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Assessing the Research Mindset of Indian Medical College Undergraduates

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ABSTRACT

Training in the medical field plays a crucial role in education and the advancement of medicine relies heavily on the training and performance of dedicated researchers in the health sciences.This study aimed to evaluate the attitudes, knowledge and obstacles related to research among undergraduate medical students using questionnaires. Students pursuing their MBBS degree, who volunteered to participate in the study, were asked to complete a validated questionnaire focusing on their attitudes, barriers and knowledge about research. The association between attitudes (A), barriers (BR) and knowledge (K) was analyzed across different phases of the MBBS program using the chi-square test. Factor analysis was employed to reduce dimensionality and explain the percentage of variation within these three domains. The findings revealed that students generally possessed a positive attitude towards research and believed that it enhances critical thinking at the undergraduate level. However, they lacked sufficient knowledge to effectively conduct research following proper protocols. Regarding barriers to research, the primary obstacle cited was a lack of time due to academic responsibilities. To encourage students to engage in research early in their medical careers, it is recommended to periodically offer research methodology courses and allocate dedicated hours for research activities within their academic schedules. Moreover, creating awareness among students about government and institutional initiatives that promote research is essential for initiating research activities during undergraduate studies.

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Key Words
Research Mindset, Medical Students, Attitude, India

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INTRODUCTION

Research has historically played a crucial role in advancing our understanding of diseases, encompassing aspects such as disease trends, risk factors, pathogenesis, diagnosis, treatment, prognosis and public health interventions. The progression of the health science field relies significantly on the training and achievements of dedicated researchers[1].

In the contemporary era, modern medicine heavily relies on evidence-based practices for disease diagnosis and treatment. Physicians are expected to stay informed about ongoing research to contribute to evidence formation. Moreover, physicians must continually update their medical knowledge. In the context of medical research in India, there is a notable deficit in terms of quality research. As of 2008, India ranked 12th globally in health research productivity, with only 1.59% of the global publication share comprising 65,745 articles. This deficiency in medical research can have adverse consequences, particularly in a densely populated country like India[2,3].

To address this issue, there is a pressing need to instill a culture of research, starting from the undergraduate level of medical education. It is imperative to prioritize the efficient training of medical students in health research from the outset of their medical education. The development of research capacity is vital both at the individual and institutional levels. Regrettably, the current medical education system in India often neglects research methodology, with medical colleges affording insufficient attention to research programs due to resource constraints, inadequate faculty training, time limitations and resource scarcity, leading to subpar research-oriented medical education[4].

Medical institutions must proactively train their students in research to meet high accreditation standards and foster a community of dedicated and high-quality researchers. Cultivating research skills among undergraduates should be a top priority. It is crucial for medical institutions to integrate research skills and training into the undergraduate medical curriculum comprehensively. This will enable students to perceive research skills as pertinent to routine clinical practice rather than solely relevant to full-time researchers[5,6].

Exposing undergraduates to research early on will promote critical thinking and a sense of social responsibility. Many students entering medical school lack knowledge about scientific research and its significance. To address this, a long-term, systematic strategy is essential to introduce health research to medical students during their undergraduate years.

It is worth noting that research is becoming a less attractive career choice for junior doctors worldwide[7,8]. The literature review highlights a scarcity of data regarding knowledge, attitudes, practices and barriers related to medical research among undergraduate medical students. Understanding these factors is crucial for assessing the success of research initiatives. Thus, this study aims to assess the attitudes, knowledge and barriers toward research among medical undergraduate students in all MBBS phases through a comprehensive questionnaire.

MATERIAL AND METHODS

In this cross-sectional study, MBBS students from various phases enrolled at an Indian Medical College were the subjects. Out of a total student population of 467 across different phases, 385 students voluntarily participated. These students were provided with a pre-validated questionnaire comprising a total of 32 items designed to assess their knowledge, attitude and barriers concerning research. Prior to their participation, the students provided written consent and they were briefed about the study's objectives and significance.

Ultimately, complete responses to all 32 items on the questionnaire were obtained from 281 students, distributed as follows: 80 students from MBBS Phase I, 91 from Phase II and 110 from Phase III.

The questionnaire used to assess attitudes toward research consisted of 11 items, while the section on barriers to research included a total of 11 items. The segment evaluating knowledge about research encompassed 10 items, with responses recorded on a Likert rating scale, ranging from "disagree" (0) to "neutral" (1) and "agree" (2).

Statistical analysis was performed using SPSS version 23 software. Data were presented as Mean±standard deviation (SD) for each parameter. The Chi-square test was employed to explore the associations between attitudes (A), barriers (BR) and knowledge (K) across different phases of the MBBS program. Factor analysis was utilized to reduce dimensionality and elucidate the percentage of variation within the three domains. One-way analysis of variance was conducted to compare the mean scores of all factors across the different phases. A significance level of $p<0.05$ was established for statistical significance.

RESULTS

Factor analysis and reliability assessment were employed to evaluate the psychometric properties of the questionnaire (Table 1).

