

Exploring Perspectives of Basic and Clinical Sciences Medical Students on Research

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ABSTRACT

Objective: To identify and compare motivating factors and obstacles towards research among undergraduate medical students of basic and clinical sciences.

Study Design: Cross sectional study.

Place and Duration of Study: Combined Military Hospital, Kharian medical college, Pakistan Jun to Aug 2021.

Methodology: This study involved 205 undergraduate medical students divided into two groups: basic sciences (1st, 2nd, and 3rd year) and clinical sciences (4th year). Data collection was done using a self-structured questionnaire based on a 5-point Likert scale. Ethical approval was obtained from the institutional review board (CKMC/IERB/AC-00119).

Results: Out of the participants, 84(40.9%) were male and 151(59%) were female. 183(89.2%) were aged 18-22, and 22(10.7%) were aged 23-27. Distribution by year was as follows: 1st year 17%, 2nd year 20.9%, 3rd year 15.6%, and 4th year 46.3%. Approximately 40-50% of clinical sciences students supported making research mandatory from the first to the final year and introducing weightage in the final assessment, foster critical thinking and teamwork, compared to only 2-17% of basic sciences students. This significant difference highlights the need for early integration of research activities in the medical curriculum (p -value<0.001). 40-50% of undergraduate students in both clinical and basic sciences agreed that there is a lack of research culture, infrastructure, training funds, and time. The barriers did not show significant differences between the groups.

Conclusion: Clinical students' perception of research is much better than basic sciences.

Keywords: undergraduate, medical, education, medical research.

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INTRODUCTION

Research plays a pivotal role in analysing disease trends, advancing healthcare, and medical education.¹ It contributes to disease surveillance, prevention, diagnosis, and treatment, providing regional evidence of diseases.² Moreover, research fosters problem-solving, critical thinking, analytical reasoning, and communication skills among medical practitioners, laying the foundation for competent medical practice. Thus instilling in physicians the ability to question laying the foundation for competent medical practitioners.³

Promoting research is highly recommended at the undergraduate level to cultivate skilled researchers.⁴ Various factors were identified to hinder students from pursuing research which include attitude, knowledge, perceived competitiveness, exam stress and strong pressure for higher grades.^{4,5} A study also found that undergraduates who engaged in research were three times more likely to publish after graduation.⁶ It was also seen that the lack of

undergraduate involvement in research has led decline in the quality of projects done at postgraduate level.⁷ This places the responsibility on medical schools to better equip undergraduate students with research skills to support their career prospects and foster professional researchers by establishing a supportive undergraduate research culture.^{7,8}

Research culture development in Pakistan is still in its early stages, and it's crucial to understand the motivating factors and barriers experienced by medical students. It include personal limitations, poor organizational management, financial constraints, inadequate funding, societal attitudes toward research, lack of mentorship and guidance along with unsupportive supervisors, and heavy workload in hospitals.^{9,10} In this prospect, we aimed to explore and compare the motivating factors and obstacles faced towards research by the undergraduate medical students of basic and clinical sciences.

METHODOLOGY

A cross-sectional study was conducted on undergraduate medical students of CMH Kharian

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Medical College. Ethical approval was obtained from the institutional review board (CKMC/IERB/AC-00119). The study duration was 3 months, from June 2021 to August 2021, and involved two groups: basic sciences (1st, 2nd, and 3rd year), and clinical sciences (4th year). The total strength of students enrolled in the study period was 400. Out of which 300 were enrolled from the first year, second year and third year (basic sciences) and 100 were from the fourth year (clinical sciences). Final year MBBS was not present as it was the first batch of the college. The sample size was calculated to be 197 using WHO calculator with a 95% confidence interval and using the formula for the finite population.

Participants were selected through non-probability convenience sampling. Data collection was done using a self-structured questionnaire based on a 5-point Likert scale.¹¹ It comprised of demographic profiles and close ended questions. A few motivating factors and some barriers regarding research among students were selected as variables.

Inclusion Criteria: medical students studying in either basic or clinical sciences in MBBS course were included.

Exclusion Criteria: Faculty and students unwilling to participate were excluded.

One hour session was conducted for each year of basic and clinical sciences. The students were also briefed about the objective of the study and ensured confidentiality before giving their consent to take part in the study. To ensure validity and reliability of data a paper based validated questionnaire was distributed by the team of demonstrators, senior faculty and students who took active part in designing this study. According to WHO calculator, the total calculated sample size was 197. To avoid the effect of missing data, we distributed a total of 250 questionnaire forms among the students of all academic years who were willing to participate. 50 questionnaires each, for 1st, 2nd and 3rd year and 100 were distributed among 4th year students.

Data was analysed through SPSS version 22. Descriptive statistics, frequencies and percentages, means, standard deviations, confidence intervals were calculated. Considering likert scale as an ordinal scale we calculated the frequencies and percentages of each category of response (strongly agree, disagree, neutral, agree, and strongly disagree). Chi square test was applied to see the difference between the degrees of likert scale for basic and clinical sciences separately.

