %)	1 (7.14 %)	13 (92.8 %)	
Gender	Male	1 (1.31 %)	49 (64.4 %)	26 (34.21%)	< 0.05
	Female	31 (36.9 %)	53 (63 %)	0 (0.00 %)	
MBBS year	Third year	31 (59.6 %)	21 (40.38 %)	0 (0.00 %)	< 0.05
	Fourth year	1 (0.92 %)	81 (75 %)	26 (24.07 %)	

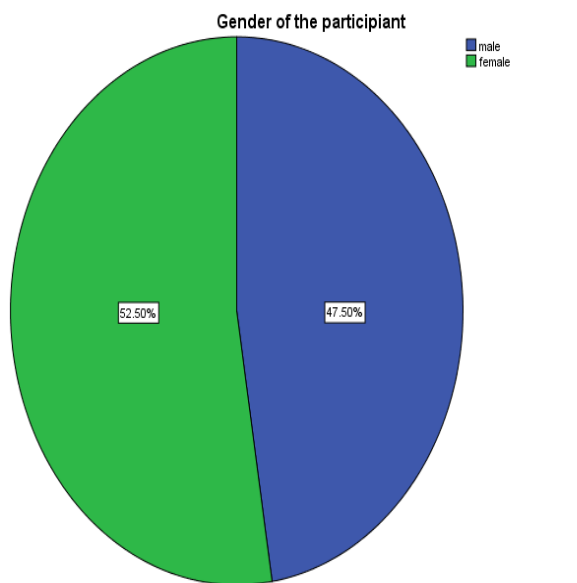


Fig 1: Gender of the participants in percentages

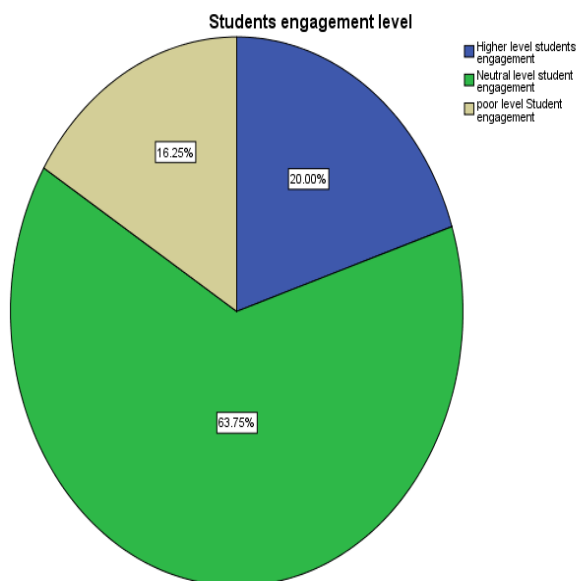


Fig 2: Engagement in the subject of forensic medicine

**DISCUSSION**

The study evaluated students' engagement in forensic medicine within an integrated undergraduate medical curriculum and identified factors influencing this engagement. It involved 160 MBBS students; only 32 (20%) demonstrated a high level of engagement with Forensic Medicine and Toxicology, while the majority showed neutral engagement (102, 63.8%), and 26 students (16.2%) exhibited poor engagement.

Significant associations were found between engagement and gender, age, and academic year, with higher engagement observed among female students and

3rd-year MBBS students, and lower engagement mainly seen in male and 4th-year MBBS students. In comparison, a survey-based perception study by Raghvendra Kumar Vidua from India, published in July 2022 and including 275 MBBS students, reported highly positive perceptions, with 83.3% finding the subject interesting and 85.9% considering it useful; however, only 14.2% expressed willingness to pursue FMT as a career.<sup>12</sup>

Together, these findings suggest that despite favorable perceptions of FMT, consistent academic engagement remains limited, particularly in senior years, as shown in our study.

In contrast, another study published in the Journal of the Panjab Academy of Forensic Medicine, India, in January 2024, examines the role of student feedback in improving active learning strategies, emphasizing that incorporating learner input can positively affect teaching quality and student engagement.<sup>13</sup> While our study quantitatively measures levels and determinants of engagement, the latter underscores pedagogical responsiveness as a crucial mechanism for enhancing engagement. Together, the two studies indicate that the neutral and poor engagement observed in our findings may be improved through structured student feedback and active learning methods, highlighting the importance of learner-centered teaching reforms in Forensic Medicine.

While our study offers descriptive and associative evidence of engagement patterns within medical education, significant links were found between engagement and gender, age, and academic year, showing that engagement varies among student groups. In comparison, the study published in February 2021 titled "Factors affecting students' learning performance through collaborative learning and engagement," which used Structural Equation Modeling (SEM) to explore causal pathways, showed that social interaction and engagement directly boost collaborative learning, which then significantly improves academic performance.<sup>14</sup> Specifically, peer interaction and social media use were key predictors of collaborative learning, accounting for 26% of its variance, while collaborative learning explained 38% of the variation in academic performance. The SEM-based study provides explanations for how engagement impacts learning outcomes. Together, these findings suggest that the moderate-to-low engagement seen in our group could be improved by enhancing collaborative and socially interactive learning strategies to boost both engagement and academic suc-

cess in Forensic Medicine.

