Research Article

DOES PRACTICAL ATTENDANCE PREDICT ANATOMY LAB SUCCESS? A RETROSPECTIVE COHORT STUDY

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Abstract

Background: Anatomy practical sessions provide structured exposure to specimens, models, and guided identification. While attendance is encouraged in many institutions, its measurable impact on laboratory and overall course performance remains inconsistently documented in routine undergraduate settings. **Aim:** To evaluate whether practical session attendance predicts anatomy laboratory performance and overall academic outcomes. **Methods**: A retrospective cohort study was conducted using de-identified academic records of 80 undergraduate students enrolled in an anatomy course. Attendance percentage was calculated as sessions attended divided by total scheduled practical sessions. Outcomes included practical (spotter) examination score, written examination score, and final course grade. Students were categorized as high (≥90%), moderate (75–89%), or low (<75%) attendance. Associations were assessed using Spearman correlation, group comparisons, and linear regression analysis. **Results**: Mean attendance was 79.5 ± 12.9%. Attendance demonstrated a moderate positive association with spotter examination score ($\rho \approx 0.53$, $p < 0.001$), written examination score ($\rho \approx 0.50$, $p < 0.001$), and final course grade ($\rho \approx 0.52$, $p < 0.001$). Students in the high-attendance group achieved significantly higher mean spotter scores (94.2 ± 3.4%) compared with the low-attendance group (68.9 ± 5.3%) ($p < 0.001$). Linear regression demonstrated that each 10% increase in attendance was associated with an approximate 5-point increase in spotter performance ($p < 0.001$). **Conclusion**: Practical attendance is positively associated with laboratory and overall academic performance in undergraduate anatomy education. Monitoring attendance patterns and providing early academic support may enhance student outcomes.

Keywords: Anatomy Education, Attendance, Practical Performance, Academic Outcomes, Undergraduate Education.

INTRODUCTION

Anatomy practical sessions form the experiential core of undergraduate anatomical education. Through direct engagement with specimens, models, and guided identification exercises, students develop spatial reasoning skills and reinforce lecture-based theoretical knowledge. Practical laboratories facilitate multimodal learning by integrating visual, tactile, and verbal inputs, thereby strengthening retention and clinical relevance[1,2]. Despite their recognized importance, attendance policies and student participation patterns vary across institutions. Attendance may reflect both learning opportunity and academic engagement; however, the extent to which practical attendance predicts measurable academic outcomes within routine undergraduate settings remains incompletely characterized [3,4]. Previous educational research suggests that class attendance is positively associated with associated with academic performance in higher education settings, though evidence specific anatomy laboratory environments based limited [5,6]. The present study aimed to evaluate the association between practical session attendance and academic performance, including laboratory (spotter), written examination, and overall course grade outcomes in an undergraduate anatomy cohort.

MATERIALS AND METHODS

Study Design and Setting: This retrospective cohort study utilized de-identified academic records from undergraduate students enrolled in an anatomy course during a single academic term. The course included scheduled practical sessions and standardized written and spotter examinations.

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Participants: All students with complete attendance and assessment records were included. Students with incomplete data were excluded from analysis.

Exposure Variable: Practical attendance percentage was calculated as the number of sessions attended divided by the total number of scheduled practical sessions, multiplied by 100. Students were categorized into high (≥90%), moderate (75–89%), and low (<75%) attendance groups.

Outcome Measures: Academic outcomes included spotter examination score (%), written examination score (%), and final course grade (%).

Statistical Analysis: Descriptive statistics were reported as mean ± standard deviation. Spearman correlation analysis assessed associations between attendance and academic outcomes. Group differences across attendance categories were evaluated using the Kruskal–Wallis test. Linear regression analysis estimated the change in examination score per 10% increase in attendance. Statistical significance was defined as $p < 0.05$.

Ethical Considerations: Data were anonymized prior to analysis. Institutional review or exemption was obtained in accordance with institutional policy governing educational research.

RESULTS

A total of 80 undergraduate students were included in the analysis. Practical attendance ranged from 57% to 100%, with a mean attendance of 79.5 ± 12.9%. Mean performance outcomes were as follows: spotter examination 80.6 ± 11.8%, written examination 79.8 ± 11.5%, and final course grade 80.4 ± 11.6% (Table 1).

