

Knowledge, attitude, practices and perceived barriers towards research among the undergraduate medical students of Government Medical College in Rajasthan

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Abstract

Introduction: Research in medicine has an impact on prevention, diagnosis, and newer treatment for the medical ailments. It has brought reforms in policies for healthcare programs. Research experience during initial study years may help the young doctors in their career decisions. However, in India, the involvement of undergraduates in medical research is less.

Aim: To assess the knowledge, attitudes, practices and perceived barriers towards research among the undergraduate students of a Government medical College in Rajasthan.

Materials and Methods: This cross-sectional, observational, questionnaire based study was conducted amongst medical students of a Government medical college in Rajasthan. A validated, structured questionnaire was self administered to collect data from 410 students who voluntarily agreed to participate in the study.

Results: Out of the total 410 students, 368 returned the completely filled questionnaire, giving a response rate of 89.7%. Among these 368 students, 74.2% students had poor level of knowledge towards medical research, 16.6% had fair level of knowledge and only 9.2% students had a satisfactory knowledge level. 73.6% students admitted of having difficulty in understanding the basic research concepts and 74.2% were insecure about the research data analysis. Only 13.3% of students admitted to have interest in research activities. Although 69.8% of the students believed that research should be taught to all the students but only 11.1% thought that research will be helpful in their future career. 7.3% students admitted to have participated in any research project. Only seven students had published their research work and only four students presented their research findings at a scientific meet/conference. The major barriers to research, faced by students were lack of: time (81.8%), skills (81%), interdepartmental cooperation (78.5%), funding (76.3%), motivation (74.4%) and interest (73.4%).

Conclusion: The study participants showed a poor knowledge level towards basic medical research. Lack of awareness, time, skills, funds, motivation and lack of interest were the most prevalent barriers. Measures like conducting a hands-on training course on research methodology, organizing research workshops and learning programs under the supervision of the senior faculty members can improve the students' research skills.

Keywords: Data analysis, Likert scale, Medical research, Mentorship, Questionnaire, Research grant

INTRODUCTION

Research is defined as "The scientific process of gathering information or detailed study to discover and understand new information that would initiate, modify or terminate present understanding." [1] In other words, scientific research is the systematic approach by which theories and hypotheses can be proved or disapproved. [2] It helps in the prevention, diagnosis and improves treatment of diseases and, thus has significant impact on development of better healthcare policies. It is essential that healthcare providers especially doctors, possess adequate knowledge and skill of conducting research, as it plays crucial role in developing critical thinking and reasoning skills of a health professional.

Research at the undergraduate level, is self-directed work under the guidance and supervision of a mentor/guide. [3] It is imperative to develop a positive attitude among

students towards scientific research from the beginning of their medical career. [4] Studies have shown that encouraging and motivating students towards research early in career can significantly improve the knowledge, skills and positive attitude towards science and scientific research. [5] Moreover, student research can significantly affect the published output of the institution, and to further extent, also of the country. [6,7]

Students in developed countries get ample incentives and grants to propagate research. A few colleges have even made it mandatory for undergraduate students to undergo research training and undertake research under the guidance of the medical faculty. [8,9] Compulsory research course along with the mandatory research project has a positive impact on student's knowledge and attitudes towards research. [4,10] Undergraduate research promotes student's judgment and encourages students to

make an understanding of what they learn. It promises better clinical care, critical reasoning, future research activity, and transition of the students from novice to life long learners. [3] While conducting research projects, students learn to identify the research question, generate research hypotheses, critically appraise literature, design the study, collect and analyze the data and write a detailed project report. Although not mandatory, students are also encouraged to publish their research work in medical journals and do presentations in conferences.

Although undergraduate research has become an integral part of medical education in developed countries, it still seems to be a far cry in India. It is seen that research programs in medical colleges get the lowest priority and hence medical students have a limited understanding of research and what it entails. Majority of colleges lack even the minimum infrastructure. Teaching is mostly didactic with little emphasis on practical knowledge or patient care and the concept of evidence-based medicine is almost non-existent. [11] Medical research, which on paper is integral part of medical education, is perhaps the most neglected field in majority of our colleges.

Various hurdles reported for conducting research at undergraduate level are lack of supervision and research training, lack of interest, lack of time and motivation, lack of funding and uncertainty about the ability to successfully complete the research. [4,10-12] Moreover, due to lack of research curriculum during their training, our medical graduates become less interested in the field of research and when

they get into their post graduation, their ability to write a protocol or proposal is not up to mark. Although some of the regulatory bodies encourage undergraduates to carry out research by providing grants but still there is lack in the research quantity and quality particularly among the undergraduate medical students.

