Knowledge and perception regarding research among undergraduate medical students: a cross sectional study in Nilratan Sircar Medical college, Kolkata

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Abstract:

Background: Amendments in MBBS curriculum is increasing focus of research orientation, still there is lack of evidence regarding their perception towards research, especially in West Bengal.

Objective: To describe the knowledge and perception regarding research and their socio-demographic correlates among medical-undergraduate students of NRS Medical College and Hospital, during 2023.

Methodology: An observational descriptive study was done in cross-sectional design among Phase-1 and Phase-2 medical-undergraduate students of NRSMCH, Kolkata during August 2023. Calculated sample size was 231 (129 from Phase-1 and 102 from Phase-2) and stratified random sampling scheme was adopted. Participants were electronically interviewed using structured questionnaire. Data analysis was done using Microsoft Excel.

Results: Majority of the students were aged between 20 and 21 years (49.3%), male (67%), Hindu (82%), from nuclear-families (80.9%) and belonged to the upper class (69.3%). Students have varying degree of knowledge regarding various steps of conducting research, however, knowledge among phase I students was less than among phase II students. Median score regarding importance of research in academics and clinical practice was 8 (IQR:6-9) and for importance of involvement in research & motivation towards research was 7 (IQR:5-9). Median motivation score was only significantly different across sex, where females feel less motivated than males. As perceived by the study population, lack of adequate training come out as the biggest barrier in doing research.

Conclusion: Undergraduate medical students are motivated to conduct research but they are deficient in knowledge mostly due to lack of time in their busy curriculum and lack of adequate training.

Keywords: perception regarding research, research aptitude, undergraduate medical students, Nil Ratan Sircar Medical College, West Bengal.

Introduction

Research is defined as a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge.[1] Research challenges students to think critically, analyze data and solve complex problems. Undergraduate medical students' knowledge of research is critical for their professional development and for the progression of medical knowledge. Several studies have found that students have a generally good attitude towards research, with a large percentage indicating interest and readiness to participate in research activities. Students confront a number of problems and barriers, including a lack of resources, little research experience, and negative attitudes towards research. Promoting a favourable research environment and addressing these hurdles is recommended to improve research capacity at the undergraduate level.[2,3,4]

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A study of undergraduate students' perceptions of research indicated that the participants had a generally positive perspective and attitude, as well as a few hurdles to participating in medical research at the undergraduate level. However, the study also found that only a small percentage of students had published research papers, showing the prevalence of hurdles to research participation.[5]

Lectures and practical sessions like short research activities are done during the MBBS curriculum, but how actually the undergraduate students perceive the importance and implication of research and grow research aptitude during their coursework, is itself a research question. Evidence regarding the same is relatively scarce, as discussed above and especially deficient in West Bengal. In this context, the study is performed with the following objectives.

Objectives

1. To describe the awareness, motivation and perception regarding research, among Phase 1 and Phase 2 undergraduate students of NRS Medical College and Hospital, during the year 2023.
2. To find out the socio-demographic characteristics of the study population and its relationship(s), if any, with their motivation regarding research

Methodology

- **Study Type &design:** Descriptive Cross-sectional study

- **Study Setting**: Nil Ratan Sircar Medical College and Hospital, Kolkata, WB

- **Study Duration**: 7th August 2023 to 31st August 2023

- **Study Population**: Undergraduate students of NRSMCH in Phase 1 and Phase 2 at the time of data collection during the year 2023.

  Inclusion criteria

  - Students studying in phase 1 and 2 of MBBS at NRSMCH

  Exclusion criteria

  - Students who could not be contacted even after three attempts
  - Students who were involved in this research project
  - Study participants not willing to participate in the study

- **Sample Size calculations**

  The size is estimated anticipating the proportion of students motivated towards research to be 50%. [P=50%] Using the following formula

$$n = \frac{Z^2 \acute{a} P(100-P)}{L^2}$$

where, n= Minimum Sample size, Z= Standard normal deviate, á= probability of type I error, taken as 0.05, so, level of confidence is 95%, L= Precision, taken as an absolute precision of 5 and P= Proportion, taken as 50%.

