Research Article

Impact of Socioeconomic Determinants on Academic Performance of Medical Students in Lahore, Pakistan: A Cross-Sectional Study

Hurain Naeem,[1] Iesha Usman,[2] Iqra Batool,[3] Mohammad Anas Zafar,[4] Javeria Shehzadi,[5] Ramsha Mushtaq Khan,[6]

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

Abstract

Background: Academic performance among students is recognized to be significantly influenced by socioeconomic status (SES) with factors such as family income, parental education and home environment profoundly shaping students' academic outcomes. Limited studies have evaluated the role of socioeconomic factors on medical student performance in Pakistan.

Objective: This study aims to investigate how family income, parental education, and home environment influence the academic performance of medical students in Lahore, Pakistan

Methods: This cross-sectional study was conducted over six months across public medical institutions in Lahore, Pakistan. Using non-probability convenience sampling, 272 medical students participated in an online survey. The sample size was calculated using Cochran's formula to ensure adequate representation and data were analyzed using SPSS version 27.0, applying descriptive statistics, chi-square tests and binary logistic regression to assess significant relationships.

Results: Among the 272 participants, 54.4% demonstrated high academic performance (above 70%), 33.5% had average performance (60-70%), and 12.1% exhibited low performance (below 60%). Statistical significance was found between family income and academic performance (p < 0.05), with high-income students performing better academically.

Conclusion: Findings from this cross-sectional study indicate that socioeconomic factors particularly family income and parental education, significantly impact the academic performance of medical students. Addressing SES disparities through targeted educational policies could support academic equity.

Keywords | Socioeconomic Factors, Academic Achievement, Cross-Sectional Study, Parental Education, Medical Students.

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

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

Introduction

The socioeconomic status (SES) is a widely recognized determinant of educational outcomes, influencing not only access to resources but also the academic trajectory of students.[1] SES is typically assessed using indicators such as family income, parental education level, and parental involvement, each of which has a documented impact on students' academic achievements. However, few studies have explored SES impacts on the academic performance of medical students, who face unique financial and academic demands. Numerous studies demonstrate that students from low-income backgrounds are less likely to pursue higher education degrees compared to those from wealthier families. For instance, a study conducted on secondary school students in Pakistan highlighted the influence of parental financial stability on academic success.[2] Experts argue that students' educational achievements are intrinsically linked to their socioeconomic situation, with unmet basic needs among low-SES students often correlating with lower academic performance.[3]

Low academic achievement is frequently associated with limited resources, maladjustment and restricted access to educational opportunities, affecting future productivity and career satisfaction of the students.[4] Children from low-income

families generally score lower on standardized tests, achieve lower educational attainment, and face significant academic challenges.[5,6] The Coleman Report (1966) estimated that approximately 10% of variance in student performance was attributable to SES,[7] a figure supported by subsequent studies that connect parental education, occupation, and income with children's academic success.[8] This "achievement gap" between high- and low-SES students is a persistent trend globally, with those from higher SES backgrounds typically performing better across academic metrics than their lower-SES peers.[9]

The home environment also plays a critical role in academic success of the students, encompassing both, the provision of basic necessities and the overall psychological climate.[10] Research highlights that children with more educated parents, particularly mothers, perform better academically. Parental education is instrumental, with studies suggesting that a mother's educational level influences the child's academic achievements due to close familial bonds, while the father's education also supports family stability and academic ambition. Parents' abilities to develop realistic expectations for their children creates an environment conducive to learning and academic success.[11] A study conducted at Sargodha University in Pakistan on the GPAs of 250 master's students emphasized the significant impact of parental education on academic outcomes.[3]

This study addresses a crucial gap in educational research by examining the influence of SES on the academic performance of medical students, an area that demands targeted insight due to the unique challenges these students face. The primary objective is to explore the relationship between three key SES factors- family income, parental education, and home environment- and academic success among medical students. Family income impacts access to educational resources, nutrition, and learning opportunities, while parental education shapes academic expectations and home learning environments. The home environment itself- including access to technology, study spaces, and family support- also plays a significant role in student engagement and achievement. Given the financial demands and academic rigor of medical education, understanding the socioeconomic determinants of academic success can guide educators and policymakers. By highlighting the critical role of SES in shaping academic outcomes, this study aims to inform strategies that support academic achievement across socioeconomic divides, ultimately promoting equity and excellence in medical education.

