Journal of Medical and Scientific Research

JMSR
www.jmsronline.com

Rajan B et al. J Med Sci Res. 2025; 13(1):76-82
DOI: http://dx.doi.org/10.17727/JMSR.2024/13-13

ORIGINAL RESEARCH OPEN ACCESS

Knowledge, attitude, practices, and perceived barriers towards research among undergraduate medical students in a teaching hospital: A cross-sectional study

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Abstract

Background: In Indian medical colleges, the extensive curriculum often limits undergraduate medical students' participation in research, coupled with insufficient exposure to research methodologies and time constraints. This study aims to understand the knowledge, attitude, practices, and perceived barriers towards research among the undergraduate medical students.

Methodology: This cross-sectional study was done on MBBS students from phase 1 to phase 3. The study questionnaire was organized into 3 parts aligned with the research objectives. Part 1 section A on demographic data, part 1 section B assessed students' knowledge about research. The part 2 included two subsections: section A collected students' approach and attitude towards research, section B on practice towards research while the final part 3 identified perceived barrier towards medical research.

Results: The study included 303 medical students. With regards to knowledge on research, only 4.6% (n=14) had good knowledge, 38.6% (n=117) had an average knowledge, while 56.8% (n=172) had poor knowledge. With regards to attitude 98% (n=297) students displayed positive attitude towards research. With regards to practice towards medical research it was seen that only 18.8% (n=57) students had participated in any kind of research. Some of the major perceived barrier towards research was lack of time due to educational tasks, lack of knowledge on statistics and research paper writing skills.

Conclusion: Most students have a positive attitude towards research, while they lacked knowledge and practice towards research. Many barriers were identified. These findings could guide policy makers in modifying the present MBBS curriculum and include research methodology as part of the under graduate medical education.

Keywords: undergraduate research; research in curriculum; medical education; teaching hospital

Introduction

The term research refers to an orderly scientific inquiry that seeks to gather new data or to conduct a detailed study to gain fresh knowledge that may lead to the introduction, change or termination of existing knowledge. In the current world, an essential factor considered to gauge a country's scientific advancement is the research context within country's scientific societies [1-3]. Medical research plays an important role in evidence-based practice of medicine as a dependable route for making information, contributions and enhancing health care [4, 5]. The fact that scientific research is carried out systematically enables the confirmation of theories and hypotheses. In addition, health research plays a major role in approaches to disease prevention, diagnosis and treatment procedures,

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Received 10 October 2024; *Revised* 29 November 2024; *Accepted* 6 December 2024; *Published* 17 December 2024

Citation: Rajan B, Joseph A, Prakash AK, Puzhikunnathu VK. Knowledge, attitude, practices, and perceived barriers towards research among undergraduate medical students in a teaching hospital: A cross-sectional study. J Med Sci Res. 2025; 13(1):76-82. DOI: http://dx.doi.org/10.17727/JMSR.2024/13-13

and development of health care guidelines [6]. Scientific research is the systematic approach by which theories and hypotheses can be proved or disapproved [7]. Health research is instrumental in enhancing the prevention, diagnosis, and treatment of diseases, and it has a profound effect on the policies related to health care programs[8].Medical students getting involved in research during the earliest stages of their medical training might help them become better doctors and may assist residents in taking better career-related decisions[9-12]. Research in medicine can be subdivided to fundamental, applied or translational research, all of which are crucial in the growth and development of medical science [13-18].

In the context of medical education, the hectic and vast undergraduate curriculum and time constraint does make it very difficult for the undergraduate medical students to get involved with any kind of research activities [19]. Thus, the current level of encouragement to the medical undergraduate contribution to scientific research by the regulatory bodies and institutions are still considerably low both in terms of number and quality of works produced [20-23].

As per the NMC regulation of 2023, in the continuous internal assessment, marks have been assigned for undergraduate research activities [24, 25]. So, it is very important to know how much our students are presently inclined and interested towards research activities and what are the challenges they are facing towards successfully completing a research project.