Considering the difference between the intervals of likert scale equal (continuous scale), we calculated the means, standard deviation, confidence interval of each motivating factor and obstacle. Independent t test was applied as inferential statistic to compare mean difference between basic and clinical sciences with a significance level set at a *p*-value of 0.05.

RESULTS

A total of 205 medical undergraduates participated in our study. Out of which 121(59%) were females, and 84(40.9%). 183(89%) were of age 18-22 and 22(10.7%) were of age 23-27. 110(53.6%) were of basic sciences and 95(46.3%) were clinical sciences. Demographic distribution of students is described in Figure-1.

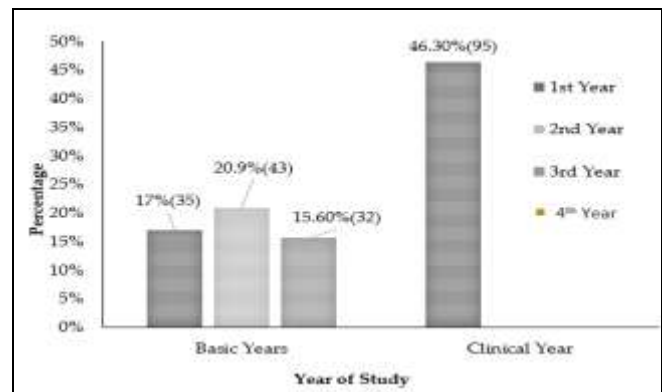


Figure-1: Demographic Distribution of Students

Table-I shows frequency distribution of basic and clinical medical undergraduates about research perception. Regarding mandatory research participation only 2.7% of basic sciences medical students strongly agreed as compared 40% of clinical sciences. Similarly a lower number of basic sciences medical students agreed to add weightage for research projects in their final assessment (15.45%). The percentage of clinical sciences students remain higher (45.26%) in perceiving research as a source of critical thinking in comparison to basic sciences (17.27%). Higher percentage of clinical sciences undergraduates agreed that research develop team work spirit (43%).

Table-II summarizes the comparison of two groups. There is a significant difference among basic sciences and clinical sciences considering research participation mandatory throughout their academic study years (*p*-value<0.001). Most of the students of clinical sciences agreed to introduce weightage of research in their final assessments to motivate

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Table-I: Frequency Distribution of Basic and Clinical Medical Students About Research Perspectives

Questions	Years of Study	Strongly Disagree % (n)	Disagree % (n)	Neutral % (n)	Agree % (n)	Strongly Agree % (n)	p-value
Research participation should be mandatory from 1st year to final year during medical studies	Basic. (n=110)	40.91% (45)	36.36% (40)	16.36% (18)	3.64% (4)	2.73% (3)	0.136
	Clinical (n=95)	2.11% (2)	4.21% (4)	10.53% (10)	43.16% (41)	40% (38)	0.052
Introducing weightage to research for assessments can motivate the students.	Basic. (n=110)	1.82% (2)	26.36% (29)	34.55% (38)	21.82% (24)	15.45% (17)	0.453
	Clinical (n=95)	1.05% (1)	2.11% (2)	6.32% (6)	50.53% (48)	40% (38)	0.020*
Participation in research promotes critical thinking and improvements in writing skills.	Basic. (n=110)	0.00% (0)	19.09% (21)	29.09% (32)	34.55% (38)	17.27% (19)	0.036*
	Clinical (n=95)	1.05% (1)	1.05% (1)	7.37% (7)	45.26% (43)	45.26% (43)	0.001*
Lack of research culture in society	Basic. (n=110)	2.73% (3)	3.64% (4)	9.09% (10)	42.73% (47)	41.82% (46)	0.967
	Clinical (n=95)	1.05% (1)	2.11% (2)	9.47% (9)	45.26% (43)	42.11% (40)	0.072
Lack of research infrastructure, training and funds.	Basic. (n=110)	1.82% (2)	0.91% (1)	12.73% (14)	46.36% (51)	38.18% (42)	0.496*
	Clinical (n=95)	0.00% (0)	3.16% (3)	10.53% (10)	44.21% (42)	42.11% (40)	0.038*
Research increases the load of academic activities due to lack of time.	Basic. (n=110)	0.00% (0)	1.82% (2)	2.73% (3)	42.73% (47)	52.73% (58)	0.505
	Clinical (n=95)	0.00% (0)	1.05% (1)	7.37% (7)	46.32% (44)	45.26% (43)	0.053
Research is essential for your selection of higher studies	Basic. (n=110)	0.00% (0)	1.82% (2)	16.36% (18)	38.18% (42)	43.64% (48)	0.528
	Clinical (n=95)	1.05% (1)	3.16% (3)	6.32% (6)	47.37% (45)	42.11% (40)	0.014*
Research helps us to develop team work spirit	Basic. (n=110)	7.27% (8)	23.64% (26)	28.18% (31)	24.55% (27)	16.36% (18)	0.574
	Clinical (n=95)	2.11% (2)	4.21% (4)	5.26% (5)	43.16% (41)	45.26% (43)	0.931