The minimum sample size calculated was 384. As the population is finite (N=450, n=384), for correcting the sample size with finite population correction,

$$n_{fp} = \frac{n}{1 + \frac{n-1}{N-1}}$$

$$= \frac{384}{1 + \frac{384-1}{450-1}}$$

$$= \frac{384}{1.85}$$

$$= 208$$

Considering 10% non-response, (n_f= final minimum sample size),

$$n_f = 208 * \frac{100}{90} = 231$$

- **Sampling technique**: A stratified random sampling technique was used. 1st and 2nd phase were the two strata. Sample size of each strata is proportionate to its size, that is,

$$n_{1st}\ \text{Phase} = \frac{250}{450} * 231 \approx 129$$

$$n_{2nd}\ \text{Phase} = \frac{200}{450} * 231 \approx 102$$

In each stratum, the number of students were selected by generating random numbers in MS Excel.

- **Study tools**
  - Pre-designed, Pre-tested questionnaire
  - Google Forms platform
  - Electronic Media (for sending the form) platform [Whatsapp, Mail]

- **Study technique**

  Response collection through electronic mode andphone calls or face to face interaction to inform about the research and follow-up.

- Study variables

Section A: Socio-demographic	Section B: Perception about research
	Awareness Regarding:
1. Academic Year	1.Importance of research
2. Age(in completed years)	2. Process of research
3. Board of education	
4. Occupation of Father & Mother	Attitude Regarding: 1. Motivation of research
5. Education of Father & Mother	2. Practice of research
6. Estimated Average Monthly Family Income	3. Barriers in doing research

- **Data Collection**

Questionnaire was developed using Google Forms and was pre-tested among the project group students. The questionnaire consisted of total 40 questions out of which 14 were related to background characteristics, 22 about knowledge and perception regarding research and rest 4 regarding barriers in doing research. Most of the questions were closed ended with single best option, some were open ended and in some, a rating scale was incorporated to estimate the degree of their motivation and perception regarding importance of research.Two sample frames were developed with roll number, name and mobile numbers of students of both phases. Random numbers were generated in MS Excel to select the preset number of students from each phase.

The selected students were called or met physically to obtain their email id and to brief about the study. The Form was circulated to them through their e-mail IDs and WhatsApp. Calls or communications were done in case they did not fill the form. Data were collected and compiled on Google Spreadsheet. The e-mail id, roll no, name, etc were deleted before preparing master table - to ensure anonymity and confidentiality.

- **Ethical considerations**: Informed consent was obtained from all students. Confidentiality & anonymity was maintained throughout data collection

Data Analysis: Master table was prepared in MS excel from Google spreadsheet. Qualitative data were expressed in proportions and quantitative data were expressed in appropriate mode of central tendency and dispersion.

Median scores were calculated from the responses given in questions containing a rating scale. Mann Whitney U test or Kruskal Wallis test was done to find out difference in median among two or more groups.

Results

Majority of the students were aged between 20 and 21 years (49.3%), male (67%), Hindu (82%), from nuclear families (80.9%), belonged to the upper class (69.3%), were living withmore than 3 family members (95.6%) and were from urban areas (70.6%). Most of them were from WBCHSE board (52.4%) and the predominant medium of instruction at school was English (57.1%). Most of their fathers had educational qualification of graduation or above (80.1%); among them, most were engaged in semi-professional jobsfollowed by professional jobs. Majority of the mothers were also a graduatealthough majority of them were homemakers. (Table 1)

