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Emotional Intelligence and Academic Performance among MBBS students in Blended Learning Environment: A Correlational Study

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ABSTRACT

Emotional intelligence (EI) is a critical factor influencing academic performance (AP) and professional competence in medical education. **Objectives:** To assess the correlation between EI and AP among MBBS students across different professional years, age groups, gender, and achievement levels within a blended learning environment. **Methods:** A correlational study was conducted at Rashid Latif Medical College, Lahore, from January to June 2023 after ethical approval. Stratified random sampling selected 300 MBBS students eligible for their annual professional examination, with full exposure of students to a blended learning curriculum. EI was measured using the validated National Health Service emotional intelligence questionnaire, and AP was assessed using annual professional marks. Data analysis was performed in SPSS version 25.0. Non-normal variables were reported as median IQR, and normally distributed variables as mean ± SD. Spearman's rank correlation evaluated the relationship between EI and AP, and Kruskal-Wallis tests compared groups. Statistical significance was set as $p<0.05$ and 95% confidence interval. **Results:** Overall, EI showed a moderate positive correlation with AP ($r=0.557$, $p<0.001$). The strongest correlation was observed in final year students ($r=0.747$, $p<0.001$). Third Year students had the highest mean emotional intelligence (202 ± 12.8, $p<0.001$). Positive correlation was consistent across genders and age groups. High achievers demonstrated significantly higher emotional intelligence than low achievers. **Conclusions:** Blended learning can enhance emotional intelligence and academic performance, particularly in early clinical years. Integrating structured emotional intelligence development into blended curricula may improve engagement and professional preparedness, including unforeseen challenges such as future pandemics.

INTRODUCTION

Emotional intelligence (EI) has been recognized as a critical non-cognitive skill for success in medical education and practice [1, 2]. High EI is associated with better communication, empathy, stress management, and adaptability. These competencies are essential for MBBS students coping with demanding academic and clinical workloads. Academic performance (AP) is typically measured through continuous assessment and professional examinations, and remains a central benchmark of medical students' success; however, it is influenced by multiple factors like cognitive, emotional, and environmental factors [3, 4]. The COVID-19 pandemic triggered a paradigm shift in medical education with institutions rapidly adopting a hybrid or blended learning model, a structured combination of face-to-face and online teaching modalities [5-7]. In this environment, students explore both physical and virtual platforms requiring greater self-directed learning and digital literacy. These conditions can alter the dynamics between emotional competencies and learning outcomes. The

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reduced in-person contact may challenge emotional regulation in online interaction, while asynchronous learning demands sustained self-motivation, both areas where EI can play a decisive role [8]. While literature documents a modest but significant relationship between EI and academic performance in traditional medical education settings, most evidence predates the widespread implementation of hybrid learning [2]. Effective e-learning requires appropriate use of modern educational tools as well as attention to emotional attitude towards online learning [9, 10].

Current studies often overlook detailed influences of demographic variables such as age, gender, and year of study, and almost none examined this relationship exclusively within a hybrid learning context, which leaves a critical knowledge gap. No recent studies in South Asian medical schools and very few globally have systematically explored the correlation between EI and academic outcomes across diverse demographic strata within a hybrid/ blended learning framework. Given the rapid post-pandemic institutionalization of blended model, understanding this relationship is essential to inform student support, curriculum design, and targeted intervention. By examining EI and academic performance among MBBS students engaged in blended learning, this study provides timely and context-specific evidence to guide interventions that fosters both emotional skills and academic achievement. This study aims to determine the correlation between emotional intelligence and academic performance among MBBS students of different age groups, all professional years exposed to a hybrid learning environment, as well as to find the level of emotional intelligence among high achievers and low achievers.

