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Medical research: Perception and barriers to its practice among medical school students of Chennai

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Abstract:

BACKGROUND: Knowledge of medical students about research has been little explored. Although there has been a practice of medical research among undergraduate level, the practice is not universal and there have been potential barriers and difficulties in carrying out the research. The present study was done to find the perception and attitude toward medical research and to assess the practices and potential barriers in carrying out medical research.

METHODOLOGY: This cross-sectional study was conducted among 344 medical school students of a medical college in Chennai, Tamil Nadu, in 2018. Systematic random sampling was used. The study tool was self-administered questionnaire including questions on knowledge, barrier, and 5-point Likert scale for assessing attitude. Adequate knowledge (>70% correct answers) and positive attitude (>25 score) were considered.

RESULTS: Among the 344 study participants, only 127 (36.9%) of students had adequate knowledge and 68 (19.8%) had positive attitude toward medical research. Regarding practice of research, only 34.3% had conducted a research and only 17.4% had published in journals. Difficulty in choosing topic, difficulty in collecting data, and allocation of time amidst academic activities were considered as a barrier by 41.6%, 40.7%, and 45.9%, respectively. Association of adequate knowledge and practice was statistically significant for age ($P = 0.000$), gender ($P = 0.000$), and academic year ($P = 0.000$).

CONCLUSION: Adequate knowledge and positive attitude were lacking in majority of students. Barriers could be addressed by support programs and sensitization toward research.

Keywords:

Medical research, perception, barriers, medical students

Introduction

In view of prompt change in disease pattern, training in medical research is considered to be an important aspect of medical education. Conducting a research helps to get a more precise picture of individual/community health and also aids in health system policy-making. Many studies have proved that medical students though they have a reasonable attitude toward research only about 50% of students participated in research during

their undergraduate period. Literature has shown that cost and complexity of research and time crisis led to decline in research among students.^[1] Furthermore, research is very essential for evidence-based medicine practice. Due to the changing pattern of disease, evidence-based medicine is very crucial in the modern medicine to prevent and treat the disease. Medical research paves a way toward evidence-based medicine.^[2]

Studies have reported that medical students have only moderate level of knowledge toward medical research and very low level of practice. Majority of the medical students perceived research as stressful

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and complex.^[3] Intensive training and student support program in this regard have been associated with significant improvement in knowledge and attitudes of students toward health research.^[4,5] Although many medical colleges have incorporated research methodology training through workshops and continuing medical education, they do not accentuate the importance of it during medical practice.^[6]

Knowledge of undergraduate medical students about research has been little explored. Although there has been a practice of medical research among undergraduate level, the practice is not universal and there have been potential barriers and difficulties in carrying out the research.^[7] Studies which assessed the practice have not explored attitude toward medical research and much of the barriers faced. With this intent, the present study was planned to address the gap by assessing knowledge, attitude, practice, and barriers altogether. The objectives of the study were to find the perception and attitude toward medical research among medical school students and to assess the practices of medical research and potential barriers in carrying out the medical research among medical school students.

Methodology

The study was a cross-sectional type of study conducted among medical school students of a medical college in Chennai, Tamil Nadu. The study duration was from May 2018 to September 2018. The study population constitutes medical school students – Bachelor of Medicine and Bachelor of Surgery (MBBS) belonging to first to final academic years of a private medical school in Chennai.

Sample size determination

Sample size calculation for cross-sectional studies = $4 * p * q / L^2$

(p – prevalence, $q = 1 - p$, L – relative error).

Considering the prevalence of knowledge from previous study as 70%,^[5] the sample size calculated from the formula was 172. On adjusting the sample size with a design effect of 2, the final sample included was 344.

Sampling

The sampling method followed was systematic random sampling. Eighty-six students were included from every academic year of MBBS. – 43 males and 43 females were included from 1st to 4th year. Attendance of every batch was used to include the first 43 male and 43 female students of a batch after obtaining written informed consent. Those who were not willing to participate were not considered in that order, and the next student who consented to

participate was included until reaching the required sample in each academic year.

