

ORIGINAL ARTICLE

Knowledge and Practice of Principles of Research and Publications Among Undergraduate Students- A Cross Sectional Study

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Abstract:

Abstraction, conceptualization, critical thinking, and reasoning skills are important for a medical researcher. Encouragement and motivation in medical research during undergraduate life can be helpful in creating future medical scientists. Very few medical students indulge and pursue career in research. The knowledge and practice of medical research are seldom assessed in undergraduate life. This study was conducted to assess the knowledge and principles of biomedical research and publications among undergraduate medical students and to compare the responses between genders and different academic years. All the students of phase 2 & Phase 3 were supplied a pretested and validated questionnaire containing 18 questions through Google forms. Informed consent was taken from each participant. The responses were tabulated in MS Excel spreadsheet and analysed with SPSS. 457 responses were collected with response rate= 76.16% with median age of 22 (22.12±1.11) years. Majority were male (57.5%). Majority of responders are not sure about the availability of guide, facility, and funding for research. Very few of them had knowledge about literature review and statistical analysis. Several studies done worldwide. Medical research is important for undergraduate students. Lack of awareness and training leads to confusion and less involvement. Exposure of undergraduate medical students to research activity is need of hours.

Keywords: Research methodology; Principles of research; Research publication; Undergraduate medical students; Questionnaire survey.

Introduction:

The present world of medical science is driven by evidence-base medicine, which is to be taught during undergraduate medical education.¹⁻³ It requires comprehension and use of scientific principal and research methodology which are rarely dealt in medical schools in undergraduate curriculum.⁴⁻⁸ Training and exposure to biomedical health research is an integral part of current medical education. Abstraction, conceptualization, critical thinking and reasoning skills are the important components for becoming a medical researcher. Studies have proven that undergraduate medical research helps the student in generating interest in the field and is strongly associated with post graduate initiatives.^{4,9-12}

Knowledge and use of scientific methods are important for being a successful medical professional.^{13,14} Encouragement and motivation in medical research during undergraduate life can be helpful in creating future medical scientist.^{4,9-12} There is a growing need felt regarding involvement of undergraduate medical students in research activities.^{15,16} The rapid expansion and progress of biomedical research is guiding the evolution of

medical care at present.¹⁶ The benefit of community and development of the nation along with economic growth is widely dependent on the financial investment and funding in medical research, proper training and education of the students and the medical scientists and innovative policy making decision.¹⁷⁻²⁶

Not only for the experts, independent research is also a necessity for the postgraduate medical students also.²⁷ Unfortunately, not enough medical graduates indulge and prefer much in medical research after being professionals but student research activities with good research and publication experiences can lead to distinguished achievements in academic medicine.¹² Studies have proved that attitudes and practice of medicals students towards research experience are seldom assessed in undergraduate life.^{4,28}

With this background the present study was conducted to assess the knowledge and practice of principles of research and publications among undergraduate medical students of 2nd and 3rd professional years.

Methodology:

Institutional Ethics Committee approval was required in this study due to the interaction with human participants. This study was approved by the Institutional Ethics Committee with reference no EC-CNMC/2023/245 dated 30.05.2023.

It was a cross-sectional descriptive study. The sample size was 600. All 2nd and 3rd professional years students were included in the study and all the absentees were excluded from the study. To determine the knowledge and practice of principles of research

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Table 1. Data collection tool.

