ORIGINAL ARTICLE

PERCEPTION AND BARRIERS TO MEDICAL RESEARCH AMONG MEDICAL STUDENTS OF A PRIVATE MEDICAL COLLEGE

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Background: Research is a core component of medical education, yet its practice among students is often influenced by their perceptions and constrained by institutional, academic, and personal barriers. Objective of this study was to assess these parameters in students of a private medical school. **Methods:** This analytical cross-sectional study was carried out from July 2023 to April 2024, with a sample of 493 MBBS students at Aziz Fatimah Medical and Dental College, Faisalabad. The data were collected using a validated questionnaire aimed at assessing perception about research, personal and institutional barriers. Descriptive statistics were used to summarize data. The normality of data was determined using the Shapiro-Wilk test. Mann-Whitney U-test was used for two-group comparison, Kruskal-Wallis test for multiple-group comparison, and Spearman's *rho* test for correlation analysis. **Results:** The mean perception score was moderately positive (3.41±0.76), while personal (3.12±0.89) and institutional (3.20±1.10) barrier scores were relatively high. The age of students was associated with higher personal barriers (U=22,959.5, $p<0.001$). Day scholars reported more positive perceptions than hostelites (U=16,907.5, $p=0.006$). Across classes, perception (H=19.84, $p=0.001$) and personal barriers (H=33.58, $p<0.001$) demonstrated significant differences, with first-year students reporting higher perception and senior students reporting higher barriers. The Spearman's correlation identified weak but significant positive associations of perception with both personal ($p=0.167$) and institutional barriers ($p=0.169$) and a strong positive correlation of personal with institutional barriers ($p=0.549$; $p<0.01$). **Conclusions:** Students showed generally positive perception toward medical research but aced significant personal and institutional barriers.

Keywords: Medical, Perception, Practice, Research, Students

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INTRODUCTION

Medical research is the backbone of advancements in healthcare and leads to innovations for better patient outcomes and improved treatment protocols as well as deeper knowledge of diseases. Involvement in medical research activities helps medical students nurture critical thinking, analytical expertise, and curiosity, which are all prerequisites for the medical profession.[1] Numerous obstacles may hinder participation of medical students in research activities, particularly in private istitutions.

Private medical colleges often prove to be different environments from what are in public institutions, having their own privacies and perspectives. Although they may possess adequate modern facilities, private institutions are often criticized for high tuition fees and for lacking a strong research culture compared to public universities.[2] Knowing the perceptions of medical students on research in such contexts is important to devise ways to encourage them for their involvement in research and reduction of barriers.

Many studies have identified factors influencing medical students' involvement in research.[3] These factors include the availability of mentors[4], access to funding for the research[5], existence of research-oriented curricula[6], and the perceived value of research in their future careers. Nevertheless, these factors may exist on a very different scale in private medical colleges owing to the level of infrastructure, faculty expertise, and institutional priority.[7]

The challenges to research engagement are diverse and may be broadly categorized into individual, institutional, and systemic domains.[8] Individual barriers include rigorous academic schedules denying students time for research; lack of motivation[9], less-than-adequate skills for accomplishing research tasks and limited awareness of the benefits of research[10]. Institutional barriers may be inadequate research infrastructure, limited access to experienced mentors, and lack of institutional support for student-led research initiatives.[11] Systemic barriers encompass issues such as insufficient integration of research into the medical curriculum and a general lack of support from the medical education system.[12] This study aims to explore the perceptions and barriers to research among students at a private medical college.

MATERIAL AND METHODS

After approval of the Ethical Committee vide No. IEC/238-23, students from MBBS classes were included through a convenience sampling method after their informed written consent. Data was collected through a validated questionnaire on students' perception of research, personal barriers, and institutional barriers to research.[13]

The tool consisted of several items rated on a 5-point Likert-type scale ranging from 'strongly disagree' to 'strongly agree'. Perception toward research was assessed using a set of Likert-scale questions exploring students' views on the importance, relevance, and benefits of research in medical education. These included items on the role of research in the medical field, its inclusion in the curriculum, teamwork, and long-term career goals. Personal and institutional barriers were assessed through questions addressing lack of time, motivation, supervision, training opportunities, and institutional support for conducting research. Composite scores were computed for each of the domains as an average of the item responses, with higher scores indicating stronger perceptions or barriers.