Study tool

A pretested, validated, self-administered questionnaire that assesses knowledge/perception, attitude, practice, and barriers of conducting research was used. The study tool consists of five sections. Section I consists of general information such as age, sex, academic year, education, and occupation of parents. Section II comprised questions, which assesses the knowledge/perception about medical research such as type of research, research hypothesis, Specific, Measurable, Attainable, Realistic, and Timely (SMART) criteria of objective, probability sampling, informed consent form, research protocol, data entry, and sources of research. Section III assesses the attitude toward medical research using 5-point Likert scale. Section IV of the questionnaire was framed to find the practice of medical research among medical students by asking them whether they have conducted any medical research, accessed peer-reviewed journal, attended/presented in any conferences, and published their work in any journals. Section V assessed and explored the barriers faced by them in conducting medical research.

Outcome of the study

Potential barriers, knowledge about medical research, practice of medical research, correct knowledge, and adequacy in practice were the study outcomes.

Data analysis

Data were entered in Microsoft Excel sheet and analyzed with IBM SPSS software version 21.0, India. Adequate knowledge was considered when at least 70% of the knowledge questions were answered right. Adequate practice was considered when at least 50% of the questions were answered positive. Scores were given to statements of perception – strongly agree – 5, agree – 4, neutral – 3, disagree – 2, and strongly disagree – 1. A score of >2.5 was considered to be positive attitude toward research. Proportions and percentages of correct knowledge, right attitude, and practices on medical research and its barriers were calculated. Chi-square test and Mann–Whitney test were applied. $P < 0.05$ was considered significant.

Ethical consideration

This study has been approved by the Institutional Human Ethics Committee. Written informed consent was obtained from the students of academic year (I–IV MBBS) who were willing to participate in the study.

Results

Among the 344 study participants, around 50.3% were in the age group of 20 and 21 years and around

66.3% were hostellers. About 50% of the participants are male and 50% are female. Among the participants, any of the parents' occupation as research based was 31 (9%) and nonresearch-based parent occupation was 313 (91%).

Among the 344 study participants, only 108 (31.4%) can correctly choose the description of hypothesis and only 87 (25.3%) had correct knowledge about SMART criterion components of research objective. Correct knowledge about sampling methods, ethical consideration of research, components of research protocol, and data analysis software were 43.6%, 41%, 39%, and 29.3%, respectively. One hundred and ninety-four (56.4%) respondents had knowledge about the agencies of medical research. Majority (79.9%) did not know about online medical research database such as PubMed [Table 1]. Adequate knowledge was considered (when at least 70% of the knowledge questions were answered right), about medical research was found in 127 (36.9%) of students.

Table 1: Distribution of study participants according to knowledge about medical research (n=344)

Knowledge on research components	Correct knowledge, n (%)	Incorrect knowledge, n (%)
Types of research	107 (31.1)	237 (68.9)
Hypothesis description	108 (31.4)	236 (68.6)
Components of research protocol	134 (39)	210 (61)
SMART objective description	87 (25.3)	257 (74.7)
Sampling methods	150 (43.6)	194 (56.4)
Data analysis software	101 (29.3)	243 (70.7)
Ethical considerations	141 (41)	203 (59)
Agencies for medical research	194 (56.4)	150 (43.6)
Online medical research database	69 (20.1)	275 (79.9)

SMART=Specific, Measurable, Attainable, Realistic, and Timely

A five point Likert scale was used to assess the perception about research. It has two sections – attributes of research and motivation and barriers. Among the 344 study participants, around 42.2% strongly agreed that medical research can be pursued as an exclusive job career. Around 31.4%, 27%, and 40.7% strongly agreed that research will enrich the medical education and parents and teachers' support is important for conducting a research, respectively [Table 2]. Positive attitude (a score of > 25) toward medical research was found in 68 (19.8%) of students.

Only 34.3% had conducted a research and only 17.4% had published an article. More than half of the study participants (59.6%) have attended a research methodology workshops or conferences, but only 95 (27.6%) had presented in research conference. Adequate practice of medical research was found in 60 (17.4%) of students [Table 3].

Difficulty in choosing topic, difficulty in collecting data, and allocation of time amidst academic activities were considered as a barrier by 41.6%, 40.7%, and 45.9%, respectively. Around 38.7% considered getting permission from review board as a barrier for conducting research. All (100%) of the study participants have faced at least one barrier [Table 3].

Association between knowledge and practice of medical research with various variables showed that age, gender, and academic year were statistically significant than the other variables [Table 4].

The mean score of gender was 21.88 for males and 21.5 for females and that of the parents' occupation was 21.8 for research-based occupation and 20.2 for nonresearch-based occupation [Table 5]. Kruskal–Wallis test was applied to find any difference in mean scores of perception in various academic year and age groups.