Material And Methods

This cross-sectional study was conducted at public medical colleges and universities in Lahore, Pakistan, over a six-months period, following ethical approval from the relevant Institutional Review Boards (IRBs). The sample size, calculated using Cochran's formula with a 50% assumed proportion, 95% confidence level, and 5% margin of error, was determined to be 272 medical students, with recruitment through non-probability convenience sampling. Eligible participants were medical students aged 18 or above, enrolled in public medical colleges in Punjab, proficient in English, with internet access, and able to provide detailed information about parental education and socioeconomic status. Exclusions included students with diagnosed mental health conditions or academic disruptions exceeding six months. Data were collected via an online questionnaire with sections on academic performance, socioeconomic indicators, and parenting style, distributed through email and social media. Quality control measures ensured data integrity, confidentiality, and anonymity. Data analysis, performed using SPSS version 27.0, included descriptive statistics for demographic characteristics and primary outcomes, Chi-square test was applied for bivariate associations, and binary logistic regression for multivariate analysis, with significance set at $p \leq 0.05$.

Results

Among the 272 participants, females constituted the majority (n=199, 73.2%), followed by males (n=70, 25.7%). The predominant age group was 20-22 years (n=163, 59.9%), with the majority being fourth-year medical students (n=192, 70.6%). Most participants were unmarried (n=255, 93.8%).

The majority of students (n=259, 95.2%) had passed their previous academic examinations, with more than half (n=148,

Table 1: *Demographic and Academic Characteristics of Medical Students (N=272)*

Student's Data	Percentage (%)
Gender	
Male	25.7
Female	73.2
Others	1.1
Age of students	
Less than 18 years	3.3
18 to 20 years	15.1
20 to 22 years	59.9
22 to 24 years	21.7
Year of study	
1st year	7.7
2nd year	7
3rd year	9.9
4th year	70.6
5th year	1.5
Others	3.3
Marital Status of students	
Married	6.3
Un-married	93.8

Previous Academic Result	
Pass	95.2
Fail	.7
Percentage in previous academic result	
Less than 60%	12.1
60 to 70 %	33.5
More than 70 %	54.4
No of distinctions I previous academic result	
None	62.1
1	16.9
2	11.8
3	2.6
More than 3	6.6
Average number of hours spend studying per week	
less than 1	8.5
1 to 2	8.8
2 to 3	13.6
3 to 4	17.3
More than 4	51.8
Primary study resources	
Books	27.6
Internet	5.9
Both	66.5
Current level of interest In medicine	
Very high	8.8
High	40.8
Medium	46.0
Weak	4.4

54.4%) achieving scores above 70%. Regarding distinctions, 62.1% (n=169) reported no distinctions, while 16.9% (n=46) had one distinction. Analysis of the study habits revealed that 51.8% (n=141) of students spent more than 4 hours per week studying, with preferred study resources being a combi-nation of books and the internet (66.5%, n=181), followed by books alone (27.6%, n=75). Interest in medicine was reported as high by 40.8% (n=111) of participants, while 46.0% (n=125) indicated medium interest.
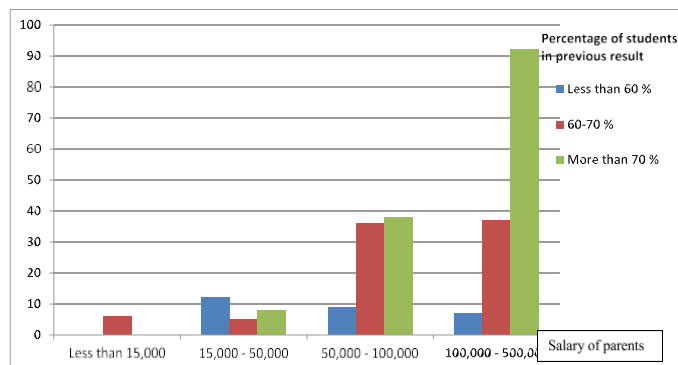
Academic performance distribution among students was

Table 2: *Association between Socioeconomic Factors and Academic Performance*

Variables	Academic results			P value
	Less than 60% n=34 (12.1%)	60 to 70% n = 90 (33.4%)	More than70% n = 148 (54.5%)	
1. Family Income				
Less than 15,000	0	6	0	
15,000 to 50,000	12	5	8	
50,000 to 1 lac	9	36	38	0.0001
1 lac to 5 lacs	7	37	92	
More than 5 lacs	5	7	10	
2. Job of Father				
Engineer	3	13	11	
Administrative	1	5	13	
Own business	25	27	33	
Educational	0	12	15	
Physician	1	3	16	
Government job (less than 17th grade)	3	9	17	0.0001
Shopkeeper	3	3	0	
Farmer	3	0	0	
Retired	1	7	9	
Others	3	12	34	
3. Job Of Mother				
Housewife	31	77	96	
Educational	1	8	39	
Administrative	0	1	2	0.006
Physician	0	3	5	
Others	1	2	6	
4. Educational Level Of Father				
Read and write	6	3	0	
Primary school	8	12	0	
Intermediate school	11	17	7	0.0001
Secondary school	3	12	5	
University	1	27	83	
Higher degree	2	21	54	
5. Educational Level Of Mother				
Read and write	10	8	0	
Primary school	8	12	0	
Intermediate school	11	17	2	0.0001
Secondary school	3	21	26	
University	1	27	83	
Higher degree	0	6	37	
6. Is There A Physician In The Family?				
Yes	4	24	62	
No	29	67	83	0.02
Maybe	0	0	3	
7. The Prescence Of Physician In Family Help Academically				
Yes	18	30	71	
No	10	23	20	0.05
Maybe	5	38	57	
8. Place Of Residence				
Day scholar	12	46	77	
Hostellites	17	45	67	0.08
Other	4	0	4	
9. Do You Use Public Transportation				
Yes	19	53	79	
No	9	15	45	0.118
Sometimes	5	23	24	
10. Type Of Transportation Used Effect You Academically				
Yes	6	27	53	
No	23	41	55	0.018
Maybe	4	23	40	