The present study aims at evaluating the knowledge, attitude, practice, and perceived barriers towards research among undergraduate medical students.

Methodology

This cross-sectional study was conducted in a teaching medical institution in India. Inclusion criteria: MBBS students from Phase 1 to Phase 3 who are willing to participate in the study. Method of data collection: The undergraduate MBBS students from Phase 1 to Phase 3 were asked for their voluntary participation in the study. A total of 303 MBBS students participated in this study. Study questionnaire consisted of three parts: part 1(Section A) sought the demographic details (age, gender, year of enrolment, current phase, library usage, hostel, or day scholar) of the study participants. part 1(Section B) consisted of five questions designed to assess the knowledge of medical students' regarding basic research information. The correct answer was given a score of one and incorrect answer was scored zero. Knowledge score was categorised into poor, average and good as given: 0-1: poor ,2-3: average, 4-5: good level of knowledge. Questions were reproduced from a previous study by Memarpour et al [7]. Part 2 of the questionnaire again was divided into two subsections: Part 2 (Section A) aimed to assess students' attitude/approach towards research which consisted of 10 statements, responded by three-point Likert scale; Agree, Uncertain and Disagree. They were scored as given: positive attitude: 2, neutral: 1, negative: 0. Scores more than 10 was considered as positive attitude. These questions were reproduced from a previous study by Assar et al [6]. Part 2 (Section B) aimed to assess the students practice towards medical research and consisted of five questions, response to which was noted on a simple two-point scale of 'yes' or 'no' or otherwise a numerical value. These questions were reproduced from a previous study by Alghamdi et al [26]. Part 3 of the questionnaire aimed to assess perceived barriers faced by students towards practicing medical research and consisted of 10 statements, responded by three-point Likert scale; Agree, Uncertain and Disagree. Questions were reproduced from a previous study by Memarpour et al [7]. The purpose of this study was to assess the knowledge, attitude, and practices towards research amongst medical students and the underlying barriers. This research protocol was cleared with the approval of the Institutional Ethics Committee, and data collected from May 2024 to July 2024.

Statistical analysis

The analysis was done using IBM SPSS version 23 (Armonk, NY: IBM Corp). Mean ±SD (standard deviation) was calculated for age and frequency taken for age, gender, phase of studying and usage of library. Knowledge and attitude scores were analysed as descriptive statistics and association with phase of study was analysed using chi-square test and fisher's exact test. The practice and barriers towards research were analysed as descriptive statistics. All the tests were analysed considering $p<0.05$ as a significant level.

Results

The mean age of students in the study was 20.73±1.655 SD. A total of 31.7% ($n = 96$) from phase I, 40.3% (n=122) from phase II and ($n = 42$) 28.1% (n=85) from phase III participated in this study. Total age group of participants ranged between 17 to 25 years, of which 69.0% ($n = 209$) were females, 29.7% ($n = 90$) were males and 1.3% (n=4) did not want to reveal their gender. When the year of enrolment of MBBS students were considered, the batchwise data is as follows: 2019 batch 0.7% (n=2), 2020 batch 10.6% (n=32), 2021 batch 15.2% (n=46), 2022 batch 20.5% (n=62), 2023 batch 22.4% (n=68), and from the 2024 batch 30.7% (n=93). Of the 303 students who participated 87.8% (n=266)

were residing in college hostel, 11.6% (n=35) were day scholars, and 0.7% (n=2) were residing as paying guest. It was observed that students who utilised library for research via online platforms was 50.8% (n= 154) as compared to 49.2% (n=149) did not utilise library for research. It was further observed that 78.9% (n=239) referred reference books for studies and research work compared to 21.1% (n=64) who did not. Another aspect that was investigated was the duration of library used per week for reading. It was observed that 54.1% (n=164) students used between 1-4 hours, 12.2% (n= 37) used between 4-8 hours, while 6.9% (n=21) students used more than 8 hours. It was alarming to notice that 26.7% (n=81) did not use the library for reading. When asked whether language was a barrier for research or publication, 61.4% (n=186) students said no, while 38.6% (n=117) believed that language was a barrier as depicted in Table 1.

