Impact of class attendance on academic performance: insights from pre-clinical medical students in a modular system

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ABSTRACT

Objective: To determine the association between class attendance and academic performance among second-year MBBS pre-clinical students enrolled in a modular system.

Methods: This retrospective record-based study was conducted in the Department of Medical Education at Gomal Medical College, Dera Ismail Khan, Pakistan. The academic performance of second-year MBBS students (session 2022–2023) was compared with their class attendance across three modular blocks: Block D (Neurosciences), Block E (Gastrointestinal and Renal) and Block F (Endocrine and Reproduction). Students were categorized into two groups: Category A (attendance ≥75%) and Category B (attendance <75%). The minimum passing score was set at 50%. Students on leave, transferred, or admitted late were excluded. Data were analyzed using descriptive statistics and the Chi-square test, with a significance level of $p \leq 0.05$.

Results: Out of 121 enrolled students, 119 met the inclusion criteria. In Block D, Category A showed a pass rate of 51.31% versus 4.65% in Category B ($p < 0.001$). In Block E, pass rates were 69.07% (Category A) and 54.54% (Category B), with no significant association ($p = 0.1928$). In Block F, Category A had a pass rate of 66.67% compared to 34.21% in Category B ($p = 0.00087$). Combined analysis of all three blocks (n = 357) showed a significantly higher pass rate in students with ≥75% attendance (63%) versus those with <75% (26.21%) ($\chi^2 = 39.740$, $p < 0.00001$).

Conclusion: Higher class attendance (≥75%) is significantly associated with better academic performance in the modular assessment system of pre-clinical medical students.

Keywords: Absenteeism (MeSH); Modular System (Non-MeSH); Students, Medical (MeSH); Examination Performance (Non-MeSH).

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INTRODUCTION

The primary objective of undergraduate medical education is to cultivate competent, knowledgeable, and compassionate physicians capable of providing high-quality patient care. Consistent attendance in lectures and tutorials plays a pivotal role in academic achievement, as it reinforces students' comprehension of course content and enhances academic performance. Additionally, regular class participation promotes essential professional traits such as discipline, commitment, and perseverance-qualities integral to personal and professional development.[1]

Unlike disciplines in the humanities, medical education necessitates direct human interaction, making classroom attendance and hands-on experience indispensable for developing clinical competencies.[2] Recognizing the intensity and complexity of the Bachelor of Medicine, Bachelor of Surgery (MBBS) curriculum, universities and regulatory bodies have implemented stringent attendance requirements to uphold academic and professional standards.[3] In most medical programs, including MBBS, participation in lectures, practical sessions, and tutorials is mandatory.[4,5] A growing body of literature consistently demonstrates a positive correlation between class attendance and academic performance among medical students.[6-9]

In line with global trends in medical education, Pakistan has begun transitioning toward a modular, competency-based curriculum. Khyber Medical University (KMU), Peshawar, introduced the modular system for its MBBS program in 2018 and implemented it across affiliated medical colleges in Khyber Pakhtunkhwa province of Pakistan.[10] According to KMU guidelines, a minimum of 75% class attendance is required for eligibility to sit in examinations.[11] Encouraged by the Pakistan Medical and Dental Council (PMDC) and the Higher Education Commission (HEC) of Pakistan, many medical institutions are shifting from traditional to outcome-based curricula.[12]

Previously, pre-clinical education in medical colleges followed a discipline-based format, with separate instruction in Anatomy, Physiology, and Biochemistry. However, the lack of integration often resulted in content redundancy, inefficient use of instructional time, and reduced student engagement.[13,14] The Aga Khan University (AKU) Karachi pioneered the modular approach in Pakistan, prompting other institutions to adopt similar reforms. Nevertheless, variations in institutional infrastructure and faculty resources have led to discrepancies in the quality of student-centered learning experiences.[12]

Given this evolving educational

landscape, the current study was planned to assess whether class attendance among second-year MBBS students in a modular system influences academic performance. To the best of the authors' knowledge, limited recent research exists on the relationship between attendance and examination outcomes in the context of Pakistan's modular medical education system.

METHODS

A record-based retrospective study was conducted in the Department of Medical Education at Gomal Medical College, Dera Ismail Khan, affiliated with Khyber Medical University (KMU), Peshawar, Pakistan. The study focused on pre-clinical Second Year MBBS students enrolled during the 2022–2023 academic session, to assess students' academic performance in relation to their class attendance across individual teaching modules.