An essential step in enhancing the undergraduate medical students role in research field is by exploring their underlying potential (knowledge and attitudes) and the perceived barriers that they might face while practicing research. With the above background this study was conducted to assess the knowledge, attitude and perceived barriers toward research among the undergraduate medical students of Government Medical College in Rajasthan.

METHODS AND METHODS

Study site, study design and study population: This cross sectional, observational, questionnaire based study was conducted at Government Medical College in Rajasthan for a period of six months. The brief study protocol was explained to all the undergraduate students from first year to final phase of MBBS and were asked for their voluntary participation in the study. A total of 410 students voluntarily agreed to participate in the study. A structured open-ended, self-administered questionnaire was constructed and was reviewed by an expert panel for content, validity and reliability. Previous literature and researcher's personal experiences were used to form and phrase the questions. [2,13-16]

Study questionnaire: The final questionnaire consisted of three parts: Part 1 was divided into two subsections: Part 1(Section A) sought the demographic details (age, gender, year of enrollment, hostel or day scholar) of the study participants, whereas Part 1(Section B) consisted of five questions designed to assess the knowledge of medical students' regarding basic research information. The questions simulated a test with multiple answers and an additional 'I Don't Know' choice. Questions were reproduced from a previous study by Memarpour *et al.* [2] Part 2 of the questionnaire again was divided into two subsections: Part 2(Section A) aimed to assess students' attitude/approach towards research and consisted of 10 statements, responded by three-point likert scale; Agree, Uncertain and Disagree. These questions were reproduced from a previous study by Assar *et al.* [15], whereas 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.* [16]

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.* [2]

Any further issues or views were allowed to be discussed at the end of the questionnaire under the heading 'Additional Comments'. Final version of the questionnaire is attached as **Annexure 1** at the end of this article.

Sample collection: The detailed study protocol was explained to the participants and prior to their enrollment; their signed written informed consent was sought. After seeking permission from the respective departments, the written informed consent and the questionnaire were distributed to the students in their lecture theaters before/after lectures and they were asked to fill and submit the same next day, without revealing their identity. In the final analysis, only the completely filled questionnaires were included.

Statistical Analysis: The data obtained was managed on an Excel spreadsheet. Simple descriptive statistics were used to generate frequencies, percentages, and proportions.

RESULTS

Out of the total 410 students enrolled in the study, 368 returned the completely filled questionnaire, giving a response rate of 89.7%. Among these 368 students, 197 (53.5%) were males and 171 (46.5%) were females with a male: female ratio of 1.2: 1. Majority of the study participants were second and third year MBBS students (230/388; 62.5%). Out of the total 368 study participants included in the study, 267 (72.6%) were staying in college hostel, whereas 76 (20.6%) were day scholars and 25 (6.8%) were staying outside as paying guests. Table 1 depicts the gender wise distribution of medical students staying in college hostel, as day scholar and paying guest.

Table 1: Gender wise distribution of medical students staying in college hostel, day scholar and paying guest. (n=368)

Study Year	Students in college hostel (n=267)		Day Scholars (n=76)		Paying Guest (n=25)		Total
	Male	Female	Male	Female	Male	Female	
First	36	27	07	04	Nil	Nil	74
Second	54	35	17	09	03	05	123
Third	47	29	13	07	05	06	107
Fourth	25	14	11	08	02	04	64
Total	162	105	48	28	10	15	368

Out of the total 368 study participants, 273 (74.2%) students had poor level of knowledge towards basic research information, 61 (16.6%) had fair level of knowledge and only 34 (9.2%) students had a satisfactory knowledge level. On assessing the students' attitude and approach towards basic medical research, majority of the students admitted of having difficulty in understanding the basic concepts of research (73.6%) or were insecure about the research data analysis (74.2%). Only 13.3% of students admitted to have interest in research activities. Although 69.8% of the students were of a view that research should be taught to all the students but only 11.1% thought that research will be helpful in their future career. Table 2 depicts the students' attitude and approach towards basic medical research.

