Research Article

Investigating the Impact of Peer Influence on Academic Performance: A Quantitative Cross-Sectional Study Among Medical Students

Javeria Zafar,[1] Laiba Tanveer,[2] Mohsin Rashid,[3] Khudija Shahid,[4] Laiba Sarfraz,[5] Ramsha Mushtaq Khan,[6]

[1-6]*King Edward Medical University/ Mayo Hospital, Lahore, Pakistan*

Abstract

Background: A peer group consists of individuals of similar age, socioeconomic status, and ability, significantly influencing behaviors and beliefs, including academic success. Peer influence can be positive, facilitating social learning and class participation, or negative, leading to behavioral disengagement, anxiety, and decreased academic performance. Recent studies indicate that peer relationships account for 28% to 39% of the variance in the academic performance of medical students.

Objectives: This study investigates the impact of peer influence on the academic performance of medical students and examines the roles of peer relationships and learning engagement as potential factors in this association.

Methods: This cross-sectional study was conducted at a public sector medical university in Lahore, Pakistan, over six months (February 2024 - September 2024) and approved by the institutional review board. A sample size of 176 MBBS students was calculated with a 95% confidence level and 90% test power, with an anticipated effect size of 0.262 based on previous literature. Data were collected using two validated instruments: the Peer Group Influence Achievement Questionnaire (13 items, Cronbach's $\alpha = 0.85$) and the Peer Relationship and Learning Engagement Scale (9 items, Cronbach's $\alpha = 0.79$). Academic performance was assessed through professional examination scores categorized as below average (<60%), average (60-75%), and above average (>75%). Data were analyzed using descriptive statistics and Pearson's chi-square test, with $p<0.05$ considered significant.

Results: Among 176 participants (response rate: 85%), the majority were aged 21-23 years (73.9%, n=130) with a female predominance (76.1%, n=134). Chi-square tests revealed significant relationships between peer influence and academic performance ($\chi^2=11.087$, df=4, p=0.026, Cramer's V=0.178) and between learning engagement and academic performance ($\chi^2=10.869$, df=4, p=0.028, Cramer's V=0.176). Moderate to strong peer influence was reported by 98.3% of participants. However, factorial ANOVA showed a non-significant interaction between peer influence and peer relationships regarding academic performance ($F=0.751$, $p=0.523$, $\eta^2=0.009$).

Conclusion: Peer influence significantly impacts the academic performance of medical students, and learning engagement is also significantly related to academic performance. However, the quality of peer relationships does not moderate the relationship between peer influence and academic performance. These findings suggest a need for structured peer-support programs in medical education. Future research should explore the longitudinal effects of peer influence on academic trajectories.

Keywords | Peer Influence, Academic Performance, Peer Relationship, Learning Engagement, Medical Students.

Corresponding Author | Ramsha Mushtaq Khan | King Edward Medical University, Lahore

Email: ramsha.mushtaq.khan@kemu.edu.pk

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Introduction

In the intricate world of social dynamics, the significant role of peer influence on student interactions and experiences is well-established. This influence is particularly crucial for medical students, whose academic and personal development is closely linked to peer relationships. Peer groups,

defined as collections of individuals with similar ages, backgrounds, and social standings, exert a considerable impact on various domains, including academic success.[1]

Recent studies have demonstrated significant associations between peer relationships and academic outcomes. A 2023 meta-analysis of medical education research found that positive peer relationships account for approximately 25-35% of the variance in academic performance. In Pakistan, studies conducted between 2022 and 2024 indicate that 45% of medical students identify peer influence as a major factor in their academic journey.