Table 1: Demographic parameters.

Parameter		*n (%)*
Current phase of studying (CBME).	Phase 1	96(31.7)
	Phase 2	122(40.3)
	Phase 3	85(28.1)
Place of stay.	College hostel	266(87.8)
	Day scholar	35(11.6)
	Paying guest	2(0.7)
Library used for using online study materials.	Yes	154(50.8)
	No	149(49.2)
Library used for reading reference books.	Yes	239(78.9)
	No	64(21.1)
Duration of library use per week for reading.	0 hours	81 (26.7)
	1-4 hours	164(54.1)
	4-8 hours	37(12.2)
	> 8 hours	21(6.9)
Do you think language is a barrier for research?	Yes	117(38.6)
	No	186(61.4)
Total		303(100)

With regards to knowledge on basic research, it was observed that only 4.6% (n=14) students showed good knowledge scores, while 38.6% (n=117) had an average knowledge and 56.8% (n=172) showed poor knowledge. This is depicted in Figure 1.

With regards to practice towards medical research it was seen that only 18.8% (n=57) students participated in any kind of research, while 81% (n=246) did not participate in research. When asked about research projects it was observed that 15.2% (n=46), 3% (n=9) and 0.7% (n=2) participated in one, two and three projects respectively, while an alarming 81% (n=246) did not participate in any research projects (Table 2).

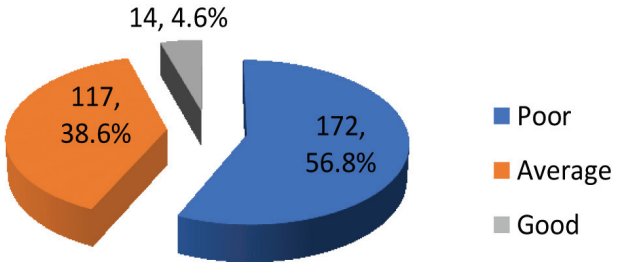

Figure 1: Knowledge about basic research.

With regards to attitude 98% (n=297) displayed positive attitude towards research, while 2% (n=6) displayed negative attitude. This is depicted in Figure 2.

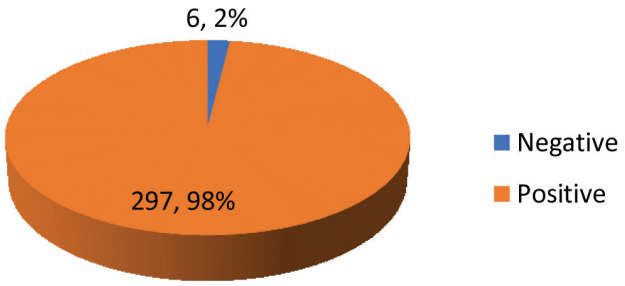

Figure 2: Attitude and approach towards basic research.

Table 2: Students practice towards medical research.

Parameter		*n (%)*
Did you participate in any research project before.	Yes	57 (18.8)
	No	246(81.2)
How many research projects did you participate in? (zero if you never participated).	0	246(81.2)
	1	46(15.2)
	2	9(3.0)
	3	2(0.7)
How many publications do you have? (zero if you don't have publications).	0	300(99)
	1	3(1.0)
Have you ever enrolled / Attended research methodology workshop or training?	Yes	112(37)
	No	191(63)
How Many Research related oral/ poster presentations did you do? (zero if you don't have poster presentations).	0	293(96.7)
	1	9(3.0)
	4	1(0.3)
Total		303

With regards to perceived barriers faced by students towards practicing medical research, our study observed

that 80.5% (n=244) students believed it was due to lack of time to do research because of educational tasks, 78.5% (n=238) shared that it was because of lack of familiarity with research skills/ statistical analysis, 76.9% (n=233) was due to lack of familiarity with writing and submitting research proposal/research papers, 71.9% (n=218) was due to lack of confidence in potential for completing research, 58.1% (n=176) was due to lack of motivation or guidance, 54.1% (n=164) was because of lack of suitable research space/ infrastructure/equipment, 53.8% (n=163) was due to lack of funds or timely funding of research project, 41.6% (n=126) believed it was due to lack of cooperation between departments and research centres, 39.9% (n=121) shared that the barrier for them was lack of interest in research and 32.3% (98) believed that lack of access to research papers and studies were the reasons (Figure 3).