Table 2: Students' attitude and approach towards basic medical research (n=368)

S.no.	Statements	Disagree (%)	Uncertain/ No opinion (%)	Agree (%)
1.	I find it difficult to understand the concepts of research	51 (13.9)	46 (12.5)	271 (73.6)
2.	Research is interesting and I like it	265 (72)	54 (14.7)	49 (13.3)
3.	I feel insecure concerning the analysis of research data, it makes me anxious	52 (14.1)	43 (11.7)	273 (74.2)
4.	Research should be taught to all students	75 (20.4)	36 (9.8)	257 (69.8)
5.	Research is useful to every health care professional	104 (28.2)	33 (9.0)	231 (62.8)
6.	Research is connected to my field of study and may be useful for my career	205 (55.7)	122 (33.2)	41 (11.1)
7.	Skills acquired from research are helpful in future career	218 (59.2)	97 (26.4)	53 (14.4)
8.	I am inclined to study the details of research procedures carefully	179 (48.6)	128 (34.8)	61 (16.6)
9.	I will employ research approaches in my profession	196 (53.3)	117 (31.8)	55 (14.9)
10.	Research-orientated thinking plays an important role in my daily life	182 (49.5)	133 (36.1)	53 (14.4)

Out of the total study participants, 27 (7.3%) students admitted to have participated in any research project before and only 5/27; 18.5% of these students had worked

in two or more than two research projects during their study curriculum. Only 7/27; 25.9% students admitted to have one or more than one research publication published in a peer reviewed journal and 4/27; 14.8% had presented their research findings as oral or poster presentation at the scientific meet or conference. None of the study participant admitted to have attended a formal research methodology workshop or training.

The major barriers to research, as opined by students were lack of time (81.8%), skills (81%), interdepartmental cooperation (78.5%), funding (76.3%), motivation (74.4%) and interest (73.4%). Table 3 depicts the Perceived barriers faced by students towards practicing medical research.

Table 3: Perceived barriers faced by students towards practicing medical research

S.no	Statements	Disagree (%)	Uncertain/ No opinion (%)	Agree (%)
1.	Lack of funds or timely funding of Research Project	29 (7.9)	58 (15.8)	281 (76.3)
2.	Lack of suitable Research space/infrastructure/equipments	62 (16.9)	41 (11.1)	265 (72.0)
3.	Lack of cooperation between departments and research centers	47 (12.8)	32 (8.7)	289 (78.5)
4.	Lack of interest in research	51 (13.8)	47 (12.8)	270 (73.4)
5.	Lack of motivation or guidance towards research	57 (15.5)	37 (10.1)	274 (74.4)
6.	Lack of time to do research because of educational tasks	39 (10.6)	28 (7.6)	301 (81.8)
7.	Lack of confidence in potential for completing research	95 (25.8)	37 (10.1)	236 (64.1)
8.	Lack of access to research papers/data/studies	105 (28.5)	35 (9.5)	228 (62.0)
9.	Lack of familiarity with writing and submitting research proposal/research papers	47 (12.8)	29 (7.9)	292 (79.3)
10.	Lack of familiarity with research skills/statistical analysis	47 (12.8)	23 (6.2)	298 (81.0)

DISCUSSION

Research is an important element in the advancement and up-gradation of any healthcare system accessible to general population. To carry out research adequate knowledge, a positive attitude and acceptable skills are required. [17] In the present study we intended to assess the knowledge, attitude, practice, and perceived barriers to research among the undergraduate students of Government Medical College in Rajasthan. Our study results showed that the study participants had poor knowledge levels about the concepts of basic medical research, and majority of them admitted to have lack of interest in research. However a high level of perception towards the relevance of research as useful practice was observed among the students. The burden of perceived barriers towards research were observed to be high, commonest being: lack of time, resources and research skills; difficulty in writing/submitting research proposals

or paper; lack of funding and cooperation between other departments.

The research participation, publication or presentation by students was negligible. Only 7.3% of the study participants admitted of having participated in research projects and had a low publication rates in comparison to the participation rate. As the students advance academically their priorities change and they get exposed to different facilitators and subjects, so most of them either do not complete their research project or if completed they do not get the findings published. Although, some of the universities in India have made mandatory paper presentation and manuscript sent for publication for postgraduates as a part of their study curriculum, but it is not mandatory for undergraduates to involve in research. Consequently, very low proportion of students wants to pursue their career in research. Exposure of students to the research centers of national importance, their interactions with eminent research scientists or scholars and work done by them can get the students motivated towards research.

The undergraduates should be exposed to the research methodology at periodic intervals in order to hone their research skills. The students who complete their research work/project should be encouraged to present it in conference and publish the same in a peer reviewed scientific journal. Developing student research programs and providing some incentives from the administration/university level can encourage the students towards research. All the faculties should be trained in research methodology and they should also encourage the students to take up research projects. Studies from countries with better medical education system and more institutional student research programs show a growing interest in research among the undergraduates, positive feelings towards research, and more motivation and optimism to pursue careers in research with a higher level of confidence about the research skills. [18-21]

Majority of students opined that research is important for every healthcare professional and should be taught to all students but very few of them agreed to have any inclination towards research. The probable reason for the same could be lack of research skills, lack of any formal research methodology training or lack of any encouragement from faculty members. In the current study, the major barriers to research, as opined by students were lack of time (81.8%), skills (81%), interdepartmental cooperation (78.5%), funding (76.3%), motivation (74.4%) and interest (73.4%). Various other studies regarding barriers of research, have reported similar findings as of ours. [10,16,20] A proposed solution to overcome the aforesaid barriers can be, integration of research projects as part of the curricular requirements and the development of learning programs that focus on improving the students' research skills under the supervision of the faculty staff members. Moreover the barriers also need to be discussed at the administrative level to bring in changes to reduce the obstacles faced by students.

