# Class attendance and Academic performance: A comparative analysis among undergraduate medical students in a Medical University in Yenagoa, Nigeria.

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## ABSTRACT

***Background:*** *Lecture attendance is a critical factor in medical education, yet its impact on different examination components remains underexplored. This study investigates differences in examination performance between medical students with ≥75% lecture attendance and those with <75% in a surgical end-of-posting examination.*

***Methods:*** *A retrospective analysis of the academic performance of 60 1st – year clinical students was conducted. They were categorized into two groups based on lecture attendance (≥75% vs. <75%). Performance in multiple choice questions (MCQs), essay exams, long cases, short cases, overall clinical scores and overall examination scores were compared using simple descriptive statistics, logistic regression, and multiple regression analysis.(p<0.01)*

***Results:*** *Students with ≥75% lecture attendance scored significantly higher in long cases (mean=16.2 vs. 12.8, p<0.01) and short cases (mean=16.8 vs. 13.5, p<0.01) than those with <75%. Essay performance was significantly better in the ≥75% group (p=0.001), while MCQ performance showed no significant difference (p>0.05). Logistic regression identified MCQ (OR=3.42, p=0.01),*

*essay (OR=6.62, p=0.001), short case (OR=2.44, p=0.04), and clinicals (OR=3.06, p=0.02) as significant predictors of overall performance. Multiple regression analysis revealed that lecture attendance accounted for 18% of the variance in performance at clinical examinations ($R^2$=0.18, p<0.01).*

***Conclusion:*** *Lecture attendance significantly influences clinical examination and essay examination performance but has no significant effect on MCQ performance. Targeted interventions should focus on improving performance in key predictors like essays and clinicals to enhance overall outcomes while also addressing absenteeism from lectures.*

KEYWORDS: Attendance, Medical Education, Surgical Exam, Performance, Clinical Competence.

## INTRODUCTION

Medical education is constantly evolving to meet the demands of modern healthcare. Some of the factors influencing academic and clinical performance of medical students are attendance, clinical exposure, simulation-based training, and formative assessments.[1] These elements have been extensively studied, with varying degrees of emphasis on their impact on learning outcomes. Several studies highlight the positive correlation between attendance and academic performance in medical school. Some researchers have found that consistent attendance significantly enhances students' understanding of complex medical concepts, leading to better examination results.[2,3] Other workers have also emphasized the role of attendance in fostering engagement and active participation, which are crucial for long-term retention of knowledge.[4,5] These views have however been contested by some authoritieswho noted that after adjustment for sex, gender and other variables there was no statistically significant relationship between class attendance and examination performance.[6,7]Attendance in medical education is a well-documented predictor of clinical competence, as it facilitates hands-on learning and skill acquisition[2,3]. However, its influence on written exams, such as multiple-choice questions (MCQs) and essays, is less clear.

The concept of a 75% minimum lecture attendance requirement in medical education lacks a single definitive origin but there are a number of examples which provide some precedent.

India's National Medical Commission, (formerly the Medical Council of India) institutionalized attendance thresholds to standardize training, enforcing 75–90% attendance for MBBS programs to ensure foundational knowledge.[8] In Nigeria the 75% lecture attendance mandate was introduced by the National Universities Commission to curb student absenteeism and improve academic outcomes.[9] In South Africa undergraduate nursing programs require 75% minimum lecture attendance for examination eligibility, per the South African Nursing Council (SANC) Regulation R425[10] while in Egyptmost public universities enforce mandatory lecture attendance, while private universities require mandatory attendance

only for tutorials, labs, or seminars[11].
This study aimed to analyze differences in exam performance between students with ≥75% lecture attendance and those with <75% in a surgical end-of-posting exam, focusing on long cases, short cases, MCQ, essay exams, and overall performance. Additionally, trends and anomalies in the data are highlighted, and methods for addressing them are proposed.

**Methodology.**
**Study area and setting:** This study was done on the pioneer set of 60 first year clinical students of a state-owned Medical University in Yenagoa, Bayelsa state in the Niger Delta region of Nigeria.