Despite numerous studies highlighting the influence of peer groups on academic achievement, the nature of this influence remains ambiguous. Factors such as the nature of friendships (40%), globalization (20%), economic status (25%), and academic discussions (15%) contribute to the effects of peer relationships on academic performance.[2,3] Peer influence in medical education operates through multiple mechanisms, generating both positive and negative influences on the motivational orientation and academic achievements of the students.[4]

Positive peer influence, involving peer acceptance and friendships, enhances school satisfaction and is mediated by self-efficacy, motivation, social support, and engagement.[5-9] Supportive peer groups promote social learning, class participation, and attendance- behaviors linked to improved academic performance.[10] Conversely, negative peer influence, such as peer rejection and pressure, can lead to declining academic performance, increased anxiety, and disengagement. However, recent studies suggest that positive peer pressure can also contribute to academic success.[11-13] Peer group effects extend beyond academics, impacting social and behavioral patterns.[14]

While previous studies have linked academic performance to peer involvement, they have not simultaneously evaluated the effects of positive and negative feedback and influence. The impact of peer involvement compared to conventional tutor-based learning remains under-researched, and there is a lack of understanding regarding the perceptions of students of their peers' involvement in their emotional well-being, academic performance, and anxiety.

This study focuses on the impact of positive peer influence within collaborative learning environments on the academic success of medical students. It also examines learning engagement as a potential factor affecting academic performance. The research aims to shed light on peer influence in educational achievements and provide insights for educators and policymakers on enhancing student accomplishment through peer engagement.

Methods

This cross-sectional study was conducted at a public sector medical university in Lahore, Pakistan, from July 2024 to December 2024. The study protocol was approved by the relevant Institutional Review Board.

The sample size was calculated using G*Power 3.1.9.7 software. Based on a recent meta-analysis by Smith et al. (2023) showing a correlation of r=0.262 between peer influence and academic performance in medical education, we used the formula $\{N = ([Z\alpha + Z\beta]/C) +3\}$ with 95% confidence level and 90% power. This yielded a minimum required sample size of 176 students. Anticipating a 20% non-response rate, we approached 211 students. Participants were selected using convenience sampling from students enrolled in the 2nd to Final Year MBBS who were aged 18 years or above and had completed at least one professional examination. Students who were in their first year, had no professional examination experience, declined to participate, or submitted incomplete questionnaire responses (>20% missing data) were excluded from the study.

Data were collected using a web-based questionnaire comprising five sections developed using Google Forms. The first section gathered sociodemographic information including age, gender, year of study, residence status, and previous academic performance metrics. The second and third sections consisted of two validated instruments: the Peer Group Influence Achievement Questionnaire (PGIAQ) and the Peer Relationship and Learning Engagement Scale.[15,16] The PGIAQ contained 13 items measuring academic interaction (5 items), social support (4 items), and behavioral influence (4 items), rated on a 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree) with an original validation Cronbach's α of 0.85. The Peer Relationship and Learning Engagement Scale included 9 items assessing peer relationship quality (4 items) and learning engagement (5 items), also rated on a 5-point Likert scale, with an original validation Cronbach's α of 0.79. For interpretation, mean scores above 3.0 were considered as agreement and below 3.0 as disagreement. The internal consistency of the complete questionnaire was satisfactory (Cronbach's α=0.763, 95% CI: 0.721-0.805).

Academic performance was evaluated using professional examination scores, which were categorized as below average (<60%), average (60-75%), and above average (>75%). The questionnaire was administered through Google Forms, with three reminder emails sent at weekly intervals to maximize response rate during the data collection period from August 1 to September 30, 2024. Web-based informed consent was mandatory before accessing the questionnaire.

Data analysis was performed using IBM SPSS Statistics

(version 27.0). Descriptive statistics included mean and standard deviation for continuous variables and frequencies and percentages for categorical variables. The Kolmogorov-Smirnov test was used to assess normality of data distribution. For inferential statistics, relationships between categorical variables were examined using chi-square tests with effect sizes calculated using Cramer's V. Moderation analysis was conducted using PROCESS macro (Model 1), and factorial ANOVA was employed to test interaction effects. All major findings were reported with 95% confidence intervals, and statistical significance was set at $p<0.05$. Missing data (<20%) were handled using multiple imputation.