Question	Yes	No	Not sure			
Have you ever attended a scientific conference in MBBS life?			-			
Have you ever presented a paper at a scientific conference in MBBS life?			-			
Have you ever presented a poster at a scientific conference in MBBS life?			-			
Have you ever written any synopsis for a research project?			-			
Have you ever written any scientific paper?			-			
Have you ever received any training on research methodology?			-			
Do you feel confident in interpreting a research paper?						
Do you feel confident in writing a research paper?						
Do you think there is sufficient scope of guidance for conducting research in your institution in pre/para-clinical subjects?						
Do you think there is sufficient scope of guidance for conducting research in your institution in clinical subjects?						
Do you think there is sufficient scope of facility for conducting research in your institution?						
Do you think there is sufficient scope of funding for conducting research in your institution?						
Do you think there is sufficient scope of training for conducting research in your institution?						
Do you think there is sufficient scope of training in research methodology among teachers/guides?						
How many research publications do you have?	0	1 to 5	More than 5			
In your opinion how much is the participation of UG-students in research activities?	High	Moderate	Low			
If your response to previous question is LOW, what may be the causes? (Choose multiple options is allowed)	Lack of motivation	Lack of guidance	Lack of exposure	No monetary benefit	No academic benefit	No professional benefit

Table 2.

Question	Male		Female		Phase 2		Phase 3	
	Yes	No	Yes	No	Yes	No	Yes	No
Have you ever attended a scientific conference in MBBS life?	94 (20.57)	169 (36.98)	60 (13.13)	134 (29.32)	41 (8.97)	131 (28.67)	113 (24.73)	172 (37.64)
Have you ever presented a paper at a scientific conference in MBBS life?	8 (1.75)	255 (55.70)	2 (0.44)	192 (42.01)	1 (0.22)	171 (37.42)	9 (1.97)	276 (60.39)
Have you ever presented a poster at a scientific conference in MBBS life?	3 (0.66)	260 (56.89)	3 (0.66)	191 (41.79)	2 (0.44)	170 (37.10)	4 (0.88)	281 (61.49)
Have you ever written any synopsis for a research project?	35 (7.66)	228 (49.89)	20 (4.38)	174 (38.07)	9 (1.97)	163 (35.67)	46 (10.07)	239 (52.20)
Have you ever written any scientific paper?	20 (4.38)	243 (53.17)	11 (2.41)	183 (40.04)	8 (1.75)	164 (35.89)	23 (5.03)	262 (57.33)
Have you ever received any training on research methodology?	49 (10.72)	214 (46.83)	32 (7.00)	162 (35.45)	19 (4.16)	153 (33.48)	62 (13.57)	223 (48.70)

among students at first a questionnaire was formulated and validated by three experts in this field. A google form was created. Link and QR code were generated. Informed consent was obtained from each participant before performing the procedure. The responses were tabulated in MS Excel spreadsheet and analyzed through SPSS software version 22.

Questionnaire: The questionnaire contained 17 questions. Some of the questions had dichotomous answers in the form of 'Yes' or 'No' and some questions included an additional option 'Not sure'. One question had response 'High-Moderate-Low' and two other questions were structured with different and multiple options. The whole data collection tool (questionnaire) is given in Table-1.

Results:

The questionnaire was distributed among 600 students, of which 457 responses were received (Response rate = 76.16%). Majority of the participants were male (n=263, 57.5%) and rest were female (n=194, 42.5%). Median age of participants was 22 years ranging from 19-25 years. The average age of the participants

were 22.12 ± 1.11 years respectively. The binomial test was done to compare the distribution of genders. The p-value was significant (p=0.001) which implies male and female population do differ significantly from the binomial assumption of equal probability.

Out of 457 students only 1 student published more than five research papers, 14 students (3.06%) published one to five research papers and most of the students (n=442, 96.72%) did not publish any research paper.

Only one third of the responders attended scientific conference in their medical academic life. Among them only 10 students (2.2%) presented a scientific paper and only 6 students (1.31%) have presented a scientific poster in scientific conference. Majority of the responders have not written synopsis or scientific paper ever in their undergraduate life. More than 80% of the responders have never received any training on research methodology. The detailed responses regarding this are mentioned in Table-2.

Most of the students were not sure about interpreting and writing

Table 3.