Almost 95% of the students agreed that research is important in academics and clinical practice, however, the agreement was more among first phase students (98.4%) than second phase students (89.2%). Less than one third students from phase I and about half of the students from phase II (51.8%) were familiar with how to write a research protocol. Only 30.7% of the students, overall, were found aware regarding the process of ethics permission before conduction research. More than half of the students from both the phases were familiar with various data collection tools, however, only 22% students said that they were familiar with the process of scientific writing, 31.4% from phase I and 14.8% from phase II. Similar pattern of awareness was found regarding familiarity with various guidelines for scientific writing. Only 40/231 students knew how to get published, and the awareness was more among phase II students (26.5%) compared to phase I students (10 %). On asking if research activities are conducted during MBBS curriculum, only 55% of the students responded yes, 67.6% from phase II and 45% from phase I. Importance of involving in research activity during MBBS course was perceived by 85.3% of the students; more among students from phase I (92.2%) than phase II students (76.4). Overall, 33.8% students had a history of previous exposure to a research activity, more for phase II students and only 24/231 students, 12 from phase I and 12 from phase II, claimed that they have published a research work in a journal. 111/231 students (48%) were familiar with any medical journal and 65/231 (28.1%) have read at least one article from any medical journal in last 1 month. Proportion of phase II students were more for both , familiarity with journal and reading an article. More than half of the students from both phases were aware regarding the presence of medical research institutes at state and national level and more than three fourth of them believed that quality research can be translated into better patient management. Only about one in five students were aware regarding

Table 1: Distribution of the study population based on sociodemographic variables (n=231)

Variables	Levels	Frequency	Percentage (%)
Academic year	1st Phase (2022)	129	55.8
	2nd Phase (2021)	102	44.2
Age Groups	18-19	64	27.7
	20-21	114	49.4
	⩽ 22	53	22.9
Sex	Male	154	66.7
	Female	77	33.3
Residence	Rural	68	29.4
	Urban	163	70.6
Religion	Hinduism	190	82.2
	Islam	39	16.9
	Christian	2	0.9
Type of family	Nuclear	187	80.9
	Joint	44	19.1
Socio-economic status *	Lower (<1166)	7	3.1
	Lower middle class (1166-2253)	12	5.2
	Middle class (2253-3808)	11	4.7
	Upper middle class (3808-7769)	41	17.7
	Upper class (>776)	160	69.3
Number of family members	2	3	1.3
	3	7	3.1
	>3	221	95.6
Board of education	CBSE	84	36.6
	WBCHSE	121	52.4
	ISC	23	9.9
Medium of education	Others	3	1.1
	English	132	57.1
	Bengali	93	40.3
	Hindi	6	2.6
Educational qualification of mother	Illiterate and less than primary	4	1.7
	Primary	12	5.2
	Secondary	35	15.2
	Higher secondary	36	15.6
	Graduate and above	144	62.3
Educational qualification of father	Illiterate and less than primary	3	1.3
	Primary	6	2.6
	Secondary	13	5.6
	Higher secondary	24	10.4
	Graduate and above	185	80.1
Occupation of mother	Professional	8	3.5
	Semi-professional	35	15.2
	Businessman	5	2.2
	Skilled worker	1	0.4
	Homemaker	176	76.2
	Others	6	2.6
Occupation of father	Professional	80	34.6
	Semi-professional	85	36.8
	Businessman	49	21.2
	Skilled worker	5	2.2
	Others	12	5.2

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Table 2: Knowledge, experience andperception regarding research and awarenessregarding its stepsamong undergraduate students (n=231)

Perception and history of exposure	Academic Phase		Total
	1st Phase	2nd Phase	
	Frequency (%)		
Importance of research in academics and clinical practice			
Important	127 (98.4)	91 (89.2)	218 (94.4)
Not important	2 (1.6)	11 (10.8)	13 (5.6)
Familiarity with research protocol			
Familiar	36 (27.9)	53 (51.8)	89(38.5)
Not Familiar	93 (72.1)	49 (48.2)	142(61.5)
Awareness on how to get ethical approval to start research on human or animal			
Aware	35 (27.1)	36 (35.2)	71(30.7)
Unaware	94 (72.9)	66 (64.8)	160(69.3)
Familiarity with Data analysis tools			
Familiar	65 (50.3)	66 (64.7)	131(56.7)
Not Familiar	64 (49.7)36	(35.3)	100(43.3)
Familiarity with the format and the process of scientific writing			
Familiar	19(14.8)	32(31.4)	51(22)
Not Familiar	110(85.2)	70(68.6)	180(78)
Awareness about the various guidelines			
Aware	19(14.8)	27(26.5)	46(20)
Unaware	110(85.2)	75(73.5)	185(80)
Awareness about how to publish your research			
Aware	13(10.0)	27(26.5)	40(17.3)
Unaware	116(90.0)	75(73.5)	191(82.7)
Awareness of research activities done in MBBS curriculum			
Aware	58 (45)	69 (67.6)	127 (54.9)
Unaware	71 (55)	33 (32.4)	104 (45.1)
Importance of involvement in research activity in MBBS			
Important	119 (92.2)	78 (76.4)	197(85.3)
Not Important	10 (7.8)	24 (23.6)	34(14.7)
Familiarity with Research types			
Familiar	30 (23.2)	49 (48.1)	79(34.2)
Not Familiar	99 (76.8)	53 (51.9)	152(65.8)
Previous exposure to any research activity			
Exposed	27(20.9)	51(50)	78(33.8)
Not Exposed	102(79.1)	51(50)153	(66.2)
Publication of research work in any medical journal			
Published	12 (9.3)	12 (11.8)	24 (10.3)
Never published	117 (90.7)	90 (88.2)	207 (89.7)