Table 1. Cohort characteristics and overall academic performance

| Variable	Mean ± SD
Attendance (%)	79.5 ± 12.9
Spotter Examination (%)	80.6 ± 11.8
Written Examination (%)	79.8 ± 11.5
Final Course Grade (%)	80.4 ± 11.6

Summary of attendance distribution and overall academic performance (N = 80)

Table 2. Academic performance by attendance category

Attendance Category	Spotter (%)	Written (%)	Final Grade (%)
High (≥90%)	94.2 ± 3.4	93.1 ± 3.8	94.0 ± 3.6
Moderate (75–89%)	85.1 ± 5.8	84.2 ± 5.6	84.7 ± 5.5
Low (<75%)	68.9 ± 5.3	69.7 ± 5.7	69.3 ± 5.5

Comparison of examination performance across predefined attendance categories

Spearman correlation demonstrated significant positive associations between attendance percentage and spotter score ($\rho \approx 0.53$, $p < 0.001$), written score ($\rho \approx 0.50$, $p < 0.001$), and final course grade ($\rho \approx 0.52$, $p < 0.001$). (Refer Figure 1)
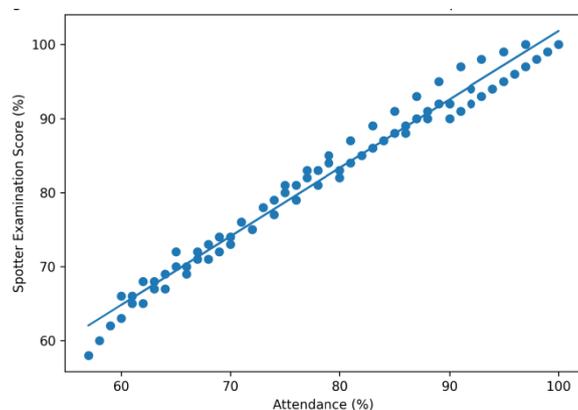
Figure 1. Association between practical attendance and spotter examination score
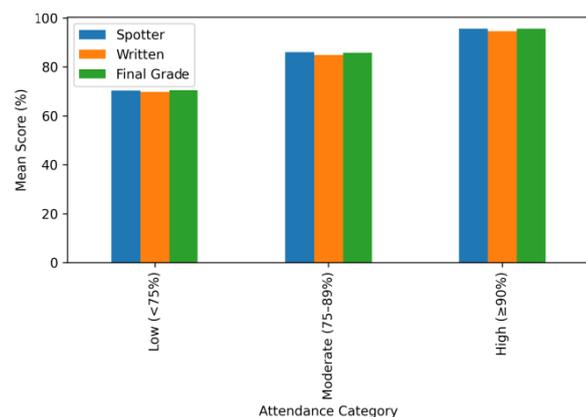
Figure 2. Academic performance by attendance category

Linear regression analysis indicated that each 10% increase in attendance was associated with an approximate 5.2-point increase in spotter examination score (95% CI: 3.9–6.5, $p < 0.001$). Attendance explained approximately 28% of the variance in performance outcomes. (Refer Table 2& Figure 2)

DISCUSSION

This study demonstrates a significant positive association between practical session attendance and academic performance in undergraduate anatomy education. Students with higher attendance achieved superior outcomes across laboratory, written, and overall course assessments. The magnitude of association observed is educationally meaningful. Regular participation in anatomy practical sessions likely enhances repeated exposure to three-dimensional structures and supports retrieval practice, both of which are known to strengthen durable learning [7]. Cadaveric and prosection-based learning environments also promote deeper cognitive integration compared to passive instructional formats [1,8]. The association observed in written examination scores further suggests that practical engagement supports conceptual understanding beyond structure identification. Laboratory-based learning has been shown to enhance long-term retention and structural-functional integration [2,9]. From an educational standpoint, attendance represents a modifiable academic behavior. Early identification of students with recurrent absences may allow targeted intervention before academic decline occurs. Prior studies in medical education suggest that attendance monitoring can function as an early indicator of students at risk of underperformance [5,10]. However, this study is observational and cannot establish causality. Attendance may partially reflect intrinsic motivation, study habits, or broader academic engagement. Future longitudinal or interventional studies are needed to clarify causal pathways.

Conclusion

In this retrospective cohort of undergraduate anatomy students, practical session attendance was significantly associated with improved laboratory performance, written examination outcomes, and final course grades. Although causality cannot be established, attendance appears to function as a meaningful academic indicator within anatomy education.

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