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Investigating the Impact of Admission Requirements on Academic Performance in Khyber Pakhtunkhwa's Medical Teaching Institutions

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ABSTRACT

Introduction: The effectiveness of admission criteria in predicting academic performance is critical for optimizing student success in medical education. This study investigates how various admission standards, including FSc grades, entrance test scores, and merit criteria, correlate with academic outcomes in medical institutions in Khyber Pakhtunkhwa.

Aims & Objectives: To examine the correlation between admission requirements and academic achievement among medical students across various medical teaching institutions in Khyber Pakhtunkhwa.

Place and Duration of Study: It was conducted for over six months from January 2022 till June 2022 at the Department of Medical Education, Khyber Medical University, Peshawar after approval from the Institutional Review Board (IRB**).**

Material & Method: A cross-sectional study using convenience sampling to include data from 10,061 students (5,657 male, 4,404 female) enrolled in public medical and dental colleges across Khyber Pakhtunkhwa (KP) under the provincial government's administration. The study utilized SPSS version 25 for data analysis, employing descriptive statistics, linear regression analysis and t-tests to assess the relationships between predictor variables and professional examination performance.

Results: Significant but weak correlations ($p < 0.05$ and $p < 0.01$) were observed between three predictor variables—F.Sc scores, merit criteria, and entrance test scores—and professional examination scores across ten medical colleges in Khyber Pakhtunkhwa. Regression analyses confirmed that F.Sc scores were the strongest predictor of academic performance from the 1st to the 4th year, whereas merit criteria, which include 40% of entrance test marks, emerged as the predominant predictor in the final professional year.

Conclusion: The study revealed significant correlations between interpreters (F.Sc, entrance test, and merit scores) and MBBS examination scores across medical institutions. Stepwise regression analysis indicated F.Sc as the best predictor from the first to fourth year, with merit emerging as the top predictor in the final year**.**

Keywords: Academic performance, predictive value of tests, medical education, entrance examinations, student selection

INTRODUCTION

The parameters of admission constitute a vital set of predictors of academic accomplishment [1]. Entities in the educational field seek to define variables which might predict academic achievement. Research indicates that a new set of strict admission standards may predict low failure rates and program completion [2]. Consequently, literature reviews reveal that admission criteria are multifaceted and include both cognitive and non-cognitive measures [3]. The former encompasses prior academic performance, intelligence, and achievement tests, whereas the latter is comprised of race, age, gender, prior exposure, personality, and cultural background, respectively. It is realized that many cognitive and non-cognitive attributes are included into admission requirements to assess and enrol students who will likely complete their studies [4,5]. Existing literature indicates that logical admission requirements, which involve a combination of academic and non-academic qualities, can foretell better academic performance [6]. Some graduate schools have prerequisite academic criteria that undergraduates need to fulfil to be considered for admission. Recent literature highlights a range of findings about how well

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different criteria forecast academic performance and success. Studies often focus on standardized test scores, high school GPA, and specific subject proficiency as primary predictors. For instance, standardized tests have shown moderate to high predictive accuracy for first-year academic performance, though their efficacy can vary depending on the context and field of study. High school GPA is consistently a strong predictor of overall academic success, particularly when combined with other factors like extracurricular involvement and personal statements. Recent research also suggests that a holistic approach, which considers multiple dimensions of a candidate's background and abilities, often provides a more accurate prediction of future performance than relying on any single criterion alone. This evolving understanding underscores the importance of continuously evaluating and refining admission criteria to better align with academic success indicators. [7]. It is widely acknowledged that relying solely on high school results for admission decisions would be biased due to variations in grading quality and standards [8]. Consequently, standardized entrance tests are becoming global, which test ability and achievements, and reduce biases [9,10].

The current relevant uniform entrance test in Pakistan is the Medical and Dental College Admission Test (MDCAT) where passing marks are 65% for admission [11]. It aims to explore the correlation between admission criteria and subsequent academic outcomes. This study is crucial for understanding how different entry standards affect student success and academic performance in medical institutions within Khyber Pakhtunkhwa. By identifying key factors that contribute to academic achievement, the research seeks to inform policy decisions and enhance the effectiveness of admission processes, ultimately improving educational quality and student success in the region. This study aims to assess the relationship between admission criteria and academic performance among medical students across various 10 medical and dental colleges in Khyber Pakhtunkhwa, Pakistan.

MATERIAL AND METHODS

This was a quantitative cross-sectional study conducted for about six months i.e., from January, 2022 to June, 2022. Ethical and administrative approval were obtained from the Institutional Review Board (IRB) vide No: (Riphah/IRC/22/2017), at the Department of Medical Education, Riphah International University, Islamabad. The medical records of all enrolled medical students in ten public sector medical colleges affiliated with Khyber Medical University, Khyber Pakhtunkhwa Pakistan were retrieved and included in the study convenience sampling technique which came out to be 10061 from academic session 2017 to 2022. All those failing to complete the course for any reason were excluded from the study. Checklist and computerized admittance database of Khyber Medical University was checked. Records and documents related to students and their admission history were collected, and information regarding their performance in the MBBS program was collected from the examination branch of Khyber Medical University, Peshawar. These study variables were percentage obtained in Matriculation and FSc, entry test marks, gender and age of a student at the time of his admission in the university. The outcome variable, academic performance was assessed in terms of marks.