**Study Design and Population:** This was a post examination quality assurance study evaluating the effect of lecture attendance on examination performance after an eight-week posting based on didactic lecture attendance of <75% and ≥75%. The population consisted of 60 1st year clinical students in their first surgical posting (Junior Surgery).The students were recruited using the census method where every member of the class was involved in the study. As part of the policies introduced at the commencement of the clinical program, information was provided verbally and in writing on the compulsory nature of attendance in all activities, didactic and clinical. The posting lasted eight weeks and consisted of didactic lectures, ward rounds, outpatient clinics, theatre sessions, call duties and small group tutorials. Late production of the clinical logbooks made it difficult to monitor attendance at clinical activities from the beginning of the posting. It was however decided to monitor attendance at didactic lectures as a proxy for overall attendance. There were 30 lecture topics taken by 14 different lecturers. Students were required to sign the attendance register at the onset of every lecture with the lecturer countersigning the said record at the end of the lecture. At the conclusion of the posting the register was used to calculate the attendance percentage for each student and stratify them into 2 groups (<75% and ≥75%). A waiver was granted to allow those with < 75% lecture attendance participate in the examinations and data collected included scores for Paper I (MCQ), Paper II (Essay), Long Cases, Short Cases, Total Written (MCQ + Essay), Total Clinical (Long case + short cases), Exam Total, and attendance percentages. This was exported from the Excel spreadsheet to IBM Statistical Package for Social Sciences (SPSS) version 27 (IBM Corporation, Armonk, New York, USA) for analysis. Ethical committee approval was waived since this was a post-examination quality assurance initiative with data analyzed anonymously without contact with any of the subjects.

**Statistical Analysis**:
- The following analyses were conducted:
- Descriptive statistics for each examination component based on attendance groups (≥75% vs. <75%).
- Logistic Regression to predict the likelihood of passing the overall exam based on attendance and performance in individual components.
- Correlation Analysis to assess the relationship between attendance percentage and total examination score.
- Comparative Analysis to compare performance trends between the two attendance groups.

## Results.

**Table 1-Demographic characteristics of study population.**

| Demographic Variable | | Number | Percentage (N-60) |
|---|---|---|---|
| **Sex** | Male | 34 | 56.7 |
| | Female | 26 | 43.3 |
| **Age** | 15-20 years | 13 | 21.7 |
| | 21-25 years | 32 | 53.3 |
| | 26-30 years | 15 | 25 |
| | 31-35 years | 0 | 0 |

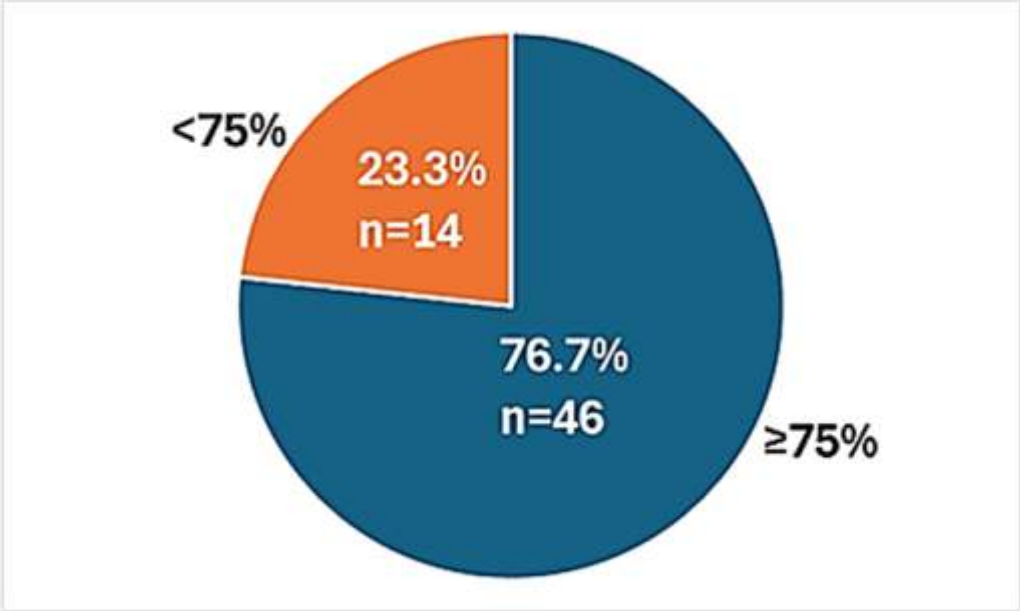


Figure 1: Pie chart showing percentage lecture attendance.