Table 2: Distribution of study participants according to attitude about medical research (n=344)

Variable	Strongly agree, n (%)	Agree, n (%)	Neutral, n (%)	Disagree, n (%)	Strongly disagree, n (%)
Attributes of medical research					
Can consider medical research as an exclusive future job career option after medical school completion	145 (42.2)	141 (41)	45 (13.1)	11 (3.2)	2 (0.6)
Research contributes to innovations in medical field	100 (29.1)	146 (42.4)	74 (21.5)	18 (5.2)	6 (1.8)
Financial prospects are good for research career	51 (14.8)	119 (34.6)	99 (28.8)	48 (14)	27 (7.8)
Research enriches the medical education	108 (31.4)	122 (35.5)	81 (23.5)	15 (4.4)	18 (5.2)
Research helps in the improvement of clinical skills	96 (27.9)	142 (41.3)	76 (22.1)	16 (4.7)	14 (4.1)
Motivation and barriers					
Medical students get special attention from their peers on doing research	55 (16)	187 (54.4)	59 (17.2)	24 (7)	19 (5.5)
Parents' support is important for doing research	93 (27)	138 (40.1)	75 (21.8)	28 (8.1)	10 (2.9)
Teacher guidance is important for doing research	140 (40.7)	127 (36.9)	60 (17.4)	11 (3.2)	6 (1.7)
Lack of time is an obstacle for conducting a research	110 (32)	125 (36.3)	71 (20.6)	25 (7.3)	13 (3.8)
Conducting research is hard and stressful	91 (26.5)	112 (32.6)	101 (29.4)	22 (6.4)	18 (5.2)

It was found that there was no significant difference in mean ranks of age groups – 19–20 (179.6), 21–22 (165.6), and ≥23 (135.4) years. Likewise, there was no significant

difference in mean ranks of academic years – 1st year (136.3), 2nd year (124.2), 3rd year (145.4), and 4th year (126.5).

Table 3: Distribution of study participants according to practice and barriers of medical research (n=344)

Serial number	Variables	Yes, n (%)	No, n (%)
Practice of medical research			
1	Participated in research methodology workshop	205 (59.6)	139 (40.4)
2	Have searched for medical journals	117 (34)	227 (66)
3	Have written a research protocol	117 (34)	227 (66)
4	Conducted a medical research	118 (34.3)	226 (64.7)
5	Have done a scientific presentation in a conference	95 (27.6)	249 (72.4)
6	Published of research study in journal	60 (17.4)	284 (82.6)
Barriers to medical research			
1	Difficulty in choosing topic	143 (41.6)	201 (58.4)
2	Getting permission from review boards	133 (38.7)	211 (61.3)
3	Difficulty in writing proposal	104 (30.2)	240 (69.8)
4	Difficulty in collecting data	140 (40.7)	204 (59.3)
5	Difficulty in analysis	111 (32.3)	233 (67.7)
6	Difficulty in writing report	88 (25.6)	256 (74.4)
7	Allocation of time among routine academic activities	158 (45.9)	186 (54.1)

Discussion

Knowledge on medical research among undergraduates has an appropriate placement in their academic foundation and critical thinking. The knowledge is important to understand the basic models in health-related literature that being studied and to increase broad thinking and communication skills and also to combat the professional competency in their specialties in future. [8,9] In this study, 31.4% had knowledge about the concept of hypothesis and 41% had knowledge about informed consent. A study done by Satav PJ *et al.* [10] showed that 85% were aware about the concept of informed consent and 48% were aware about the hypothesis concept. Similarly, a study done by Pawar DB *et al.* [11] showed that 58% had concept of hypothesis and 98% had knowledge about the informed consent. Conducting regular workshop on research, small group literature review, introducing research methodology in the curriculum, proper motivation, and the guidance from the teachers will help to increase the knowledge and skills of conducting research among medical students. [6]

A study conducted by Meraj *et al.* [3] inferred that 65.7% of students considered research to useful for their professional careers and relevant to their daily life and 62.2% perceived research as stressful complex. In our present study, 83.2% of respondents had agreement (strongly agree plus agree) that medical research was a career option after MBBS. Furthermore,

Table 4: Association between knowledge and practice of medical research with selected variables (n=344)