Table 2: Knowledge, experience andperception regarding research and awarenessregarding its stepsamong undergraduate students (n=231)

Perception and history of exposure	Academic Phase		Total
	1st Phase	2nd Phase	
	Frequency (%)		
Familiarity with any medical journal			
Aware	56 (43.4)	55 (53.9)	111 (48)
Unaware	73 (56.6)	47 (46.1)	120 (52)
Their experience of reading any research article in the last six months			
Read	33 (25.6)	32 (31.4)	65 (28.1)
Not read	96 (74.4)	70 (68.6)	166 (71.9)
To awareness of the research institutions at national or state level			
Aware	65 (50.4)	62 (60.8)	127 (55)
Unaware	64 (49.6)	40 (39.2)	104 (45)
Opinion on significant change in management of patients if quality research is available			
Will change	108 (83.7)	79 (77.4)	187 (80)
Will not change	21 (16.3)	23 (22.6)	44 (20)
Awareness regarding the scholarship opportunities			
Aware	20 (15.5)	31 (30.4)	51 (22.1)
Unaware	109 (84.5)	71 (69.6)	180 (77.9)
Total	129 (100)	102 (100)	231 (100)

any scholarship opportunities for conducting research work. Those who knew, named scholarships like ICMR-STS, JBNSTS, KVPY, Jawaharlal Nehru Memorial Fund Scholarship and Inspire.(Table 2).

Median score, the students assigned, regarding importance of research in academics and clinical practice was 8 (IQR:6-9). The median score for importance of involvement in research was 7 (IQR:5-9) and for motivation towards research was also 7 (IQR:5-9). (Figure 1).

Motivation of the study population was compared across the categories of some socio-demographic variables, selecteddue tothe indication of plausibility from other literatures.Median motivation score, reflective of the level of motivation,was only significantly different across sex, where females feel less motivated than males. (Table 3).

As perceived by the study population, lack of adequate training come out as the biggest barrier in doing research.(Figure 2)

Discussion

The study looks into awareness regarding, motivation towards and reported practice of research among participants who were undergraduate students of Nil Ratan Sircar Medical College during the period of data collection.

Among the predominant characteristics of the study population, 82% were Hindu, about 81% came from a nuclear family, 70% belonged to upper class, most of their fathers were professional or semi-professional and most of the mothers were homemakers. Similar findings can be found in different studies done among Indian medical graduates, pointing towards the concurrence of our study findings.[6,7]

Our study finds a good amount of agreement among the students regarding the importance of research in academics and clinical practice, but awareness regarding the intricacies of conducting research and getting it is less known to the students. A study done among medical undergraduate students of Jawaharlal Nehru Medical College (JNMC), Datta Meghe

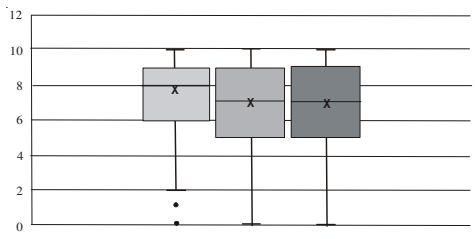

Fig. 1. Boxplot depicting the distribution of students' response scores regarding questions related to perception and attitude towards research (n=231)

Table 3: Relationship of sex, type of residence, socio-economic class with the level of motivation of students towards research (n=231)