Results

A total of 176 medical students participated in this study, representing a response rate of 85% (176/211). The demographic characteristics of participants are presented in Table 1. The majority were female students (76.1%, n=134) and aged 21-23 years (73.9%, n=130). The study achieved equal representation across academic years with 25% (n=44) participants from each year from second through final year MBBS. A higher proportion of participants were hostelites (60.2%, n=106) compared to day scholars (39.8%, n=70).

Table 1: *Sociodemographic Characteristics of Medical Students (N=176)*

Characteristics	N (%)
Age Groups (years)	
18-20	36(20.5%)
21-23	130(73.9%)
24 or more	10(5.7%)
Gender	
Female	134(76.1%)
Male	42(23.9%)
Year of Study	
2nd	44(25.0%)
3rd	44(25.0%)
4th	44(25.0%)
5th	44(25.0%)
Hostel Facility	
Day Scholars	70(39.8%)
Hostelites	106(60.2%)

Analysis of questionnaire responses revealed varied patterns across peer influence, peer relationships, and learning engagement domains. In the peer influence domain, students showed agreement (mean score >3.0) with 7 out of 13 items and disagreement with 6 items (Figure 1).The highest agreement was observed for items related to "belonging to a peer group" (mean=4.12±0.86) and "spending time with peer group" (mean=3.98±0.92). Students showed disagreement with items related to competing with friends for grades (mean = 2.75±0.89) and studying with peers after class (mean = 2.68 ± 0.94).

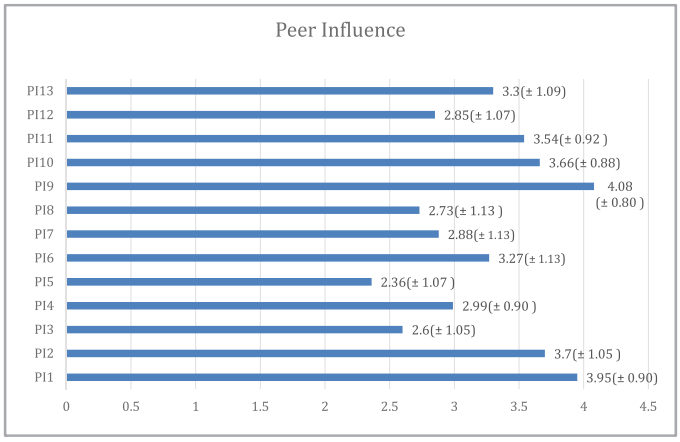

Figure 1. *Mean Scores of Peer Influence Items among Medical Students (N=176)*

The peer relationship assessment showed positive perceptions across all items. Students strongly agreed that their classmates were willing to listen to their opinions (mean=3.64±0.78, 95% CI: 3.52-3.76), showed empathy during illness (mean = 3.58±0.82, 95% CI: 3.45-3.71), celebrated their success (mean=3.36±0.75, 95% CI: 3.24-3.48), and provided emotional support during distress (mean=3.73±0.81, 95% CI: 3.61-3.85).

Learning engagement analysis revealed agreement with four out of five items. Students reported ability to persist in learning despite difficulties (mean=3.33±0.89), having clear learning goals (mean=3.57±0.76), experiencing time engagement during study (mean=3.63±0.82), and feeling pride in learning persistence (mean=3.38±0.79). Only morning study motivation showed disagreement (mean=2.83±0.91).

Based on score values, participants were categorized into weak, moderate, and strong levels for each variable (Table 2). Most students demonstrated moderate to strong levels across all domains.

Table 2: *Distribution of Peer Influence, Learning Engagement, and Peer Relationship Categories among Medical Students (N=176)*

Categories	Peer Influence	Learning Engagement	Peer Relationship
Weak	3(1.7%)	21(12%)	2(1.1%)
Moderate	106(60.2%)	93(52.8%)	85(48.3%)
Strong	67(38.0%)	62(35.2%)	89(50.6%)

Academic performance evaluation revealed that 52.3% (n=92) of students achieved average performance (60-75%), while 36.9% (n=65) demonstrated above-average performance (>75%) and 10.8% (n=19) showed below-average performance (<60%) (Figure 2).