Table 2 shows that the students exhibited the highest mean value in their personal interest in research, followed by their agreement that research enhances critical thinking. Conversely, the lowest mean value was observed in their awareness of conducting an effective research study. Additionally, a low mean

Table 1: Calculations of reliability employing Cronbach's alpha coefficients

Factor	Number of Items	Factor analysis (%)	Reliability	Overall reliability
Factor 1: Challenges encountered in medical research	7	17.3	0.934	0.89
Factor 2: Understanding of research methods and competence in conducting effective research	6	16.5	0.901	
Factor 3: Relevance of research for future career prospects	5	9.2	0.742	
Factor 4: Individual inclination towards research	4	8.1	0.698	
Factor 5: Significance of ethical considerations in research	3	5.2	0.315	
Factor 6: Role of research in developing competence as a practicing clinician	3	5.8	0.488	
Factor 7: Advantages of research within the medical field	2	4.3	0.584	
Factor 8: Enhancement of critical thinking through research	2	4.6	0.526	
Total	32	75		

Table 2: Mean values for the 8 factors extracted from the questionnaire responses (n = 281)

Factors	Mean	SD
Factor 1: Challenges encountered in medical research	1.572	0.124
Factor 2: Understanding of research methods and competence in conducting effective research	0.378	0.257
Factor 3: Relevance of research for future career prospects	1.609	0.225
Factor 4: Individual inclination towards research	1.804	0.018
Factor 5: Significance of ethical considerations in research	1.156	0.198
Factor 6: Role of research in developing competence as a practicing clinician	0.932	0.313
Factor 7: Advantages of research within the medical field	1.257	0.289
Factor 8: Enhancement of critical thinking through research	1.899	0.035

Table 3: One-way ANOVA results for mean values among the three MBBS phases

Factors	Phase I (n = 80)	Phase II (n = 91)	Phase III (n = 110)	p-value
1	0.800±1.42	-0.020±0.45	0.0015±1.03	0.742
2	0.060±1.38	-0.150±0.42	0.0900±0.97	0.148
3	0.175±1.08	0.002±0.47	-0.1300±1.19	0.209
4	0.140±1.58	0.070±0.54	-0.1500±0.76	0.129
5	0.280±1.05	1.080±0.51	0.1100±0.049	<0.05
6	-0.018±1.03	0.490±0.55	0.1230±1.18	<0.05
7	-0.175±1.28	-0.530±0.71	0.2670±0.87	<0.05
8	0.154±1.01	0.007±1.012	0.1020±0.97	0.271

value was noted for Factor 6, which pertains to the importance of research in developing competence as a clinician.

Table 3 indicates that there was a notable difference in mean values for factors 5, 6 and 7 across the three MBBS phases.

DISCUSSION

Based on the findings, it is evident that students exhibited a positive outlook toward research, acknowledging its role in fostering critical thinking at the undergraduate level. However, it became apparent that they lacked the necessary knowledge and proficiency to effectively conduct research with a proper protocol in place. On a different note, when evaluating the obstacles hindering research participation, the primary impediment identified was the shortage of time due to the demanding educational commitments.

Factor 8, titled "Enhancement of Critical Thinking through Research" exhibited the highest mean value. This suggests that students recognize the value of research in cultivating critical thinking skills, which are pivotal in any career path. Conversely, Factor 4, denoted as ": Individual Inclination towards Research" displayed a mean value of 1.804, indicating a lack of personal interest in research among students due to the rigorous nature of the MBBS program and its time-consuming demands.

The lowest mean value, at 0.378, pertained to Factor 2. This implies that students had limited awareness regarding research methodology and their ability to conduct research effectively. Factor 6 also garnered a low mean value of 0.932, suggesting that students may not perceive research as crucial for becoming proficient clinicians. Furthermore, students exhibited limited knowledge concerning institutional research committees, ethical clearance processes, subject sampling methods, subject selection criteria, statistical data analysis and seeking guidance from experienced mentors.

A study conducted in Auckland, New Zealand, involving 558 medical students indicated that only a minority of students expressed a strong interest in pursuing research during their intercalated undergraduate degree option. Many cited the time-consuming nature of research as a source of stress, given the demands of completing the MBBS degree[9]. Similar results were reported by Meraj *et al*.[10]. in a study of 172 students at Shifa College of Medicine, Islamabad, where students viewed research as valuable but simultaneously perceived it as demanding and intricate. Additionally, a study by Ibrahim *et al*.[11] highlighted major research obstacles, including the absence of mentorship, limited time and inadequate funding. These findings align with our own research, as a study on Egyptian medical school students revealed low knowledge scores regarding research methodology

and identified issues related to time constraints, funding limitations and the need for proper mentoring[12].

The underlying principle behind incorporating research experiences into undergraduate medical education is to cultivate an understanding of research methodology and nurture an appreciation for medical or basic science research as a potential academic career. Given the barriers identified, efforts should be made to bring together research-active faculty and motivated undergraduate students, with recognition of the significance of undergraduate research by funding authorities[13-16].

CONCLUSION

To promote research engagement among students, it is advisable to periodically offer courses in basic research methodology. This would impart a comprehensive understanding of the rationale behind research, emphasize the importance of literature reviews, clarify the aims and objectives of specific research endeavours and highlight the potential implications of such studies. Moreover, students should be informed about short-term research projects initiated by the government and encouraged to participate in faculty research projects as assistants. For students facing time constraints, short-duration workshops can be conducted during breaks. Those who embark on research endeavours should be acknowledged and rewarded with scholarships. Lastly, allocating credit hours within their educational curriculum for research activities can serve as a motivational factor for students to undertake research initiatives.

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