METHODS

This correlational study was conducted at Rashid Latif Medical College, Lahore (RLMC), in six months (January-June 2023) to find relationships between EI and AP. Stratified random sampling was used via the lottery method. MBBS students eligible for their annual professional examination (more than 75% attendance) and who had full exposure to blended learning during the academic year were included. Students who were excluded from the examination were excluded from the study. The blended learning model at RLMC combined 60% online and 40% face-to-face instruction using platforms like Zoom, Google Meet, Socrative, and Kahoot for content delivery and assessment purposes. The targeted population was MBBS students from all professional years enrolled at RLMC. The sample size was calculated using a 5% significance level, 90% study power, and an anticipated correlation coefficient of 0.51, resulting in 60 students per year (Total n=300) [11]. Ethical approval was sought from the ethical review board of the University of Health Sciences and the Institutional Review Board of Rashid Latif Medical College (Approval no RLMC-IRB-2021/018). Written informed consent was obtained from all participants, with confidentiality and anonymity ensured. Data collection involved two components. First, EI was measured using the open-access validated National Health Services Emotional Intelligence Questionnaire [12]. Each item was rated on a five-point Likert scale (1=strongly disagree to 5= strongly agree). Details of the questionnaire are shown in Figure 1. Second, AP data in the form of percentage marks from the annual professional examination were taken from official institutional records. Data were collected in the classroom on a hard copy of a proforma comprising three sections: demographic information, emotional intelligence, and academic performance (Figure 1).

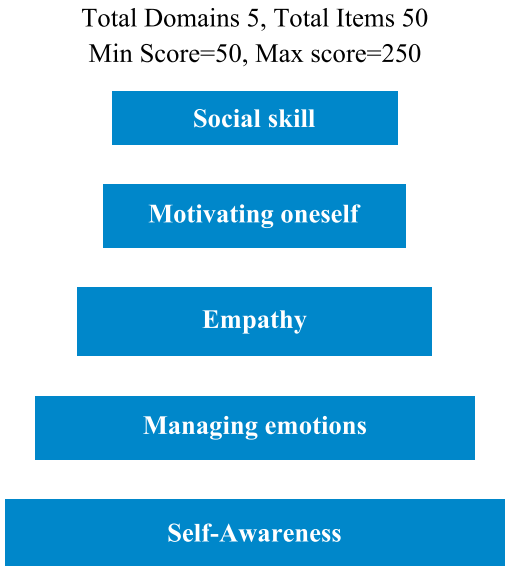

Figure 1: NHS Emotional Intelligence Questionnaire Detail

The hybrid/ blended learning context during the study period reflected post-pandemic adaptation. Blended instructional delivery combined asynchronous and synchronous online lectures, small group face-to-face clinical teaching, and technology-enhanced and technology-mediated assessments. Faculty used interactive tools to sustain engagement and align learning activities with curricular objectives [13].

Data analysis was conducted in SPSS version 25,0. Normality was assessed with the Shapiro-Wilk test. Non-normal continuous variables (emotional intelligence scores, raw marks) were reported as median with interquartile range, while normally distributed variables, i.e., percentage marks, were summarized as mean and standard deviation. Categorical variables were presented as frequencies and percentages. The relationship between emotional intelligence and academic performance was tested using Spearman's rank correlation coefficient.

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Group comparisons were conducted with a Kruskal-Walli's test. The statistical significance was set as a p-value less than 0.05 and a confidence interval of 95%.

RESULTS

A total of 300 MBBS students participated in the study with the mean age of 21.22 ± 2.5 years (median 21.0: IQR 20.0-24.0). Most of the students (56.3%) belonged to the 17-21 years age group, while 43.7% were between 22-24 years of age. The age variable exhibited a non-normal distribution. Demographic details are shown in table 1.

Table 1: Demographic Characteristics of Study Participants (n=300)

Variables	Category / Statistics	n % or Value
Age (years)	Mean ± SD	21.22 ± 2.5
	Median (IQR)	21.0 (20.0-24.0)
	Distribution	Non normal
Age Groups (years)	17-21	169 (43.7%)
	22-24	131 (56.3%)
Gender	Males	101 (33.7%)
	Females	199 (66.3%)

Comparison across professional years revealed significant differences in both Academic Performance and Emotional Intelligence EI. The highest mean emotional intelligence score was observed in 3rd year students (Mean=202, SD=12.8, n=60, 95% CI= 198.8-205.2) Which is significantly higher than other years (p<0.001). Correlation analysis demonstrated a moderate positive correlation between emotional intelligence and academic performance in the first year (r=0.502) 2nd year (r=0.590). 4th year students (r=0.659). A weaker correlation was noted among 3rd-year students. Whereas final year students showed a strong positive correlation (r=0.747). All correlations were statistically significant (p<0.001) as shown in table 2.