Question	Male			Female			Phase 2			Phase 3		
	Yes	No	Not sure	Yes	No	Not Sure	Yes	No	Not sure	Yes	No	Not sure
Do you feel confident in interpreting a research paper?	62 (13.57)	39 (8.53)	162 (35.45)	25 (5.47)	39 (8.53)	130 (28.45)	34 (7.45)	25 (5.47)	113 (24.73)	53 (11.50)	53 (11.50)	179 (39.17)
Do you feel confident in writing a research paper?	70 (15.32)	61 (13.35)	132 (28.88)	23 (5.03)	66 (14.44)	105 (22.98)	32 (7.00)	48 (10.50)	92 (20.13)	61 (13.35)	79 (17.29)	145 (31.73)
Do you think there is sufficient scope of guidance for conducting research in your institution in pre/para-clinical subjects?	102 (22.32)	66 (14.44)	95 (20.79)	67 (14.66)	67 (14.66)	60 (13.13)	63 (13.79)	42 (9.19)	67 (14.66)	106 (23.19)	91 (19.91)	88 (19.26)
Do you think there is sufficient scope of guidance for conducting research in your institution in clinical subjects?	76 (16.63)	68 (14.88)	119 (26.04)	51 (11.16)	59 (12.91)	84 (18.38)	45 (9.85)	45 (9.85)	82 (17.94)	82 (17.94)	82 (17.94)	121 (26.48)
Do you think there is sufficient scope of facility for conducting research in your institution?	87 (19.04)	69 (15.00)	107 (23.41)	55 (12.04)	52 (11.38)	87 (19.04)	49 (10.72)	36 (7.88)	87 (19.04)	93 (20.35)	85 (18.50)	107 (23.41)
Do you think there is sufficient scope of funding for conducting research in your institution?	95 (20.79)	46 (10.07)	122 (26.60)	53 (11.50)	44 (9.63)	97 (21.23)	49 (10.72)	30 (6.56)	93 (20.35)	99 (21.66)	60 (13.13)	126 (27.57)
Do you think there is sufficient scope of training for conducting research in your institution?	113 (24.73)	47 (10.28)	103 (22.54)	77 (16.85)	53 (11.50)	64 (14.00)	64 (14.00)	29 (6.35)	79 (17.29)	126 (27.57)	71 (15.54)	88 (19.26)
Do you think there is sufficient scope of training in research methodology among teachers/ guides?	50 (10.94)	93 (20.35)	120 (26.26)	33 (7.22)	72 (15.75)	89 (19.47)	32 (7.00)	51 (11.16)	89 (19.47)	51 (11.16)	114 (24.95)	120 (26.26)

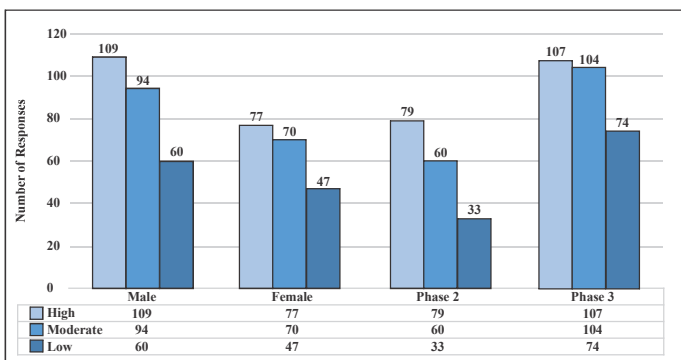


Figure 1.

a research paper. As opinionated by the responder more than one third affirmed that there is sufficient scope of guidance for conducting research in pre/para clinical subjects and almost half of the responder are not sure about the same in clinical subjects. About one third of the responders gave positive response regarding scope of facility and funding for conducting research. Majority of the students believe that there is scope of training of research methodology for students, but they are not sure about the same among teachers or guides. The detailed responses regarding this are depicted in Table-3.

Exploring the lack of participation in research activities which is depicted in Figure-1. To enumerate the causes the responders pointed out majorly due to lack of exposure (n=271, 77.43%) followed by lack of motivation (n=249, 71.14%), lack of guidance (n=231, 66%), lack of monetary benefit (n=105, 30%), lack of academic benefit (n=108, 29.71%), lack of professional benefit (n=77, 22%).