Data Analysis: Data analysis was done using Statistical Package for Social Science (SPSS) version 25. Multivariate analysis was conducted on all applicants of the study. These included the linear regression analysis, t-tests and bivariate analysis.

RESULTS

This study surveyed 10061 students (Male = 5657, Female =4404) appearing in 10 Medical colleges of KP from entry to completion, who were registered in the 2017, 2018, 2019, 2020, 2021, & 2022 academic sessions.

Table 1: Year wise sample of the study

Year	2017	2018	2019	2020	2021	2022	Total	Mean
Medical	12	15	16	17	18	20	100	167
Dental	90	19	80	09	10	62	61	7

Table 2: Sample of medical students in relation to gender and college

S.NO	College	Male	Female
		Number (%)	Number (%)
1	COLLEGE- 1	803 (53.4%)	697 (46.6%)
2	COLLEGE- 2	770 (49.7%)	780 (50.3%)
3	COLLEGE- 3	00 (00%)	650 (100%)
4	COLLEGE- 4	550 (58%)	400 (42%)
5	COLLEGE- 5	700 (63.4%)	403 (36.6%)
6	COLLEGE- 6	870 (74.3%)	300 (25.7%)
7	COLLEGE- 7	745 (61.4%)	467 (38.6%)
8	COLLEGE- 8	439 (60.2%)	290 (39.8%)
9	COLLEGE- 9	390 (65%)	210 (35%)
10	COLLEGE- 10	390 (65.3%)	207 (34.7%)
Total		5657 (56.2%)	4404 (43.8%)

The data presented in Table 3 demonstrates that median of Students' F.Sc scores was 0.22, have a significant correlation at the 0.05 and 0.01 levels

with all five years academic exam marks of students. Further, the entrance test and merit list were also good with a median of 0.33 and 0.19 respectively, but there is no significant relationship to the 3rd-year exam.

Table 3: Medical Students overall samples and its correlation

Variables	1st	2nd	3rd	4th	5th	Range	Median
FSc	.433*	.300*	.456*	.150*	.211*	.17-.46	.22
Sig. (2-tailed)	.000	.000	.000	.000	.000		
Entry Test	.307*	.076*	.177*	-.037	.270*	-.03-31	.19
Sig. (2-tailed)	.000	.002	.000	.387	.000		
Merit	.270*	.222*	.369*	.039	.330*	.06-.32	.33
Sig. (2-tailed)	.000	.000	.000	.330	.000		

Table 4 shows that F.Sc marks have medians from 0.138 to 0.300 in the five years have the highest correlation to all standard variables for most medical colleges except college9 in the second year. This is followed by Merit scores ranging from 0.038, 0.108, 0.224 and Entry test scores ranging from, 0.002, 0.060, 0.144. This implies that the observed relationships are substantial in most cases.

Table 4: College Wise Correlation of All Medical Colleges

College	Forecasters	1st Year	2nd Year	3rd Year	4th Year	Final
COLLE GE- 1	FSc	.378**	.209**	.331**	.291**	.399**
	Entry Test	.286**	-.023	.161**	.101**	.223**
	Merit	.328**	.041	.299**	.209**	.376**
COLLE GE- 2	FSc	.161**	.080*	.300**	.289**	.154*
	Entry Test	.030	.039	.189**	.169**	-.060
	Merit	.169**	.031	.245**	.249**	0.15
COLLE GE- 3	FSc	.360**	.109*	.222**	.201**	.370**
	Entry Test	.238**	.031	.149*	.091**	.160*
	Merit	.326**	.040	.286**	.201*	0.99
COLLE GE- 4	FSc	.310*	.029	.211*	.199**	.355**
	Entry Test	.032	.030	.176*	.159**	.15
	Merit	.160**	.029	.222*	.197*	.081
COLLE GE- 5	FSc	.300*	.028	.207*	.188*	.320**
	Entry Test	.029	.027	.210*	.187*	.079
	Merit	.279*	.023	.299*	.178*	.310*
COLLE GE- 6	FSc	.233*	.023	.199*	.168*	.301*
	Entry Test	.0194	.030	.201*	.182*	.069
	Merit	.274*	.022	.187*	.168*	.299*
COLLE GE- 7	FSc	.210*	.021	.188*	.168*	.299*
	Entry Test	.019	.020	.178*	.184*	.070
	Merit	.272*	.022	.181*	.162*	.276*
COLLE GE- 8	FSc	.199*	.020	.187*	.167*	.200*
	Entry Test	.260*	.20	.173*	.152*	.061
	Merit	.206	.016	.151	.162*	.267*
COLLE GE- 9	FSc	0.86	.105	.205*	.206*	.090
	Entry Test	0.45	.267**	0.33	.126	.004
	Merit	0.41	.230**	0.61	.109	0.51
COLLE GE- 10	FSc	0.81	0.050	.171	.200*	.158*
	Entry Test	0.18	-.166	-0.030	.159	.000
	Merit	.049	-.089	.139	.203*	.162