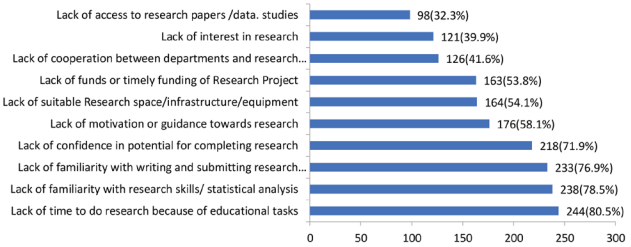

Figure 3: Perceived barriers faced by students towards practicing medical research.

An association between age, gender and current phase towards knowledge was also studied. A Fisher's exact test was applied and there was a significant association between age and the current phase with regards to knowledge. It was observed that as age and phase of studying progressed there is also an increase in the knowledge about research. It is depicted in Table 3.

Table 3: Association between age, gender, and current phase towards knowledge.

	Knowledge			*Total*	*P value (fisher's exact test)*
	Poor	*Average*	*Good*		
Age					
17-19	40(56.3%)	31(43.7%)	0(0%)	71	
20-22	108(58.1%)	69(37.1%)	9(4.8%)	186	0.037*
≥23	24(52.2%)	17(37%)	5(10.9%)	46	
Gender					
Don't want to reveal	2(50%)	2(50%)	0(0%)	4	
Female	115(55%)	83(39.7%)	11(5.3%)	209	0.781
Male	55(61.1%)	32(35.6%)	3(3.3%)	90	
Current phase					
Phase 1	65(67.7%)	30(31.3%)	1(1%)	96	
Phase 2	71(58.2%)	48(39.3%)	3(2.5%)	122	0.001*
Phase 3	36(42.4%)	39(45.9%)	10(11.8%)	85	

*Significant association

Similarly, an association between age, gender and current phase towards attitude was also studied. It is depicted in Table 4.

An association between duration of library use per week for reading, with regards to knowledge, attitude and current phase was also studied. A Fisher's exact test was applied and we found there was no association. This is depicted in Table 5

Discussion

Our study shows that undergraduate students have a very good attitude towards research, but however they are lacking both in terms of basic knowledge as well as practice towards research. Also, our study shows the various barriers and challenges faced by medical students towards research. In a cross-sectional descriptive study (2015) by Mahtab Memarpour et al [7], questionnaires were administrated to undergraduates and postgraduates in medicine, dentistry, and pharmacy students of three schools in Shiraz and Iran. Mean student scores for attitude, knowledge and barriers were 68.97 ± 12.56, 70.99 ± 20.97 and 75.27 ± 15.38, respectively. On the knowledge parameter, 77.8% of students' scores fell above the middle of the possible attainable score, but 90% of attitude scores came below

Table 4: Association between age, gender and current phase towards attitude.

	Attitude		*Total*	*P value (fisher's exact test)*
	Negative	*Positive*		
Age				
17-19	1(1.4%)	70(98.6%)	71	
20-22	3(1.6%)	183(98.4%)	186	0.531
≥23	2(4.3%)	44(95.7%)	46	
Gender				
Don't want to reveal	1(25%)	3(75%)	4	
Female	3(1.4%)	206(98.6%)	209	0.146
Male	2(2.2%)	88(97.8%)	90	
Current phase				
Phase 1	1(1%)	95(99%)	96	
Phase 2	0(0%)	122(100%)	122	0.007*
Phase 3	5(5.9%)	80(94.1%)	85	

*Significant association

Table 5: Association between duration of library use per week for reading, with regards to knowledge, attitude, and current phase.