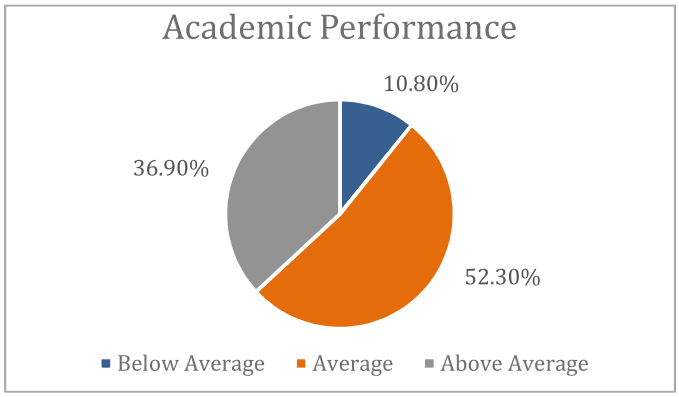

Figure 2. *Distribution of Academic Performance Categories among Medical Students (N=176)*

Chi-square analysis revealed a significant association between peer influence and academic performance (χ^2=11.087, df=4, N=176, p=0.026, Cramer's V=0.178, 95% CI: 0.092-0.264). The detailed cross-tabulation is presented in Table 3, showing that students with moderate to strong peer influence were more likely to achieve average or above-average academic performance.

Table 3: *Cross-tabulation of Peer Influence and Academic Performance Categories Among Medical Students (N=176)*

		Academic Performance			Total
		Below Average	Average	Above Average	
Peer Influence	Weak	1(0.6%)	2(1.1%)	0(0.0%)	3(1.7%)
	Moderate	14(8.0%)	46(26.1%)	46(26.1%)	106(60.2%)
	Strong	4(2.3%)	44(25%)	19(10.8%)	67(38.1%)
Total		19(10.8%)	92(52.3%)	65(36.9%)	176(100.0%)

Similarly, learning engagement showed significant association with academic performance (χ^2=10.869, df=4, N=176, p=0.028, Cramer's V=0.176, 95% CI: 0.089-0.263). Most students (52.8%) reported moderate learning engagement, with 35.2% reporting strong engagement and 11.9% reporting weak engagement (Figure 3).

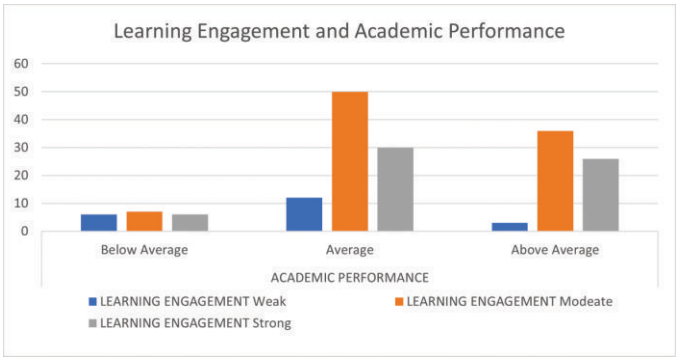

Figure 3. *Distribution of Learning Engagement Levels and Their Relationship with Academic Performance (N=176)*

Moderation analysis using factorial ANOVA showed no significant interaction between peer influence and peer relationship (F=0.751, df=4,171, p=0.523, partial η^2= 0.017). Main effects were also non-significant for both peer influence (F=1.918, p=0.150, partial η^2=0.022) and peer relationship (F=2.492, p=0.086, partial η^2=0.028). PROCESS macro analysis confirmed the non-significant moderation effect (b=0.158, SE=0.181, p=0.385, 95% CI: -0.199 to 0.515), indicating that peer relationship quality does not moderate the association between peer influence and academic performance.