Socio-Demographic Variables	Category	Median Motivation score(Score range:0-10)	IQR	p- value
Sex	Male	7	6 – 9	0.041*#
	Female	6	5 – 8	
Type of residence	Rural	7	5 – 8	0.689#
	Urban	7	5 – 9	
Socio-economic Class	Upper Class	7	5 – 9	0.623$
	Upper Middle Class	7	5 – 8	
	Others	7	5 – 8	
Board of education	WBCHSE	7	5 - 8	0.265$
	CBSE	8	6 - 9	
	Others	7	5 - 10	
Medium of education	English	7	5 - 9	0.409$
	Bengali	7	5 - 8	
	Hindi	8	4 - 9	
Occupation of Father	Professional	7	6 – 8	0.701$
	Semi-professional	7	5 – 9	
	Others	7	5 – 8	
Education of Mother	Graduate and above	7	5 – 9	0.570#
	Others	7	5 – 9	

*Statistically significant; #Man Whitney U test; $Kruskal Wallis test

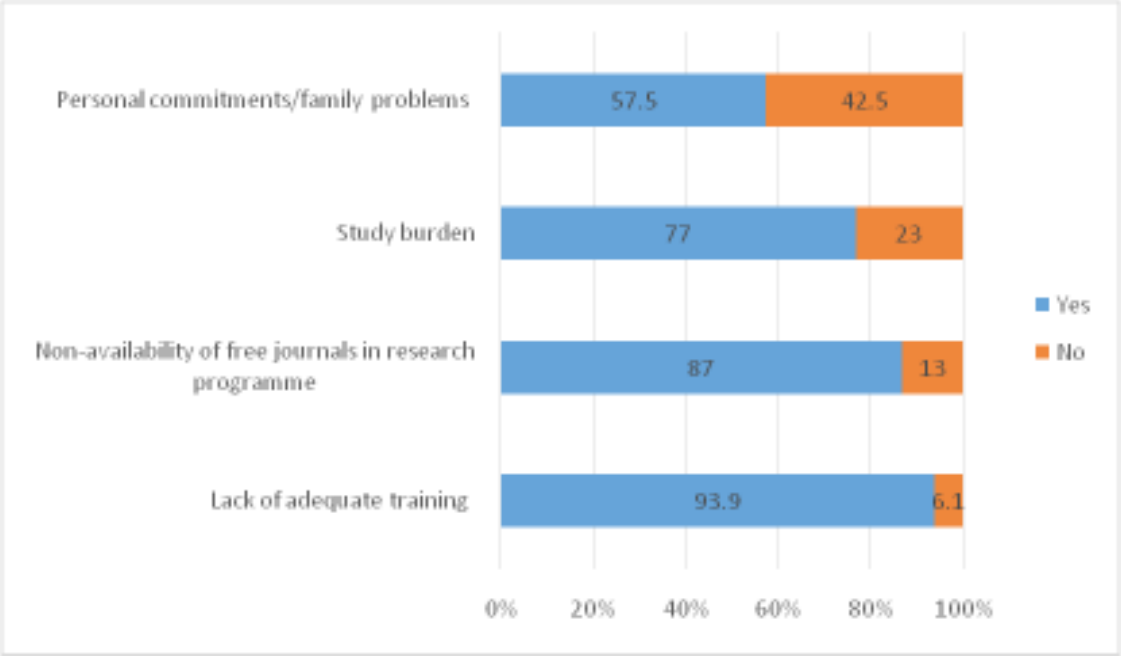

Figure 2. Component Bar Diagram showing distribution of students according to their perceived barriers towards doing research (n=231)

Institute of Medical Sciences (DMIMS, deemed to be University), Wardha, Maharashtra with the aim to make the medical undergraduates competent and apprised with certain basic research skills in research methodology and to develop aptitude amongst the undergraduates for research, concluded that "there was a lack of understanding amongst medical undergraduates pertaining to the basic nuances of the research and how to go about carrying out the same".[8] Another study among 344 medical school students of a medical college in Chennai, Tamil Nadu, in 2018 found that adequate knowledge was lacking in majority of students".[9]