Internal assessments for these students were conducted at the end of each module in the form of Block Assessments, which were supervised by the Department of Medical Education. These assessments were institutional and not university-based. The second-year curriculum is structured into three academic Blocks:

· **Block D:** Neurosciences 1A and Neurosciences 1B Modules

· **Block E:** Gastrointestinal 1 and Renal & Metabolism 1 Modules

· **Block F:** Endocrine 1 and Reproduction 1 Modules

Attendance records, including both major and minor subjects, were maintained for each block/module by the Department of Medical Education. Approval for the study was obtained from the Institutional Ethical Committee (IEC) via reference number 84/GJMS/JC, dated June 11, 2024, and strict confidentiality of student data was ensured.

The study duration was from 14 June 2024 to 16 September 2024. All enrolled students were included in the study except those who had migrated, were admitted late, or were on extended leave due to health reasons during the relevant modules. Students were stratified into two categories:

· **Category A:** Attendance ≥75%

· **Category B:** Attendance <75%

Academic performance was determined based on end-of-module assessment scores, with a minimum of 50% required to pass. Students scoring below 50% were considered to have failed.

The results of all three blocks were analyzed individually and collectively. Chi-square tests were applied to determine the association between attendance and academic performance, with a significance level set at $p \leq 0.05$. Descriptive statistics, including frequencies and percentages, were used for data presentation, and results were displayed using tables and pie charts.

RESULTS

The results of 3 Blocks were analyzed as Block D, Block E and Block F.

In Block D, a total of 121 preclinical Second-Year MBBS students from the 2022–2023 session were enrolled. However, two students were excluded from the study-one due to leave and the other due to transferring from the college before the end-of-module assessment-resulting in a final study population of 119 students. Among these, 76 students had class lecture attendance greater than 75%. Of these, 39 students passed, yielding a passing rate of 51.31%, while 37 students failed, resulting in a failure rate of 48.69%.

Out of the total 119 enrolled students, 43 had attendance below 75%. Within this group, only 2 students passed, reflecting a 4.65% pass rate, while 41 students failed, resulting in a 95.35% failure rate. The association between attendance and performance was statistically significant, with a chi-square value of 26.4805 and a p-value of <0.001.

In Block E, a total of 119 students were analyzed. Among them, 97 students had attendance above 75%, with 67 students passing (69.07%) and 30 students failing (30.93%) the end-of-block assessment. In contrast, 22 students had attendance below 75%; of these, 12 passed (54.54%) and 10 failed (45.46%). The chi-square statistic for this comparison was 1.6959, with a p-value of 0.1928, indicating no statistically significant association between attendance and academic performance at the p < 0.05 threshold.

In Block F, a total of 119 students were studied, in which 81 students were having attendance greater than 75%, out of which 54 students have shown passing results giving 66.67 % passing rate, whereas 27 students failed to achieve passing percentage giving 33.33 % failure rate in end Module assessment test.

In enrolled 119 students, 38 students were having attendance less than 75%, out of which 13 students passed giving 34.21 % passing rate, while 25 students failed to achieve passing percentage giving 65.79 % failure rate in this group.

The chi-square statistics is 11.0747. the

Table I: Association between class attendance and academic performance across all three blocks (n=357)

Attendance	Block Score ≥ 50% (Pass)	Block Score < 50% (Fail)	Marginal Row Totals	Test of significance X^2	p value
Greater than 75% (n=254)	160 (63%)	94 (37%)	254 (100%)		
Less than 75% (n=103)	27 (26.21%)	76 (73.79%)	103 (100%)	39.740	0.00001
Marginal Column Totals	187	170	357		

The chi-square statistic is 39.740. The p-value is <0.00001 which is highly significant.

■ Pass 63% ■ Fail 37%

Category A > 75%
n= 254

n=94
37%

n=160
63%

■ Pass 26.21% ■ Fail 73.79%

Category B < 75%
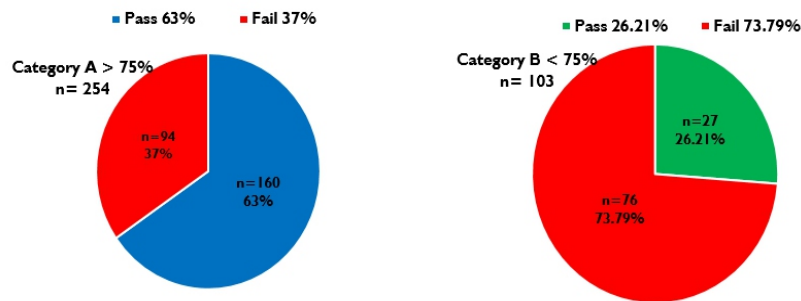n= 103

n=27
26.21%

n=76
73.79%

Figure 1: Diagrammatic representation of cohesive results.

p-value is 0.00087 which is Significant at $p < 0.05$.

Combining the results of all 3 Blocks/modules, we analyzed 357 results of the overall performance of 119 Candidates, 254 results of students from Category A, and 103 results are students of Category B (Figure 1).