A chi square test was performed between gender and all the responses. No observed cell value was zero. There was statistically significant relationship between confidence in interpreting a research paper (c2 (df=2) 9.03, p=.01), writing a research paper (c2 (df=2) 16.99, p=.0002), scope of training for conducting research in the institution (c2 (df=2) 6.01, p=.04). All

the other relationships between the responses and gender were not statistically significant (p>.05).

A chi-square test was also performed between the academic year of the study population and all the responses. No observed cell value was zero. There were statistically significant relationship between attendance in a scientific conference in MBBS life (c2 (df=1) 12.00, p=.0005), written any synopsis for a research project (c2 (df=2) 12.06, p=.0005), scope of facility for conducting research in the institution (c2 (df=2) 8.09, p=.0174), scope of training for conducting research in the institution (c2 (df=2) 11.09, p=.0038), received any training on research methodology, c2 (df=1) 8.43, p=.0036. All the other relationships between the responses and academic year were not statistically significant (p>.05).

Discussion:

Several studies done worldwide to explore the importance, attitude and practice of research work as a part of the undergraduate medical curriculum. Higher response rate (as high as 97.73%) was observed in the studies conducted in Croatia, Iran and Chennai as their sample size were much smaller than our study sample.^{13,17,29} The mean age of the study participants was higher in our study as compare to those in Pakistan, Iran and Chennai.^{9,17,29} Most of the studies done on this topic includes a smaller sample size ranging from 65 to 301.^{3,9,12,13,15-17,29,30} A study done in Southeast Europe include 4307 study participants.¹

Study participants from USA and Chennai showed poor attendance, scientific paper and poster presentation at undergraduate level at different medical conferences.^{16,29} Regarding the ability to interpret and write a research paper, 31% of the responders were confident in Kerala study and 90.3% showed positivity in Pakistan, compared higher than the present study.^{9,15}

Writing a synopsis for a research project is imperative for getting Institutional Ethics Committee approval before starting a research work, which was not inquired in the study participants in

any of the studies conducted earlier. Writing a research paper for publication after the completion of research has been explored and found higher in Pakistan study (25.9%) and lower in Kerala study (3%) in comparison to the present study (6.8%).^{9,15}

A longitudinal study conducted in Netherlands involving 318 undergraduate participants showed that after gaining extracurricular research experience participants publish more articles.¹² The facet of lack of guidance in pre/para clinical and clinical subjects which were not covered in other relevant articles. Regarding lack of facility for conducting research, 60% of the responders said positively in Kerala study which was comparatively higher than present study.¹⁵ Study participants from USA and Kerala both showed lack of funding (64%) for conducting research.^{15,16} The inquiry about received of training in research methodology was not included in other studies yet most of the studies found value and use of scientific methodology. 67% showed lack of knowledge in research methodology in a study done in Kerala which was higher in present study.¹⁵

Regarding lack of training in research methodology among teachers or guides, 39% participants gave positive response, compared higher than the present study.¹⁵ Low level of participation research activities observed in Iran and Chennai studies which was similar to present study.^{17,29} Study participants from Chennai showed 80.4% lack of guidance which was poorer in present study.²⁹

The other significant factors influencing the lack of research activities, identified by the students, were monetary, academic and professional benefits which has not been explored in other studies. Thus, the present study reflects less involvement and indifferent attitudes of the undergraduate medical students of different academic years. They are also unsure about the scope of research activities in terms of availability of logistics and resources.

Conclusion:

It is the need of hour to integrate research methodology in undergraduate core curriculum. Students are to be encouraged and motivated to improve their research skills as government of India initiative like Indian Council of Medical Research – Short Term Studentship (ICMR-STs) and different university grants for the undergraduate medical researchers are sanctioned recently. Students should be motivated and encouraged by the teachers and guides. Training and exposure in research should be important part for the students. Conduction of monthly research workshop for undergraduate students as an initiative by the university is helpful.

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