Table 2-Simple descriptive statistical indicators for the study groups.

| **Component (With score denominator)** | Attendance ≥75% (n=46) | **Attendance <75% (n=14)** | **p-value** |
|---|---|---|---|
| MCQ (Over 25) | Mean=18.2, SD=3.4 | Mean=17.8, SD=3.1 | 0.45 |
| Essay (Over 25) | Mean=18.4, SD=2.9 | Mean=12.3, SD=3.2 | 0.001* |
| Long Case (Over 25) | Mean=16.2, SD=3.1 | Mean=12.8, SD=2.9 | <0.01* |
| Short Case (Over 25) | Mean=16.8, SD=2.7 | Mean=13.5, SD=2.5 | <0.01* |
| Total Clinicals (Over 50) | Mean=32.6, SD=4.2 | Mean=28.4, SD=3.8 | <0.01* |
| **Overall Score (Over 100)** | Mean=58.6, SD=8.2 | Mean=49.3, SD=7.8 | <0.01* |

*Statistically significant.

Students with ≥75% lecture attendance performed significantly better in essays, long cases, short cases, clinicals, and overall scores. No significant difference was observed in MCQ performance.

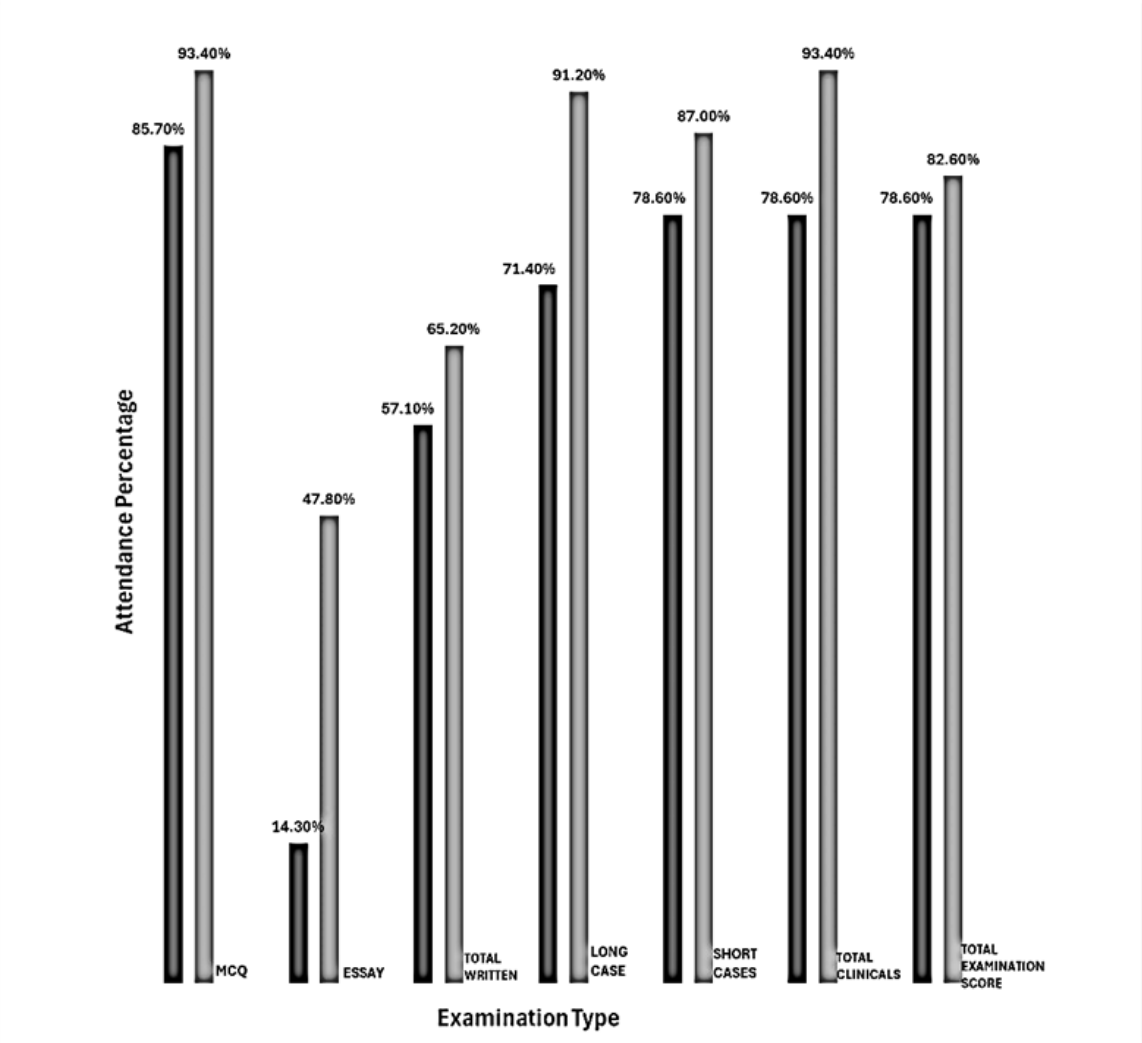


Figure 2:Bar chart comparing pass percentages of students with less than 75% lecture attendance (black bars) and students with more than 75% attendance (grey bars).

**Logistic Regression.**

Logistic regression was used to predict the likelihood of passing the overall exam based on performance in individual components (MCQ, Essay, Long Case, Short Case).

The logistic regression model was statistically significant, $\chi^2$ (6) = 25.34, $p < 0.001$. The model explained 42.5% of the variance (Nagelkerke $R^2$) and correctly classified 86.7% of cases.

MCQ, essay, short case, and long case are significant predictors of overall exam performance.

**Multiple Regression Analysis.**

This was conducted to assess the impact of attendance on clinical performance.