Table 2: Correlation of Emotional Intelligence with Academic Performance Among MBBS Students of Years

Study of the Year	Mark's Percentage Obtained (Mean ± SD)	Emotional Intelligence (Mean ± SD)	Correlation Coefficient	p-value[a]
First-Year	73.3 ± 5.9	194.9 ± 14.0	0.502	<0.001*
Second Year	72.1 ± 5.4	194.3 ± 14.2	0.590	<0.001*
Third Year	73.0 ± 4.1	202.5 ± 12.8	0.288	<0.001*
Fourth Year	70.6 ± 4.2	195.4 ± 14.0	0.659	<0.001*
Fifth Year	67.2 ± 3.6	195.0 ± 12.5	0.747	<0.001*
Overall	71.2 ± 5.2	196.4 ± 13.8	0.557	<0.001*
p-value[b]	<0.001*	0.004*	–	

[a]Spearman's rho correlation, [b]Kruskal-Walli's test. *Significant

The correlation between emotional intelligence and academic performance remained moderately positive for both genders (r = 0.587) for males and r=0.531 for females, indicating that higher emotional intelligence was consistently associated with better academic outcomes, irrespective of gender. Students aged 17-21 years obtained significantly higher academic scores compared to those aged 22-25 years (69.1 ± 4.3) (p<0.001). However, the difference in mean emotional intelligence score between the younger (197.2 ± 14.0) and older groups (195.5 ± 13.4) was not statistically significant (p=0.268). Correlation analysis revealed a moderate positive correlation between emotional intelligence and academic performance in both groups, with r=0.480 for the younger group and r=0.687 for the older group, both statistically significant (p<0.001). Students were categorized as high achievers (>70% marks) and low achievers (<70% marks). High achievers scored significantly higher in total EI score, i.e., total emotional intelligence score was 203.4 ± 11.2 among high achievers versus 186.8 ± 10.9 among low achievers. Correlational findings revealed a moderate positive correlation between academic performance and EI (r=0.557), and it was statistically significant (p<0.001). Overall, the findings consistently indicated that higher EI correlated with better academic performance across genders, age groups, achievement levels, and most professional years, particularly in the context of blended learning.

DISCUSSION

The study explored the relationship between emotional intelligence and different variables (academic performance, low and high achievers, different age groups, and both genders) among students of all professional years exposed to a blended learning environment. Mostly, the findings revealed a positive correlation with variation in strength among various subgroups. Our study reported the highest mean EI Score in third year MBBS students (202 ± 12.8, n=60, 95% CI = 198.8-205.2). A previous study conducted in Sweden among first year and fifth year students demonstrated a significant increase in emotional intelligence during medical training, where fifth year students demonstrated higher trait EI (F (5,423=2.39, p=0.037)). Although this supports enhanced EI during progression in medical training, EI can be at peak during early clinical years, as in the case of our study, rather than at the terminal stage of training [14]. In contrast to our findings, a previous study using the Universal Emotional Intelligence Questionnaire-Inventory reported the lowest score for third-year MBBS students (2.27%) and the highest for first and final-year MBBS students (2.90%). The study was conducted with a traditional curriculum with classroom pedagogy. Our findings on students exposed to a blended learning system suggest that contextual factors like implemented curriculum (blended vs onsite) and student support system may have an impact on EI difference, with the highest in the third year, underscoring the importance of EI development over the years in teaching learning environment [15]. Our study found a