* significant p-values

Table-II: Comparison of Average Perception Scores of Basic and Clinical Medical Undergraduates

Perception items	Basic Years (Mean±SD)	Clinical Years (Mean±SD)	Confidence Interval (Upper Limit -Lower Limit)	p-value
Research participation should be mandatory from 1st year to final year during medical studies	1.91±0.98	4.15±0.92	(-2.50)-(-1.97)	<0.001*
Introducing weightage to research for assessments can motivate the students.	3.23±1.06	4.26±0.76	(-1.29)-(-0.77)	<0.001*
Participation in research promotes critical thinking and improvements in writing skills.	3.50±0.99	4.33±0.75	(-1.07)-(-0.58)	<0.001*
Lack of research culture in society	4.17±0.93	4.25±0.79	(-0.31)-(0.15)	0.51
Lack of research infrastructure, training and funds.	4.18±0.82	4.25±0.77	(-0.29)-(0.14)	0.52
Research increases the load of academic activities due to lack of time.	4.46±0.64	4.36±0.66	(-0.07)-(0.28)	0.25
Research is essential for your selection of higher studies	4.24±0.78	4.26±0.80	(-0.24)-(0.19)	0.81
Research helps us to develop team work spirit	3.19±1.18	4.25±0.89	(-1.35)-(-0.76)	<0.001*

* significant p-values

students for conducting research as compared to basic sciences (p -value<0.001). For the tool of improvement in critical thinking and writing skills average score of

basic sciences remained on lower side (p -value<0.001). Another significant finding was observed for team work spirit for which clinical sciences scored on higher

side (p -value <0.001). For, barriers no significant difference is seen between the two groups showing that both groups of medical undergraduates are facing the same problems.

DISCUSSION

Understanding the research perspectives of medical undergraduates provides valuable insights into their motivations and the obstacles they face in pursuing research. This involvement significant as it increases the likelihood of publishing high-quality work.¹² This study reveals significant differences in perceptions between basic and clinical sciences students, indicating the necessity for tailored strategies to enhance research engagement at different academic levels.

The results of our study indicated a significant difference in the perception of research between basic and clinical medical undergraduates (p -value 0.00). This finding was in line with a study conducted by N Zehra.¹³ Research was compulsory for 4th-year medical undergraduates at the study site, which could explain why they strongly supported the inclusion of research projects in their final assessments. This was further supported by a study conducted at Ayub Medical College by Arshad S ^{et al.}¹⁴ Khalid M. AlGhamdi *et al.*¹⁵ found a higher number of students agreeing with this idea, around 67.4%, in contrast to our study (40%).

Our data revealed that 45.26% of clinical medical undergraduates believed that research contributes to the development of critical thinking and writing skills, while only 17.27% of basic sciences students strongly agreed with this. Additionally, only 2.7% of basic sciences students strongly agreed that research participation should be mandatory, indicating that research motivation significantly increased with each academic year. These findings align with a study that concluded that fourth-year medical students have a greater awareness of research.¹⁶ but this study of Meraj *et al.*¹⁶ reported higher understanding of need in the higher students around 71% which is contradictory to this which found it around 40%. Another significant finding in our study was the improvement in teamwork spirit with increasing academic years, as fourth-year clinical undergraduates had a better perception of research. Similar findings were reported by Khan *et al.*¹⁷

The only common motivating factor reported among medical undergraduates is the requirement of research articles for higher studies, which aligns with

the findings of Mahmood *et al.* However, this effect was also found to be detrimental as it decreased the intention to pursue research as a career.¹⁸ Considerable barriers inhibiting research were observed. Our data indicated no significant difference between basic and clinical medical undergraduates facing difficulties in conducting research. The majority of medical undergraduates reported a lack of research culture, training, infrastructure, and funds as the main obstacles to research. Another main barrier identified in our study is the lack of time, due to which most basic sciences medical undergraduates were reluctant to consider research mandatory during their early years of study. This finding was comparable with Khan *et al.* Dadipoor, and H.^{10,19,20} A systematic review by Stone *et al.* also identified these factors as important barriers and emphasized a declining trend in the number of physician-scientists due to the aforementioned barriers in the current era.²¹

LIMITATION OF STUDY

This study has a few limitations. It was single centered study with small sample size further decreasing the generalizability of our findings. As, it was conducted in the early years of the institute being established, fifth-year undergraduate medical students were not part of this study, as the institute was established four years ago. We recommend the establishment of research society, yearly conduction of symposium for undergraduate medical students and distributions of montreal prizes especially among those conducting good study designs. We can overcome the lack of time barrier faced by undergraduate medical students by assigning tasks to cover related to research over weekends and college breaks.

CONCLUSION

The study found that students in clinical sciences showed a greater understanding of the importance of research, critical thinking, teamwork, and writing skills compared to students in basic sciences. Both groups faced similar barriers such as lack of research culture, training, funds, and time. The study also highlighted that students' perception of research improved with increasing years. Practical changes in the curriculum, such as encouraging students with prizes, and better schedule management, were recommended.

Conflict of interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

IN & IN: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

WN & AC: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

MAE & SA: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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