categorized as follows: low (<60%, n=34, 12.1%), average (60-70%, n=90, 33.4%), and good (>70%, n=148, 54.5%). A significant association was found between family income and academic performance (p=0.0001), with 50% of students from families earning between 1-5 lacs demonstrating good academic performance, while those from families earning below 50,000 (11.4%) showed average to low performance. Parental education levels also showed a significant correlation with academic performance (p=0.0001), with 44% of students whose fathers had university degrees and 41% whose mothers had university degrees demonstrating superior performance (>70% scores). Regarding maternal occupation, 75% of students had housewife mothers, among whom 35% achieved scores above 70% and 28% scored between 60-70% (p=0.0001).

Additional factors influencing academic performance included the presence of a physician in the family, which showed a significant association (p=0.02), and the perception that having a physician in the family helps academically, which was marginally significant (p=0.05). Living arrangements (hostelite vs. day scholar) showed no significant association (p=0.08), while transportation type significantly affected academic performance (p=0.018).

Figure 1: *Distribution of Academic Performance by Family Income Categories*
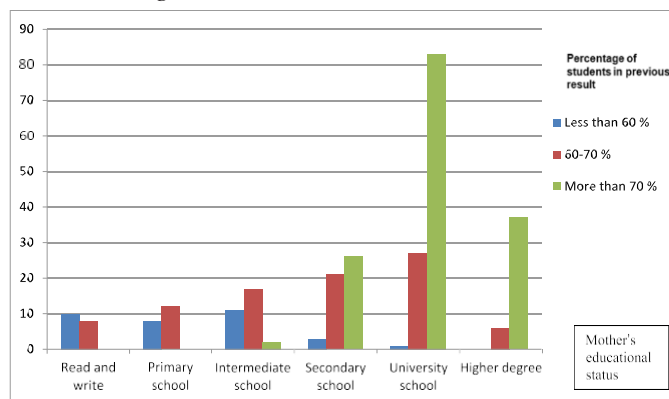
Figure 2: *Correlation between Parental Education and Student Academic Achievement*

Discussion

The academic journey of students is a complex interplay of various factors, including socioeconomic status, mental health and parental education. As previous studies have showed the profound effect of socioeconomic status on the student's academic performance, it's critical to delve deeper into how all these factors intersect and heavily influence student outcomes. The goal behind shedding light on these critical aspects in this research seeks to not only enhance our understanding of the challenges faced by students but also pave the way for targeted interventions and policies that promote educational equity and support student wellbeing. Ultimately, this can lead to improved academic success for all students considering all complex factors associated with their academic journey.

This study reveals a significant relationship between academic performance and socioeconomic status. More well-off students typically do well academically, with a sizable majority receiving high marks. In addition, parents' educational attainment—especially that of fathers—has a significant influence on students' academic performance. According to the research, children who have fathers with college degrees are more likely to perform academically. It's interesting to note that academic achievement is not always negatively impacted by a homemaker mother. As a matter of fact, a sizable portion of students whose mothers are homemakers succeed academically. These revelations underscore the necessity of addressing socioeconomic disparities and providing support to students from a variety of backgrounds, which has significant ramifications for educators and policymakers.

51.4% students (n=442) with high socioeconomic status were found to be high achievers and 65% (n=306) students with low socioeconomic status were found to be low achievers. 47.4% students (n=442) were having high academic achievements whose parents were having higher educational degrees and 62.5% (n=306) students were having low academic achievements whose parents were having lower educational degrees.