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moderate positive correlation between academic performance and emotional intelligence among all cohorts of MBBS students, with a strong correlation in final year MBBS students (r=0.747). A study conducted in Spain among students reported a positive association of EI with academic performance, as well as resilience, positive emotions, and self-determined motivation, and this association was statistically significant and was confirmed through structural equation modelling. (χ^2/df = 3.24, IFI = 0.95, CFI = 0.95, RMSEA = 0.062, SRMR = 0.057). These results augment the significance of the results of our study [16]. Ranasinghe et al. performed binary logistic regression to find the predictors of academic performance, including gender, choice of study medicine, and emotional intelligence. Among these factors, female gender (OR=1.98) and satisfaction with the choice to study medicine (OR=3.69) were significantly associated with passing the exam, while EI was not a strong and significant predictor [17]. Taken together, generally EI is better correlated with academic performance, but different confounding factors, mode of teaching and learning (online vs, on site vs blended), and educational stages, particularly in medical training, may cause variation in the association of EI and academic performance. Our study demonstrated a moderately positive correlation between EI and AP among both genders exposed to blended teaching and learning (r=0.587) for males and (r = 0.531) for females. But there was no significant difference between the two groups regarding the impact of EI on academic performance. Consistent results were reported in previous literature in a study that male medical students have a statistically significant but slight association with self-esteem, while emotional intelligence exerted a stronger and more consistent effect across both genders. Considerably, no evidence suggested that the positive association between emotional intelligence and GPA was limited to one gender, indicating that emotional intelligence works as a universal facilitator for academic performance without gender discrimination among university students [18]. Contrarily, A study conducted in Lebanon on online teaching and learning found a significant gender difference, with women showing higher self-perceived performance, academic engagement, and emotionality factor in trait EI, while men scored higher in self-control [19]. In another study conducted in a traditional class learning environment reported significant gender differences were reported between different domains of Emotional intelligence among both genders ($p<0.05$), with females scoring higher in emotional attention and academic self-concept. Additionally, most of the students fell in the remarkable category of academic performance; females showed higher academic performance overall, with greater representation in the remarkable category (66.9%) as compared to males (27.1%) [20]. In another study on blended learning environments, although cognitive engagement mediated the positive relationship between emotional intelligence and study habits, gender also exerted a modest but significant influence (B=0.117, $p<0.05$), suggesting that while EI enhances academic performance across students in blended learning, female and male students may differ slightly in the way they engage with study practices [21]. These observed discrepancies may be attributed to differences in sample characteristics and use of domain specific vs global measures of emotional intelligence, as well as learning environment. Data analysis of our study demonstrated that students aged 17-21 years obtained significantly higher academic scores compared to those aged 22–25 years, while there was an insignificant difference between the mean emotional intelligence of both age groups. Correlational analysis revealed there was a moderate positive correlation between emotional intelligence and academic performance of MBBS students exposed to a blended teaching and learning system in both groups, with r=0.480 for the younger group and r=0.687 for the older group, both statistically significant. In a study on online learning during COVID-19, Age and gender showed minimal association with both emotional competence and academic outcomes, while emotional competence was moderately related to online learning readiness, but academic performance remains the strongest predictor of academic achievement during COVID-19 [22]. Contrasting results were reported in a study conducted in private universities of Bangladesh that age was a potential factor influencing the development of emotional intelligence. Regression analysis confirmed that age didn't significantly predict academic performance (B=0.012, p=0.438), whereas emotional intelligence showed a strong and positive effect [23]. In another study, emotional intelligence exhibited age-related changes during adolescence, with overall EI increasing modestly with age, particularly in girls (B=0.82, β=0.13, $p<0.001$). Gender-specific analysis revealed that girls show improvement in emotional management over time, while boys experienced a slight decline in emotional perception [24]. A blended learning environment can effectively enhance emotional intelligence and academic performance, particularly during early clinical years. Integrating structured EI development within blended curricula can prepare students for adaptive and resilient learning and professional functioning in the face of unforeseen challenges, including future pandemics. Tailoring interventions to different students' subgroups may optimize students' engagement and academic outcomes.

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This single-institution, cross-sectional study limits generalizability and causal inference. Self-reported EI may be influenced by bias, and contextual factors like prior training exposure to EI and the mental support system for students were not studied. The study didn't analyze emotional intelligence separately for synchronous and asynchronous components of blended learning. Examining EI in different contexts could provide different insights and represent a potential direction for research.

CONCLUSIONS

Emotional intelligence was positively correlated with academic performance across all MBBS years, gender, age group, and achievement level in a blended learning environment, peaking in early clinical years. High-achieving students consistently demonstrated high emotional intelligence, highlighting its role in academic success. These findings suggest that integrating structured EI development in medical curricula as a longitudinal module can enhance resilient and adaptive learning, thus preparing the students for unforeseen challenges, especially a pandemic. Tailored intervention may further optimize student engagement and academic outcomes.

Authors' Contribution

Conceptualization: SY
Methodology: SY, NK
Formal analysis: MS, MAR
Writing and Drafting: SY, MS, NK, MAR
Review and Editing: SY, MS, NK, MAR

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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