The data were analyzed using SPSS-25. Descriptive statistics were computed for socio-demographic variables and scale scores. The normality assumption was assessed by the Shapiro-Wilk test. The Mann-Whitney U-test was used to compare the scores between two groups. Kruskal-Wallis test was used to compare scores among three or more groups. A post-hoc pair-wise comparison with Bonferroni adjustments was conducted only for results that were significant. The association between perception, personal and institutional barriers was assessed with Spearman's *rho* correlation. Effect size (r) for Mann-Whitney U-test was computed to determine the magnitude of differences, and $p \leq 0.05$ was considered statistically significant.

RESULTS

Total number of participants was 493 (response rate= 76%). The majority of participants were from the 4th year (130, 26.4%), followed by the 3rd year (111, 22.5%), 2nd year (106, 21.5%), 1st year (100, 20.3%), and final year (46, 9.3%). The sample comprised of 303 females (61.5%) and 190 males (38.5%). There were 285 participants (57.8%) aged above 21 years, and 208 participants (42.2%) aged 21 years or below. Day scholars were 387 (78.5%) and boarders were 106 (21.5%) in number. Majority were from urban areas (403, 81.7%) while 90 (18.3%) belonged to rural areas.

Students showed a moderately positive perception toward research (mean 3.41±0.76). However, relatively higher mean scores for personal (3.12±0.89) and institutional (3.20±1.10) barriers suggest that both individual and institutional factors hindered their participation in research. It was determined that there was no significant difference in perception scores between male and female students (p=0.764). No significant gender differences were observed for either personal barriers (p=0.195) or institutional barriers (p=0.156). (Table-1).

Mann-Whitney U-test revealed no significant differences in perception scores between younger and older students (p=0.057, r=0.086). However, older students reported significantly higher levels of personal barriers (p<0.001). No significant difference was observed for institutional barriers (p=0.208). (Table-2).

Day-scholars medical students had significantly more positive perceptions about research compared to boarders. There were no statistically significant differences among groups regarding personal and institutional barriers. (Table-3).

The perception and personal barriers differed significantly between MBBS classes (p=0.001 and p<0.001 respectively) but not institutional barriers (p=0.550). In post-hoc analysis, the perception score of 1st year students was significantly higher than that of 2nd and 3rd year students, while 4th and final-year students reported significantly higher personal barriers as compared to 1st and 2nd year students. No other pair-wise differences were statistically significant. (Table-4).

Table-5 presents the Spearman's *rho* correlation results. Research perception had weak but statistically significant positive correlations with personal barriers and institutional barriers. There was a strong positive correlation between personal and institutional barriers.

Table-1: Perception and barriers toward research among medical students (Mann-Whitney U-test)

Variable	Gender (n)	Mean Rank	U	Z	*p*	Effect size (*r*)
Perception score	**Male (190)**	249.43	28,322.5	-0.301	0.764	0.014
	Female (303)	245.47				
Personal barriers	**Male (190)**	236.53	26,796.0	-1.296	0.195	0.058
	Female (303)	253.56				
Institutional barriers	**Male (190)**	235.53	26,605.5	-1.418	0.156	0.064
	Female (303)	254.19				

U= Mann-Whitney test statistic. Z= Standardized test statistic for Mann-Whitney U

Table-2: Perception and barriers towards research between age groups (Mann-Whitney U-test)

Variable	Age Group	Mean Rank	U	Z	*p*	Effect size (r)
Perception score	**Group 1 (208)**	261.28	26,670.5	-1.903	0.057	0.086
	Group 2 (285)	236.58				
Personal barriers	**Group 1 (208)**	214.88	22,959.5	-4.290	<0.001	0.193
	Group 2 (285)	270.44				
Institutional barriers	**Group 1 (208)**	256.44	27,675.5	-1.259	0.208	0.057
	Group 2 (285)	240.11				

U= Mann-Whitney test statistic. Z= Standardized test statistic for Mann-Whitney U

Table-3: Mann–Whitney U test for perception and barriers by current residence

Variable	Residence	Mean Rank	U	Z	*p*	Effect size (r)
Perception	Day-scholar (387)	256.31	16907.5	-2.776	**0.006**	0.13
	Boarder (106)	213.00				
Personal barriers	Day-scholar (387)	249.65	19484.5	-0.792	0.428	0.04
	Boarder (106)	237.32				
Institutional barriers	Day-scholar (387)	249.44	19566.5	-0.728	0.467	0.03
	Boarder (106)	238.09				