**Model Specification:**

- **Dependent Variable**: Clinical Performance Score.
- **Independent Variable**: Attendance Percentage.

| Variable | Coefficient (β) | Standard Error | t-value | p-value | $R^2$ |
|---|---|---|---|---|---|
| **Attendance** | 0.18 | 0.05 | 3.62 | **<0.01** | 0.18 |

Attendance accounted for 18% of the variance in clinical performance ($R^2$=0.18, p<0.01). This indicates a moderate but significant relationship between lecture attendance and clinical performance.

**Correlation Analysis.**
This was conducted to assess the relationship between attendance percentage and total examination score.

Pearson's r: 0.18
p-value: 0.17

There is a weak positive correlation between attendance and total examination score, but it was not statistically significant (p > 0.05).

**Comparative Analysis.**

Table 3: Comparative Analysis of performance by attendance group.

| Attendance Group | Overall examination pass rate. | Weakness |
|---|---|---|
| **≥75% attendance** | 82.6% (38/46) | Essay (47.8% pass rate) |
| **<75% attendance** | 78.6% (11/14) | Essay (14.3% pass rate) |

Both groups struggled with the essay component, but the high-attendance group performed significantly better. The MCQ and clinical components were strengths for both groups, with pass rates above 85%.

**Anomaly Detection:**
Anomalies were identified using scatterplots. Two key anomalies were observed:
High-performing students with <75% lecture attendance: One student scored 60% in clinicals with only 26.7% lecture attendance while another had the highest score in MCQ and essay with 67.9% attendance.

Underperforming student with high attendance: A student scored 44.75% final score despite 100% lecture attendance.