Comparing the results of two categories in 3 blocks/modules cohesively, the resultant chi square value was $X^2 = 39.740$ indicating a very significant p-value <0.00001 (Table 1).

DISCUSSION

This study aimed to assess the relationship between class attendance and academic performance among pre-clinical second-year MBBS students under a modular system. The findings demonstrated a significant positive association between higher class attendance ($\geq 75\%$) and better academic performance across all three assessed blocks. Students with lower attendance ($<75\%$) consistently showed higher failure rates, with the cumulative analysis yielding a highly significant association ($p <0.001$), reinforcing the critical role of regular attendance in achieving academic success in modular medical education.

Interactive class participation is widely recognized as one of the most effective learning strategies, promoting hands-on engagement and deeper understanding of course material.[15,16] Medical school attendance is vital for future doctors to develop the necessary habits of self-discipline and consistency, which are critical for success in their field.[17] Numerous studies have shown that absenteeism is associated with lower academic performance, underscoring the importance of consistent class

attendance. Moreover, students who underperform during the early years of medical school are at increased risk for future professional difficulties, including misconduct and disciplinary issues.[18,19] On the other hand, attending classes consistently can have a dual benefit; improving academic outcomes, while also providing opportunities for socialization, networking, and building relationships that are vital for professional growth and development.[20] In our study while assessing the academic achievements in modular system with respect to the attendance, in Block D, a strong positive correlation was shown between absenteeism and poor exam performance, as also reported in Hamdi's study suggesting the importance of regular attendance as a way of improving test scores.[7]

In Block E, although the chi-square test was Not significant for the absenteeism in relation to Block Exam Scores indicating that there is no substantial relationship between academic outcomes and lecture attendance, which is in line with Doggrell's study's result,[21] yet there is higher rate of percentage failure at 45.46% in the Category B (students having attendance less than 75%) as compared to failure rate observed in Category A which is 30.93%. These findings may be in accordance with the low number of absentees from class lectures as only 22 students were having attendance less than 75% as compared to Block D and F, where a large number of students fell into Category B. The improvement in the passing rate might also be due to higher failure rate in the preceding Block D, which might have sensitized the students about their Examination performance.

In Block F, a positive correlation was

observed between absenteeism and poor exam performance suggesting a positive link between attendance and academic achievements. An observational study conducted at Akhtar Saeed Medical and Dental College Lahore [6] among MBBS students revealed a similar significant positive link between attendance and academic achievement. Likewise, a separate study at Saidu Medical College Swat [9] found a statistically significant positive correlation between class attendance and academic performance among pre-clinical students, hence missing classes is linked to lower grades, emphasizing the importance of attending and engaging in class sessions to improve learning outcomes and better academic performance.

This study has several limitations. Being a single-center, retrospective analysis, and its findings may not be generalizable to other institutions. It relied solely on existing records, which may be prone to inaccuracies or incomplete data. The study did not control for confounding factors such as prior academic performance, socioeconomic status, or personal circumstances that could influence both attendance and academic results. Moreover, attendance was measured quantitatively without assessing the quality of engagement during classes. The focus was limited to short-term outcomes based on end-of-block assessments, without evaluating long-term academic or professional progress. Additionally, the study did not explore students' perspectives or reasons for absenteeism, which could have provided deeper insights.

CONCLUSION

The study revealed a clear trend: lower class attendance was consistently associated with poorer academic performance across all blocks. In Block D, 43 out of 119 students had attendance below 75%, with a striking 95.35% failure rate in this group. Block E showed a relatively smaller group of 22 students with attendance under 75%, of which 45.46% failed. In Block F, among 38 students with attendance below the threshold, 65.79% did not pass the assessment. These findings strongly suggest that students with

attendance below 75% are at a significantly higher risk of underperforming or failing in modular assessments.

RECOMMENDATIONS

Given that this was a small, record-based descriptive study limited to second-year pre-clinical MBBS students, broader investigations are recommended. Future research should include students from all academic years and explore additional factors such as absenteeism trends, learning style preferences, and satisfaction with teaching methods and classroom environment. This would help in identifying the underlying causes of absenteeism and inform strategies to enhance student engagement and academic performance.

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AUTHORS' CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

MO: Conception and study design, acquisition, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

JN & FUR: Study design, analysis and interpretation of data, drafting the manuscript, approval of the final version to be published

MJS: Conception and study design, critical review, approval of the final version to be published

NA & MS : Study design, acquisition of data, drafting the manuscript, approval of the final version to be published

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.

CONFLICT OF INTEREST

Authors declared no conflict of interest, whether financial or otherwise, that could influence the integrity, objectivity, or validity of their research work.

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The data that support the findings of this study are available from the corresponding author upon reasonable request

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