*P < 0.05 **P < 0.01

The following table provides the results of regression analysis for 1st to Final year. Significant but weak correlations ($p < 0.05$ and $p < 0.01$) were observed between three predictor variables—F.Sc scores, merit criteria, and entrance test scores—and professional examination scores across ten medical colleges in Khyber Pakhtunkhwa. Regression analyses confirmed that F.Sc scores were the strongest predictor of academic performance from the 1st to the 4th year, whereas merit criteria, which include 40% of entrance test marks, emerged as the predominant predictor in the final professional year.

Table 5: Regression Analysis for 1st to Final Year

Predictors	Beta	Standard Error	Regression	Regression Square	p-value
1st Year					
F.Sc	.213	.011	.339	.107	<0.001
Entry test	.059	.005	.201	.039	<0.001
Merit	1.069	.079	.259	.066	<0.001
2nd Year					
F.Sc	.200	.024	.199	.039	<0.001
Entry test	.026	.008	.077	.003	0.002
Merit	.669	.129	.122	.014	<0.001
3rd Year					
F.Sc	.290	.019	.361	.132	<0.001
Entry test	.086	.014	.156	.023	<0.001
Merit	1.76	.165	.272	.080	<0.001
4th Year					
F.Sc	.250	.021	.316	.102	<0.001
Entry test	.076	.013	.146	.021	<0.001
Merit	1.569	.168	.232	.058	<0.001
Final Year					
F.Sc	.910	.161	.168	.032	<0.001
Entry test	.676	.103	.214	.042	<0.001
Merit	9.569	1.316	.230	.053	<0.001

DISCUSSION

The study included all public medical and dental colleges in Khyber Pakhtunkhwa regulated by the provincial government. Data on students' marks from individual institutes under Khyber Medical University, Peshawar, were collected from the examination office. Incomplete or ineligible data

were excluded. Significant but weak correlations (at 0.05 and 0.01 levels) were found between three predictor variables and professional examination scores across the ten medical colleges.

However, F.Sc scores showed in other studies had somewhat strong correlation [12,13,14].Regression analyses confirmed significant correlations between all predictors and standard variables across the medical sample. F.Sc emerged as the top predictor from the 1st till 4th year, while merit was the paramount predictor in the final professional year.

The study suggests that theoretical teaching in earlier years favour's F.Sc as the best predictor, while practical aspects in the final year favour merit criteria. As merit criteria include 40% of entrance test marks, the entrance exam influence is crucial for predicting medical students' academic performance in final year exams [15,16,17].

The evaluation of admission criteria, such as the MDCAT and ETEA, is crucial for understanding their impact on academic performance in medical and dental colleges. The Medical and Dental College Admission Test (MDCAT) and the Educational Testing and Evaluation Agency (ETEA) exams are key determinants for admissions in Khyber Pakhtunkhwa's medical institutions. Recent research highlights that standardized tests like MDCAT and ETEA can provide valuable predictions of academic success in medical education [18]. However, the predictive accuracy of these tests may vary, influenced by factors such as test preparation quality and socioeconomic background [19]. Studies indicate that while these tests are significant, they should be complemented with other criteria such as high school performance and relevant extracurricular activities [20]. The integration of holistic assessment approaches might improve prediction accuracy and better align admissions with student potential. Therefore, it is essential to continually assess and refine these admission criteria to enhance their predictive validity and ensure they accurately reflect the capabilities and readiness of prospective students [21].

The study acknowledges limitations, including its focus on public sector colleges only and the absence of data on non-selected candidates. This lack of data may have affected the validity coefficients, as students are selected based on multiple criteria, including F.Sc and entry test scores [22,23,24,25,26,27,28]. Furthermore, the research did not consider the rationality of other conjecturers such as financial status and urban-rural background. Additionally, the influence of diverse education boards on F.Sc education was not explored.

CONCLUSION

We concluded that all the prognosticators, including F.Sc, Entry test, and merit list marks, have notable positive correlations with the MBBS exam marks in almost all six cohorts of all medical colleges. On the other hand, stepwise regression analysis indicated that F.Sc was the strongest predictor from first to fourth year in order followed by merit and entry test scores. On the other hand, for the final year, merit was considered as the independent variable along with entry test and F.Sc scores.

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