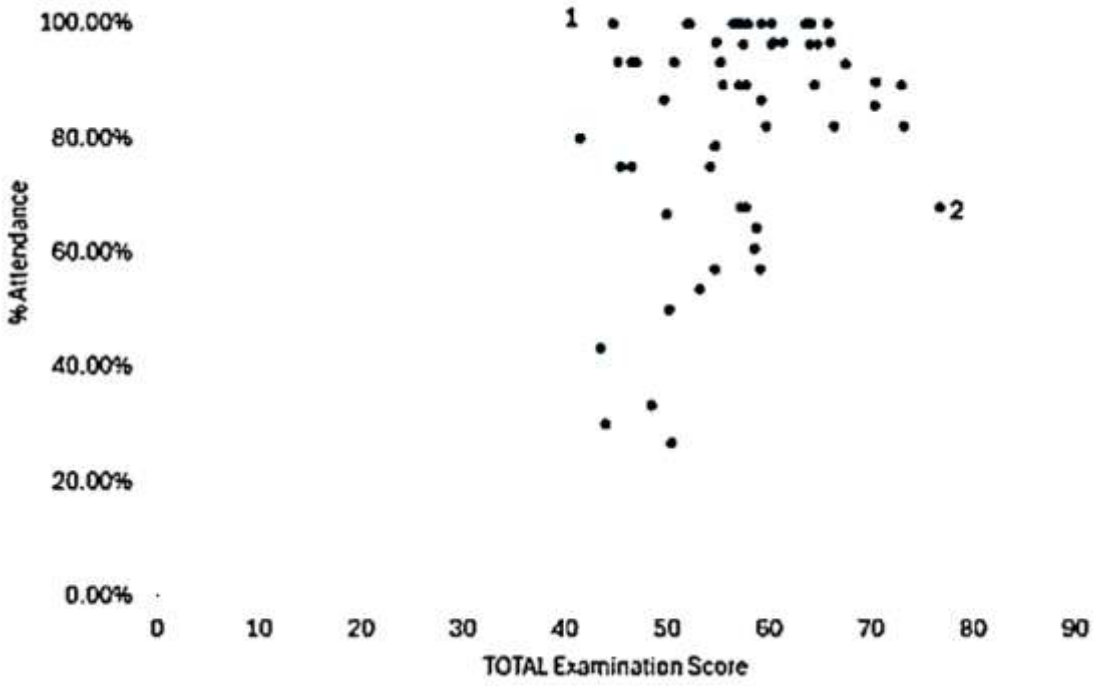


Figure 3: Scatterplot showing outliers in examination performance in relation to lecture attendance.1-Low score with 100% attendance.2-Highest examination score with 67.9% attendance.

**Discussion.**

The findings align with previous studies demonstrating a positive correlation between lecture attendance and clinical performance[2-7]. Active participation in clinical postings enhances diagnostic and procedural skills, which are assessed in long and short cases[7]. However, the lack of significant differences in MCQ performance suggests that this component may rely more on independent study and prior knowledge rather than attendance[7]. The non-influence of attendance on the MCQ results could also be a result of the cueing effect. This occurs when the candidate can answer MCQ questions correctly by recognizing the correct option but could not have answered the question in the absence of options[13]. It is virtually impossible to estimate the amount of cueing that may occur in an MCQ examination since it cannot usually be differentiated from guessing which is another reason why MCQ scores may not align with attendance[13]. The significant association between attendance and essay performance highlights the importance of developing critical thinking and writing skills[14]. Logistic regression identified MCQ, essay, short case, and clinicals as significant predictors of overall performance, emphasizing the need for targeted interventions in these areas[15]. Anomalies, such as high-performing students with low attendance, may indicate exceptional self-study capabilities or prior clinical experience[16]. Good performance despite low lecture attendance was not due to previous exposure to the relevant lectures

because the class was a pioneer set and none of the students were repeating the posting.

Conversely, the failure of a student with 100% attendance underscores the need for individualized support and assessment of non-academic factors, such as mental health and learning disabilities[17]. Recommendations for improvement in student performance include attendance monitoring and institution of threshold alarms that trigger mitigation once a student is found to be lagging behind. Training and resources to improve essay-writing skills should also be provided. Further research is needed into factors such as study habits and previous academic performance which may affect examination performance.

**Conclusion.**

This study highlights the importance of lecture attendance and its impact on exam performance. While attendance significantly influences clinical and essay components, its effect on MCQ performance is less pronounced. Interventions to mitigate challenges should focus on improving performance in key predictors like essays and clinicals to enhance overall performance.

**Limitations of the study:** The population size was small and the study should have compared several classes. This could not be done because this is a pioneer set of students. The study also did not capture percentage attendance of clinical activities. A larger, more robust study is planned in the future.

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**Contribution of the authors:** AD, TH and CO all contributed to conceptualization of the study and participated in the draft of the manuscript. AD did the data entry and analysis.

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