Duration of library use per week for reading	*Poor*	*Average*	*Good*	*Total*	*P value (fisher's exact test)*
> 8 hours	12(57.1%)	8(38.1%)	1(4.8%)	21	
0 hours	54(66.7%)	25(30.9%)	2(2.5%)	81	0.081
1-4 hours	82(50%)	71(43.3%)	11(6.7%)	164	
4-8 hours	24(64.9%)	13(35.1%)	0(0%)	37	
Current phase					
Duration of library use per week for reading	*Phase 1*	*Phase 2*	*Phase 3*	*Total*	*P value (fisher's exact test)*
> 8 hours	4(19%)	11(52.4%)	6(28.6%)	21	
0 hours	32(39.5%)	25(30.9%)	24(29.6%)	81	0.403
1-4 hours	50(30.5%)	69(42.1%)	45(27.4%)	164	
4-8 hours	10(27%)	17(45.9%)	10(27%)	37	
Attitude					
Duration of library use per week for reading	*Negative*	*Positive*		*Total*	*P value (fisher's exact test)*
> 8 hours	0(0%)	21(100%)		21	
0 hours	2(2.5%)	79(97.5%)		81	
1-4 hours	2(1.2%)	162(98.8%)		164	0.388
4-8 hours	2(5.4%)	35(94.6%)		37	

the middle of the possible attainable score, while our study shows that only 4.6% (n=14) had good knowledge towards research. Undergraduate students (70.27 ± 12.00) showed a more positive attitude to research than postgraduate students (65.57 ± 13.06) (p = 0.001), while in our study we observed that 98% (n=297) showed positive attitude and only 2.0% (n=6) showed negative attitude. Many barriers were highlighted by students

such as lack of funding support and lack of time for research. Similarly, our study also highlighted that lack of time to do research because of educational tasks, lack of confidence in potential for completing research, lack of familiarity with research skills/ statistical analysis, lack of motivation or guidance towards research, lack of funds or timely funding of research project and lack of cooperation between departments and research centres were some of the barriers.

Another cross-sectional questionnaire survey was done by Pallamparthy et al [27] from Kolar, Karnataka, in 2019. The knowledge scoring regarding the concept of re-search and its methodology was 70%, while in our study only 4.6% students had a good knowledge score on research. Out of all participants, 60% responded strongly to having research in undergraduate curriculum, 57% believed that research is good for gaining better understanding of the subject, 41% students believed that it will improve clinical practice and 56% believed research is a waste of time and interrupts studies. While in our study, 75.6% (n=229) agreed that research should be taught to all students, 84.8% (n=257) agreed that research is useful for every healthcare professional, 91.4% (n=277) students agreed that research is connected to their field of study and may be useful for the future career. In the Kolar study, some of the barriers to research among the students were lack of awareness, lack of self-interest, lack of funding, lack of faculty encouragement and lack of time. This was similar to our study, in which students believed lack of time, lack of confidence, lack of familiarity with research skills/ statistical analysis, lack of motivation or guidance towards research, lack of funds and lack of cooperation between departments and research centres were some of the barriers towards research. In conclusion, most of the participants had research awareness and a positive attitude towards research. Some of the challenges raised revolved around ignorance, lack of proper time, funding, and a lack of enough follow-up with the patients.

The major limitation of our study is that it was conducted in a single centre. Therefore, we propose that future studies should include multiple centres across different states and throughout the country to have a better understanding about this important issue. This will help the policy makers in implementing remedial measures to improve the research practices among under graduate medical students.

Conclusion

Most students have a positive attitude towards research, while they lacked in knowledge and practice towards research. Many barriers were identified. These findings could guide policy makers in modifying the present MBBS curriculum and include research methodology as part of the undergraduate medical education. If the universities and educators can investigate these barriers and provide an environment favourable for research, more undergraduate students will get into research from a young age and will ultimately help them in patient care as they graduate as a primary care physician.

Acknowledgement

We would like to acknowledge our statistician, Mr. Vidhu Joshy for the help in this study.

Conflicts of interest

Authors declare no conflicts of interest.

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