Variables	Adequate knowledge, n (%)	Inadequate knowledge, n (%)	P	Adequate practice, n (%)	Inadequate practice, n (%)	P
Age (years)						
19-20	93 (47.2)	104 (52.8)	0.000	20 (10.2)	177 (89.8)	0.000
20-22	32 (23.9)	102 (76.1)		34 (25.4)	100 (74.6)	
≥23	2 (15.4)	11 (84.6)		6 (46.2)	7 (53.8)	
Gender						
Male	47 (27.3)	125 (72.7)	0.000	37 (21.5)	135 (78.5)	0.032
Female	80 (46.5)	92 (53.5)		23 (13.4)	149 (86.6)	
Academic year						
4 th year	27 (31.4)	59 (68.6)	0.000	7 (8.1)	79 (91.9)	0.000
3 rd year	55 (64)	31 (36)		11 (12.8)	75 (87.2)	
2 nd year	31 (36)	55 (64)		14 (16.3)	72 (83.7)	
1 st year	14 (16.3)	72 (83.7)		28 (32.6)	58 (67.4)	
Residence						
Hosteller	82 (36)	146 (64)	0.389	34 (14.9)	194 (85.1)	0.027
Day scholar	44 (38.3)	71 (61.7)		25 (21.7)	90 (78.3)	
Parents' occupation						
Research based	8 (25.8)	23 (74.2)	0.124	9 (29)	22 (71)	0.068
Nonresearch based	119 (38)	194 (62)		51 (16.3)	262 (83.7)	

Chi square test, P<0.05 is significant

Table 5: Association between scores of attitude toward medical research with selected variables (n=344)

Variables	Mean±SD scores	Z	P
Gender			
Male	21.88 (5.1)	-0.547	0.584
Female	21.5 (4.3)		
Residence			
Hosteller	22 (41.7)	-1.785	0.074
Day scholar	21 (4.6)		
Parents' occupation			
Research based	21.8 (4.8)	-1.665	0.096
Nonresearch based	20.2 (3.47)		

Mann-Whitney U-test, $P < 0.05$ is significant. SD=Standard deviation

59.1% of students had agreement (strongly agree plus agree) that conducting research is complex and stressful which is comparable with the previous study.^[10] Although the students have a positive attitude toward medical research their practice of conducting research is low this could be averted by reinforcing the fact that perceiving research is also a way of learning.

Alghamdi KM *et al.*^[6] in their study in Saudi Arabia found that only around half of the students participated in research during medical school although majority of participants felt that research is crucial in medical field. In the present study, only 34.3% has conducted research when compared to the Saudi study (55.3%). A study done by Giri PA *et al.*^[12] in Central India showed that 59.5% found lack of time due to the curriculum as a barrier in conducting a study in comparable with our study (45.9%). Similarly, the study done by Satav PJ *et al.*^[10] showed that 60% found lack of time as a barrier in conducting the research. A study conducted by Osman TA *et al.*^[13] also infers that insufficient time (68.3%) was one among the principle barriers in conducting research. Some of the barriers in conducting research among medical students could be more theoretical curriculum, lack of motivation, complexity of research, and casual attitude of the student.^[14] Addition of medical research courses and mandatory submission of research project with proper guidance from the faculties can help students allot proper time for conducting research along with their academic activities and it has a positive impact not only to the published institution but also the research output of the country.

Currently, in India, the status of undergraduate research is unsatisfactory and less static. To up bring the research knowledge among undergraduate students, the Indian Council of Medical Research has introduced short-term studentship.^[15] The program encourages the undergraduates to undertake research for 2 months in their own field of interest, and the students receive incentives and certificate as token of appreciation. Two-week hands-on training course on

research methodology will be useful to improvise the knowledge on research among various departments of undergraduates. Kishore Vaigyanik Protsahan Yojana program^[16] introduced by the Department of Science and Technology, Government of India, to identify and encourage talented students with an aptitude for research and encouraging by giving scholarship.

Limitation

This study is a single-center study, multicenter study that should include representation from public and private medical schools could give a better picture of barriers and attitude of medical research among medical students.

Conclusion

This study revealed that the knowledge and practice of medical research is average among the medical students. This study also ascertained potential barriers in doing medical research. Proper motivation and guidance from the teachers and parents should be present to develop the skills for conducting a medical research. Students who will walk the path of future research should have a sound knowledge about it.

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Conflicts of interest

There are no conflicts of interest.

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