CONCLUSION

Number of physician-scientists in medical practice is declining; more so in our country, an observation, which suggests that environment for research-based careers is not conducive in India. The majority of data on attitudes and perceptions of medical students towards research is from industrialized countries but there is still dearth of data in this regard from India. In order to enhance the state of medical education, it is important to understand the student's attitude towards research and the perceived barriers. Development of structured research skills, learning programs, integration of research as an educational task and proper mentoring from the senior faculty members can surely improve the students' skills and approach towards research. We believe that data extrapolated from our study will be helpful to understand the resources and opportunities available to undergraduate students to conduct research and also will help to overcome the barriers faced by them.

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Annexure 1

STUDY QUESTIONNAIRE

Knowledge, attitude, practices and perceived barriers towards research among the undergraduate medical students of Government Medical College in Rajasthan

Please fill this questionnaire to help us to identify Knowledge, attitude, practices and perceived barriers towards research among the undergraduate medical students. By completing this questionnaire you are indicating your willingness to participate. Your participation is greatly appreciated.

Part 1 (Section A)

Demographics details

1. Age in years:
2. Gender:
3. Enrollment Year:
4. Do you stay in :
 - College Hostel
 - Day Scholar
 - Paying Guest

Part 1 (Section B)

Assessment of students' knowledge about basic research

1. Which of the following is not part of a scientific original paper?
 - a. Discussion
 - b. Introduction
 - c. Letters to the Editor
 - d. Methods and Materials
 - e. I don't Know
2. In which part of an article do you talk about the study limitations?
 - a. Acknowledgment
 - b. Methods and Materials
 - c. Discussion
 - d. Introduction
 - e. I don't Know
3. Which of the following types of research sees sample loss more commonly?
 - a. Clinical trial
 - b. cross Sectional

- c. Case – control
 - d. Cohort
 - e. I don't Know
4. Which way of writing reference is approved for medical dissertations and most medical journals?
- a. Vancouver
 - b. Harvard
 - c. None
 - d. Chicago
 - e. I don't Know
5. Which of the following software is used for incorporating references in scientific article?
- a. SPSS
 - b. Access
 - c. Concept Map
 - d. End Note
 - e. I don't Know

Part 2 (Section A)

Students' attitude and approach towards basic medical research

S.no.	Statements	Disagree	Uncertain/ No opinion	Agree
1.	I find it difficult to understand the concepts of research			
2.	Research is interesting and I like it			
3.	I feel insecure concerning the analysis of research data, it makes me anxious			
4.	Research should be taught to all students			
5.	Research is useful to every health care professional			
6.	Research is connected to my field of study and may be useful for my career			
7.	Skills acquired from research are helpful in future career			
8.	I am inclined to study the details of research procedures carefully			
9.	I will employ research approaches in my profession			
10.	Research-orientated thinking plays an important role in my daily life			

Part 2 (Section B)*Students' practice towards medical research*

1. Did you participate in any research project before?
 - YES
 - NO
2. How many research projects did you participate in? (please write zero if you never participated)
3. How many publications do you have? (please write zero if you don't have publications)
4. Have you ever enrolled/Attended research methodology workshop or training?
 - YES
 - NO
5. How many Research related oral/poster presentations did you do? (please write zero if you don't have poster presentation)

Part 3*Perceived barriers faced by students towards practicing medical research*

S.no.	Statements	Disagree	Uncertain/ No opinion	Agree
1.	Lack of funds or timely funding of Research Project			
2.	Lack of suitable Research space/infrastructure/equipments			
3.	Lack of cooperation between departments and research centers			
4.	Lack of interest in research			
5.	Lack of motivation or guidance towards research			
6.	Lack of time to do research because of educational tasks			
7.	Lack of confidence in potential for completing research			
8.	Lack of access to research papers/data/studies			
9.	Lack of familiarity with writing and submitting research proposal/research papers			
10.	Lack of familiarity with research skills/statistical analysis			

Additional Comments