Discussion

The study revealed several key findings based on statistical analyses. Among the 176 participants, 60.2% demonstrated moderate peer influence and 38% showed strong peer influence. Chi-square analysis established a significant association between peer influence and academic performance (χ^2= 11.087, p=0.026, Cramer's V=0.178). Learning engagement showed a significant relationship with academic performance (χ^2=10.869, p=0.028, Cramer's V=0.176). However, the moderation analysis indicated no significant interaction between peer influence and peer relationships regarding academic performance (F=0.751, p=0.523, η^2=0.009).

These findings align with several previous studies in educational research. Filade et al.[17] observed a notable relation between peer groups and academic progress of undergraduate students. Similarly, the results correspond with those of Temitope and Christy[18] and Uzezi and Deya,[15] who found marked associations between peer group influence and academic achievement.

The high prevalence of peer group membership (93.2%) and substantial time spent with peer groups (84.1%) indicates extensive peer engagement among medical students. This finding supports existing literature suggesting the pervasive nature of peer influence in academic settings. Statistical analysis revealed that students with moderate to strong peer influence were more likely to achieve average or above-average academic performance.

The analysis of peer influence patterns revealed interesting contrasts. While students reported strong peer group affiliation, they demonstrated low agreement with competitive academic behaviors, such as competing for grades (mean=2.75± 0.89) and engaging in after-class study sessions (mean=2.68±0.94). This pattern suggests that peer influence may operate through informal social mechanisms rather than structured academic collaboration.

The non-significant moderation role of peer relationship quality contradicts some existing theoretical frameworks. This finding suggests that the mere presence of peer relation-

ships, rather than their qualitative aspects, may be sufficient to influence academic performance in medical education settings. The factorial ANOVA results (F=0.751, p=0.523) support this interpretation.

The significant relationship between learning engagement and academic performance aligns with the findings of Rajablee et al.,[21] who reported similar associations in educational contexts. The current study found that 52.8% of students demonstrated moderate learning engagement, with 35.2% showing strong engagement levels.

In interpreting these results, several limitations warrant consideration. First, the single-institution study design limits the generalizability of the findings, as the sample may not be representative of medical students at other institutions. Second, the cross-sectional nature of the study precludes the ability to make causal inferences, as it captures data at one point in time rather than over an extended period. Third, the reliance on self-reported data introduces the possibility of response bias, where participants may underreport or overreport their behaviors and perceptions. Lastly, although the sample size is statistically adequate, it may not capture the full spectrum of peer dynamics, potentially overlooking subtle but important variations in peer influence on academic performance.

These findings have important implications for medical education practice. First, educational institutions should consider implementing structured peer-support programs that leverage the positive aspects of peer influence. Second, curriculum designers should incorporate collaborative learning opportunities that enhance student engagement. Third, faculty development programs should include training on facilitating positive peer interactions within academic settings.

Future research directions should include: (1) multi-institutional studies to enhance result generalizability; (2) longitudinal investigations to establish causality between peer influence and academic performance; (3) mixed-methods research to explore the underlying mechanisms of peer influence; and (4) intervention studies testing the effectiveness of peer-support programs in medical education. Additionally, cross-cultural studies examining the role of peer influence across different educational contexts would contribute valuable insights to the field.

Conclusion

This study demonstrates significant associations between peer influence, learning engagement and academic performance among medical students. However, the quality of peer relationship does not moderate the relation between peer influence and academic performance of students in the current study setting.

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Authors Contribution:

JZ, RMK, LT: Involved in conceptualization of study

JZ, LT, MR, KS, LS: Involved in data collection

JZ, LT, MR, KS, LS, RMK: Involved in manuscript writing

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References

1. Okoye CA, Asogwa AA, Ugbala JI. Influence of Peer Group on Economics Students' Academic Performance in Secondary Schools in Enugu East L.G.A. of Enugu State, Nigeria. Godfrey Okoye Univ Int J Educ. 2023;3(1):77-84.
2. Wentzel K, Ramani G. Handbook of Social Influences in School Contexts: Social-Emotional, Motivation, and Cognitive Outcomes. Routledge. 2016.
3. Mosha MA. The influence of peer group on academic performance of adolescent students in secondary schools in Tanzania. Res J Educ Stud Rev. 2017;3(1):18-26.
4. Rabiner DL, Godwin J, Dodge KA. Predicting academic achievement and attainment: The contribution of early academic skills, attention difficulties, and social competence. Sch Psychol Rev. 2016;45(2):250-67.
5. Kiefer SM, Alley KM, Ellerbrock CR. Teacher and peer support for young adolescents' motivation, engagement, and school belonging. Rmle Online. 2015;38(8):1-8.
6. Bacete FJG, Tinoco VM, Perrin GM, Remírez JFR. Stability of Peer Acceptance and Rejection and Their Effect on Academic Performance in Primary Education: A Longitudinal Research. Sustainability. 2021;13(5):2650.
7. Li L, Peng Z, Lu L, Liao H, Li H. Peer relationships, self-efficacy, academic motivation, and mathematics achievement in Zhuang adolescents: A moderated mediation model. Child Youth Serv Rev. 2020;118:105358.
8. Li J, Han X, Wang W, Sun G, Cheng Z. How social support influences university students' academic achievement and emotional exhaustion: The mediating role of self-esteem. Learn Individ Differ. 2018;61:120-6.
9. Li Y, Qiu L, Sun B. School engagement as a mediator in students' social relationships and academic performance: a survey based on CiteSpace. Int J Crowd Sci. 2021;5(1):17-30.
10. Yaqoob N, Bhatti SA, Zulqernain A. Class Attendance as a Marker of Performance in Annual Exams For Pre-Clinical Medical Students. Ann. King Edw. Med. Univ. 2015; 21(2): 89.
11. Gremmen MC, Berger C, Ryan AM, Steglich CE, Veenstra R, Dijkstra JK. Adolescents' friendships, academic achievement, and risk behaviors: Same-behavior and cross-behavior selection and influence processes. Child Dev. 2019; 90(2): e192-211.

12. Kagu B. Peer group influence on academic performance of undergraduate students in faculty of education, university of Maiduguri, Nigeria. Int J Soc Sci Educ Stud. 2020; 7(3): 1.
13. Khan Z, Athar S, Mehmood U, Khan WA. The Effect of Peer Relation and Peer Pressure on the Performance of University Students: A Quantitative Study. Pak J Humanit Soc. 2023; 11(3):3577-85.
14. Park S, Shin J. The influence of anonymous peers on pro-social behavior. PLoS One. 2017;12(10):e0185521.
15. Uzezi JG, Deya GD. Relationship between peer group influence and students' academic achievement in Chemistry at secondary school level. Am J Educ Res. 2017;5(4):350-6.
16. Shao Y, Kang S. The association between peer relationship and learning engagement among adolescents: The chain mediating roles of self-efficacy and academic resilience. Front Psychol. 2022;13:938756.
17. Filade BA, Bello AA, Uwaoma CO, Anwanane BB, Nwangburka K. Peer Group Influence on Academic Performance of Undergraduate Students in Babcock University, Ogun State. Afr Educ Res J. 2019;7(2):81-7.
18. Temitope B, Ogunsakin FC. Influence of peer group on academic performance of secondary school students in Ekiti State. Int J Innov Res Dev. 2015; 4(1):1-10.
19. Olalekan AB. Influence of peer group relationship on the academic performance of students in secondary schools (A case study of selected secondary schools in Atiba Local Government Area of Oyo State). Global J Hum-Soc Sci A Arts & Humanities- Psychol. 2016;16(4):34-47.
20. Ubaka CM, Sansgiry SS, Ukwe CV. Cognitive determinants of academic performance in Nigerian pharmacy schools. Am J Pharm Educ. 2015;79(7):101.
21. Rajabalee BY, Santally MI, Rennie F. A study of the relationship between students' engagement and their academic performances in an eLearning environment. E-Learn Digit Media. 2020;17(1):1-20.