If we try to understand the causes of lack of research activities and outputs from undergraduate medical students in India, we can focus on three underlying constructs. Firstly, lack of the knowledge or awareness regarding the importance of research, secondly the level of motivation of students to actively conduct research activities and thirdly, the lack of required knowledge and skill to conduct a research project. Our study finds the lacking mostly in case of the third construct. The level of motivation is also found less among female students. Studies from India[10,11] and abroad [12] finds similar deficiency in students' knowledge and skill to conduct research. However, compared to the previously mentioned studies, our study finds more motivation among students towards conducting research. The fact that motivation among female students was comparatively less may be spurious and should be explored in greater details in future. Cohering to previous studies[8-12], lack of adequate training and study burden were found to be important perceived barriers among the study population.

To conclude, we found that undergraduate medical students are motivated to conduct research but they are deficient in knowledge regarding the nuances of conducting the research mostly due to lack of time in their busy curriculum and lack of adequate training. Although research is emphasized in existing curriculum, but in the light of the study findings,all efforts should be made to find out specific deficits and address them by student centric, individualised modifications in Indian Medical Graduate curriculum, especially in terms of teaching learning methods and assessment programmes.

Limitations The students were not interviewed face to face, so some questions could not be cross verified. There also remain a chance of data contamination.

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References

1. US department of health and human service. The office of research integrity. [Home page: definitions]. Available at https://ori.hhs.gov/content/chapter-3-The-Protection-of-Human-Subjects-Definitions. [Last accessed 11th January 2024].

2. Alyousefi N, Alnojaidi J, Almohsen A, Alghanoum S, Alassiry G, Alsanad L et. al. How Do Medical Students Perceive Their Research Experiences and Associated Challenges? Advances in Medical Education and Practice. 2023 Dec 31:9-20.

3. Orebi HA, Shahin MR, Awad Allah MT, Hegazy AH, Alshakhs MA, Alaithan AM et. al. Medical students' perceptions, experiences, and barriers towards research implementation at the faculty of medicine, Tanta university. BMC Medical Education. 2023 Nov 27;23(1):902.

4. Arshad S, Huda NU, Nadeem N, Ali S, Ahmad N, Anwar S, et. al. Perceptions of medical students about research at undergraduate level. J Ayub Med Coll Abbottabad. 2021;33(1):129-33.

5. El Achi D, Al Hakim L, Makki M, Mokaddem M, Khalil PA, Kaafarani BR et. al. Perception, attitude, practice and barriers towards medical research among undergraduate students. BMC medical education. 2020 Dec;20:1-1.

6. Pramanik S, Saha A, Mallick B. Assessment of Socio-economic Status and Personality Traits on Academic Performance of Second Year MBBS Students: A Cross-sectional Study from a Teaching Hospital of Eastern India. Journal Of Clinical and Diagnostic Research. 2023 Feb 1;17(2):FC07-12.

7. Goyal A, Kishore J, Anand T, Rathi A. Suicidal ideation among medical students of Delhi. J Ment Health Human Behavior. 2012;17(1):60-9.

8. Shukla S, Acharya S, Acharya N, Singh S, Dolas P. Inculcating research methodology related skills and aptitude amongst medical undergraduates-An interventional study. Journal of Family Medicine and Primary Care. 2022 Jul;11(7):3648.

9. Chellaiyan VG, Manoharan A, Jasmine M, Liaquathali F. Medical research: Perception and barriers to its practice among medical school students of Chennai. Journal of education and health promotion. 2019;8.

10. Meraj L, Gul N, Zubaidazain IA, Iram F, Khan AS. Perceptions and attitudes towards research amongst medical students at Shifa College of Medicine. JPMA. 2016;66(2):165-9.

11. Satav PJ, Wankhede UN. Knowledge, attitude, and practice of resident doctors about medical research in BJ Medical College, Pune, Maharashtra. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2017 Jul 1;6(7):2969-73.

12. AlGhamdi KM, Moussa NA, AlEssa DS, AlOthimeen N, Al-Saud AS. Perceptions, attitudes and practices toward research among senior medical students. Saudi Pharmaceutical Journal. 2014 Apr 1;22(2):113-7.