Positive relationship was found between income and student performance (test score) in Islamia University Sub-Campus Rahim Yar Khan. This implies that the parents having high income cause of high test score(12).A study conducted among biology students in secondary school in Ughelli North Local Govern- ment Area of Delta State showed that performance of students from high SES was better than students from middle and low SES. The mean score of students from high SES was 63.5, SD 13.01 while students from low SES is 60.5, SD 16.06. This implies that there is difference between students belon- ging to high socio-economic backgrounds compared to low socioeconomic background. It was suggested that socioeco- nomic policies be implemented to provide low-SES parents'

children with an equal opportunity to advance the expense of their education and that grants be provided to underprivileged pupils to allow them to pursue their academic goals.[14] According to a research the relationship between student's academic performance and parental income is complex. Higher parental income leads to availing of more and desired opportunities.[15] There was consistent tendency for parental SES and occupation with medical students' attainment in our study and is in line with study conducted among students conducted in Tanazia.[16] The findings of our study shows that income has significant impact on the achievement and it is supported by findings of study on students from KPK's district rural areas[17] and Sudanese universities.[18] According to our study, students having parents with university degree have good academic performance and parental education has marked affect on children grades. It is complimented by study at International Islamic University Islamabad[17] but contrary to Sudanese universities study which shows it's

influence but not statistically significant.[18] A study of teen-

age students in Peshawar, Pakistan revealed that high socio-economic position, a father's education up to and including an undergraduate degree, a father's high level of caring, and a father's detached parenting style are all important predictors of excellent grades.[5] The findings that high socioeconomic status and father's education level till undergrad or above contribute to good academic performance are in lines with our study. According to the study conducted among Undergraduate Medical Students in Taif University, Saudia Arabia, Female students had higher significant GPA than male students. Students who reported longer time of transportation between home and university had higher significant GPA compared with those with shorter time. Other factors like family income, father's and mother's educational level, source of financial support were not significantly associated with GPA according to this study.[13] A study carried out in a medical school in South East Nigeria found that medical students were more likely to perform better academically if their maintenance allowance was less than ten thousand naira (US$27) per month. When compared to students who get less than 10,000 naira as maintenance each month, those who receive between 21,000 and 40,000 naira monthly are 0.13 times less likely to perform well academically. Medical students with lesser monthly allowances performed noticeably better than those with higher upkeep allowances, it was found. This contradicts a number of research. Additionally, kids who made weekly trips to see their relatives did better academically.[19] Iranian review research revealed that parental education has no discernible effect on students' academic achievement[20] which is not in line with our study. Similarly a literature review conducted in district Rajanpur showed a significant association between parental education and stu-

dent's academic performance at secondary school level.[21] According to a study conducted in Bangladesh, a significant co relation was found between the student's academic performance and the father's educational level, class attendance and household environment[22] and the results are almost in line with our study. A study found consistent with our results showed a relationship between parental education and students' GPA. A worth mentioning relationship was observed between parental socio-economic status and students' edu- cational performance.[4] A study conducted on Alzaiem Alzhari University medical students in 2021–2022 indicated that the father's educational background and status had a substantial impact on the students' educational attitudes, which in turn affected their GPA[23] showed similar findings to our study. A study similar to our study was done to check the influence of socio-demographic characteristics on academic perfor- mance of medical students also showed that the factors such as mother's educational qualification and adequacy of the money provided by the parents / guardiance of the students had

an impact on the academic performance of medical students.[24] The study has classified the academic performance of medical students into three groups , making it easier to explain the association of performance with variables like family income, parental education and occupation and many others. It also reveals that having a physician in family can undoubtedly improve academic performance and nearly half of the stu- dents have admitted this. One important conclusion is that 93% of students think that having supportive family relation- ships help them succeed academically. This emphasizes the value of emotional support and offer discerning information for further interventions. Evidence about students' preferen- ces for studying at home is provided by the study which is useful in understanding how learning environment has impact on academic performance. The main concern of this study is to describe the effect of socioeconomic variables on acade-mic success of medical students of Public Medical Colleges of Lahore, Punjab as the number of studies conducted here are very less.

There are some limitations to this study. The study examined only a limited range of socioeconomic factors, overlooking other important factors. It was conducted in a specific population, which restricted its generalizability. Due to its short duration, our study may not have captured the long term effects of these factors on academic performance of medical students.

Future initiatives should prioritize implementing scholarship programs for medical students with low income background and conducting parental education workshops for parents on enhancing their children's academic performance. Efforts should be directed towards establishing mentorship programs

that pair medical students with professionals. There should be collaborations with other organizations to share expertise and skills. Resources can be offered to help medical students from challenging household environment. These actions can help address the socioeconomic barriers faced by medical students.

Conclusion

According to the findings of this cross-sectional study, socioeconomic factors including, parental education and family income, have a significant impact on medical students' academic achievement. Improved academic results were associated with higher family wealth and more educated parents, particularly fathers. These results demonstrate the necessity of focused interventions and policies to provide fair access to academic success for students from lower socioeconomic backgrounds.

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Author's contribution: RMK, HN: Involved in conceptualization of study. IU, IB: Contributed in data collection and analysis. MAZ, JS: Involved in manuscript writing

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