A 2021 study on the Impact of Integrated Modular System on the Basic Science Disciplines highlights the negative structural effects of the IMS, noting that the fragmentation of Forensic Medicine across different modules leads to a decline in its perceived importance, as students tend to prioritize subjects based solely on their assessment weight.<sup>15</sup> In contrast, our engagement study identifies the human element—the “lever”—that can reverse this trend: the power of clinical relevance. While Zaidi’s study points out that the modular structure can “break” a subject’s identity, our findings likely provide the necessary “fix,” suggesting that when content is delivered through clinically-focused strategies, student engagement and perceived value remain high despite the modular framework. Both studies highlight a critical shift in how students view the importance of pre-clinical subjects within an Integrated Modular System (IMS), but they approach the “engagement” problem from different perspectives.

The study’s findings are limited by a single-center, cross-sectional design, which cannot be generalized, and by reliance on subjective, self-reported data, which prevents assessment of long-term knowledge retention or behavioral changes over time. These factors restrict the overall applicability of the results. More detailed longitudinal studies are necessary to explore what factors can enhance students’ engagement in forensic medicine within an integrated medical curriculum.

## CONCLUSION

This study found that only one-fifth of MBBS students demonstrated a high level of academic engagement in Forensic Medicine and Toxicology, while the majority exhibited neutral engagement. Engagement was more common among female students and 3rd-year students. Poor engagement was mainly observed among male students and 4th-year students. Gender, age, and academic year were compared with engagement levels and found to be highly statistically significant. Furthermore, although students generally find the subject interesting and useful, this did not lead to high academic engagement.

## REFERENCES

1. Yar MA, Yahya A, Akbar S, Ramzan A, Khalid U. Use of activity-based learning to improve students’ drive for knowledge & enhance their academic performance in the subject of forensic medicine: a cross-sectional survey from a private medical college of Faisalabad, Pakistan. *J*

*Aziz Fatimah Med Dent Coll.* 2023 Dec 22;5(2):61-6.

2. Alcantara MD, De Los Reyes CE, Pinili LC, Etcuban JO, De Los Reyes NR, Capuno RG, et al. Level of Essential Best Practices and the Implementation of Inclusive Education among Regular Elementary Teachers. *J Humanit Soc Sci Stud.* 2024 Dec 8;6(12):37-58.
3. Payne-James J, Payne-James G, Cecchi R, Cusack D, Keller E, Ludes B, et al. Current status of undergraduate teaching in forensic & legal medicine in Europe. *Int J Legal Med.* 2024 Sep;138(5):1965-76.
4. Kennedy KM, Wilkinson A. A Student Selected Component (or Special Study Module) in Forensic and Legal Medicine: Design, delivery, assessment, and evaluation of an optional module as an addition to the medical undergraduate core curriculum. *J Forensic Leg Med.* 2018 Jan 1;53:62-7.
5. Shrigiriwar M, Thube HR. Assessing the need for clinical forensic medicine training in the medical undergraduate curriculum. *Cureus.* 2024 May 2;16(5).
6. Eraña-Rojas IE, Cabrera MV, Barrientos ER, Membrillo-Hernández J. A challenge-based learning experience in forensic medicine. *J Forensic Leg Med.* 2019 Nov 1;68:101873.
7. Anders S, Fischer-Bruegge D, Fabian M, Raupach T, Petersen-Ewert C, Harendza S. Teaching post-mortem external examination in undergraduate medical education—the formal and the informal curriculum. *Forensic Sci Int.* 2011 Jul 15;210(1-3):87-90.
8. Razak NA, Haque M. The vital role of forensic medicine as a ‘hidden curriculum’ in medical education: Current perspectives. *Adv Hum Biol.* 2023 Jul 1;13(3):229-31.
9. Baranova T, Khalyapina L, Kobicheva A, Tokareva E. Evaluation of students’ engagement in an integrated learning model in a blended environment. *Educ Sci.* 2019 Jun 17;9(2):138.
10. Franke M. Final exam weighting as part of course design. *Teach Learn Inq.* 2018 Mar 20;6(1):91-103.
11. Shukla RK. A new systematic approach of teaching and learning forensic science for interdisciplinary students: A step towards renovating the forensic education system. *Forensic Sci Int Synergy.* 2021 Jan 1;3:100146.
12. Vidua RK, Pakhare A, Patel S, Patel N, Arora A. What do the MBBS undergraduates think about the subject of Forensic Medicine & Toxicology? A survey-based evaluation of perception. *J Indian Acad Forensic Med.* 2020 Sep;42(3):193-8.
13. Chhabra HS, Das S, Tripathi P. Voices from the Classroom: How Student Feedback Shapes Active Learning in Forensic Medicine.

14. Qureshi MA, Khaskheli A, Qureshi JA, Raza SA, Yousufi SQ. Factors affecting students' learning performance through collaborative learning and engagement. *Interact Learn Environ.* 2023 May 19;31(4):2371-91.
15. Arafa MA, Ghaith MM, El-Drieny MS, Alsayed M. Pre-clinical and Clinical Medical Students' Perception of the Learning Environment: A Reference to the Forensic Medicine and Clinical Toxicology Course. *Adv Med Educ Pract.* 2022;13:369-406.

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**Authors Contribution:**

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Nadeem F	✓	✓	✗	✗	✓	✗
Hussan J	✓	✗	✓	✓	✓	✗
Kashif L	✓	✓	✗	✗	✗	✓
Ali A	✓	✗	✓	✓	✓	✗
Kashif Q	✓	✓	✗	✗	✗	✓
Zafar Q.	✓	✗	✓	✓	✓	✗

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

**Ethical Approval:**

This study was approved by the Institutional Ethical Review Board of Khyber Medical College, Peshawar, Pakistan  
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