Table-4: Kruskal-Wallis test for perception and barriers by MBBS class

Variable	MBBS Class	Mean Rank	H (χ^2)	df	*p*
Perception	1st Year (100)	300.30	19.84	4	0.001
	2nd Year (106)	221.46			
	3rd Year (111)	228.44			
	4th Year (130)	239.67			
	Final Year (46)	255.50			
Personal Barriers	1st Year (100)	208.41	33.58	4	0.000
	2nd Year (106)	214.29			
	3rd Year (111)	238.55			
	4th Year (130)	300.12			
	Final Year (46)	276.53			
Institutional Barriers	1st Year (100)	243.83	3.05	4	0.550
	2nd Year (106)	229.16			
	3rd Year (111)	260.51			
	4th Year (130)	253.77			
	Final Year (46)	243.26			

Table-5: Correlation between perception and barriers toward research among medical students

Variables	Perception Mean (ρ/*p*)	Personal Barriers (ρ/*p*)	Institutional Barriers (ρ/*p*)
Perception Mean	1.00/---	0.167**/0.001	0.169**/0.001
Personal Barriers	0.167**/0.001	1.00/---	0.549**/0.001
Institutional Barriers	0.169**/0.001	0.549**/0.001	1.00/---

ρ= Spearman's correlation coefficient

DISCUSSION

It was observed that although perceptions toward medical research were moderately positive, the students reported considerable personal and institutional barriers to their research engagement. Specific demographics, i.e., year of study, age, and residence were associated with various levels of perception and barrier scores.

The perception mean shows that students generally appreciate the value of research; however, the personal and institutional barrier means were comparatively high. This scenario was previously reported in Egypt and Pakistan also, wherein students regarded research as an important activity, yet identified lack of training, mentorship, and resources as major hindrances.[14–16] Older students from our study reported significantly higher personal barriers. This finding aligns with reports from Egypt[14], where the senior students had encountered higher barriers by increments of workload and less facilitation by the supervisor. First Year students had a higher score for perception compared with the latter classes, while the fourth and final Year students reported a higher score for personal barriers. One of the studies from Pakistan[17] also reported the finding of the barriers increasing later in years, particularly by academic overload and limited opportunity for mentoring.

Days-scholars in this study had considerably greater positive perception than boarders. Though limited research compares these two groups immediately, prior evidence suggests personal circumstances, access to facilities, and institution sponsorship might dictate research participation opportunities.[18] We observed little significant gender variation between barriers and perceptions. This is in contrast with some Pakistani studies[16] which indicated subtle gender differences for awareness and research attitudes. Our finding may indicate a favourable condition of equity between the genders for opportunities at our institution.

Correlation analysis further revealed a significant relationship between students with elevated perception scores and elevated personal and institutional barriers. This suggests valuing research does not necessarily result in fewer barriers but potentially highlights research awareness instead. The significant association between the personal and institutional barriers reveals how system-level factors, such as the absence of an appropriate base for mentoring or a lack of funding, could lead to personal barriers.[14,15,19] The combination of moderate perception and high barrier scores suggests that despite valuing research, students are often unable to engage in it meaningfully. Adding protected research time, formal mentorship, and early skills workshops may encourage students' engagement.[20,21] Given that barriers to undertaking research were greatest among senior medical students, contextualized support throughout the clinical years may be needed. It is also important that institutions address any infrastructure gap, offer academic (statistical) support, and provide applications/financial assistance to bridge personal and institutional barriers.[22,23] In the present study, lack of time, inadequate supervision or mentorship, and limited institutional support emerged as key barriers. These findings are consistent with those reported in Saudi Arabia[24], where it was found that lack of mentorship and guidance were the most cited obstacles to student research participation. Khan *et al*[19] in Pakistan identified insufficient research training and time constraints as major limiting factors.

The study involved a vigorous sample across all years of the MBBS, employed a validated questionnaire and appropriate non-parametric analysis for data. However, the cross-sectional nature limits drawing causal inference and being from a single institution limits generalizability. Self-reported measure may be impacted by recall or social desirability bias. In future studies, it would be beneficial to be multi-centric across public and private colleges, longitudinal transferral work outcome with perception across academic years, and qualitative measures to better understand the personal and institutional aspects. Interventional research is suggested to determine the longitudinal impact of structured mentorship and or workshops, along with institutional changes to improve student engagement with research.

CONCLUSION

Medical students in our study showed generally positive perception toward medical research but faced significant personal and institutional barriers. To foster a stronger research culture, medical colleges must integrate research skill-building early in curricula, strengthen mentorship, and provide institutional supports such as funding and protected time.

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MS: Conceptualization, study design, methodology, data analysis, and Writing Draft
MS: Conceptualization, Study Design, Methodology, data analysis, interpretation and Writing Draft
MI: Methodology, Data analysis and interpretation
IF: Study Design, writing draft
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