**RESEARCH ARTICLE**

# Approach toward research among the medical undergraduates studying in Apollo Medical College, Hyderabad

## Ayesha Juhi[1], Sai Dinesh Y[2]

[1]Department of Physiology, Apollo Institute of Medical Sciences and Research, Hyderabad, Telangana, India, [2]Medical Intern, Apollo Institute of Medical Sciences and Research, Hyderabad, Telangana, India

**Correspondence to:** Ayesha Juhi, E-mail: juhiayesha@gmail.com

**ABSTARCT**

**Background:** Research training is a critical element of education in the medical field. Continued progress in medicine is fundamentally dependent on the training and performance of scientists dedicated to research in health sciences. **Aim and Objective:** This study was taken up with an objective to assess the attitude, knowledge, and barriers toward research through questionnaires among medical undergraduate students at Apollo Medical College. **Materials and Methods:** MBBS students of AIMSR, Hyderabad, who were willing to participate in the study were asked to answer a pre-validated questionnaire regarding the above aspects toward research. Chi-square test was used for the analysis of association between A, BR, and K across different MBBS phases. Factor analysis was used to reduce the dimensionality and explain percentage of variation in all the three domains. **Results:** Students had a positive attitude toward research and also believed that research promotes critical thinking at the undergraduate level but had no enough knowledge to conduct research effectively with proper protocol. On the other hand, when it came to assessing the barriers toward research; the main barriers were lack of time to conduct research because of educational tasks. **Conclusion:** Conducting research methodology course periodically and allocating credited hours in their educational schedules for research activities can encourage students to take up research in early medical career. Awareness among students about the existing research promoting schemes undertaken by the government and medical institutes is mandatory for the students to initiate research activity at the undergraduate level.

**KEY WORDS:** Research; Attitude; Knowledge; Barrier

## INTRODUCTION

Research in the field of health science has always played a potential role in terms of understanding disease, its trends, risk factors, and pathogenesis, diagnosis, treatment aspects, prognosis, and public health interventions. Progress in the field of health science substantially depends on the training and attainments of dedicated scientists toward research.[1]

In this advanced era, where modern medicine relies on the exploration of evidence leading to a specific diagnosis of the disease or successful treatment of it for which physicians are expected to know about the research in pursuit of understanding the formation of evidence.[2] It is also responsibility of the doctors to keep an update in their present medical knowledge.

When we consider the medical health research scenario in India, quality research is lacking. According to the data available till 2008, with 65,745 articles with a global publication share of 1.59%, India holds the 12th rank among

the productive countries for health research.[3] Under performance in the medical research will seriously have a negative impact on the nation since it directly affects health of people, especially where ours is a thickly populated country.

We need to ensure quality medical research on a much larger scale right from the undergraduate level of medical students. Efficient training of medical students in health research should the main priority right from the inception of imparting medical education to them. Development of research capacity is important at both individual and institutional levels.

It is the need of the hour in the present medical education system of India to uphold the research culture. It does not inculcate the research methodology in the medical undergraduate curriculum. The medical colleges give less priority for research programs due to various reasons related to lack of funds, trained faculty, lack of time, and resources, leading to poor quality of research-oriented medical education.[4]

Medical institutes should take the initiative to train their students in research to reach the high accreditation standards and encourage them to generate a pool of researchers. To promote dedicated quality researcher in the medical filed, the development of research capacity by training the young undergraduate is very essential.[5]

It has been emphasized that there is a need for medical institutions to focus on the integration of specific research skills and training within all aspects of the undergraduate medical curriculum so that these skills are perceived by the young minds to be relevant to the routine clinical practice and not just those engaged in full-time research.[6]

The prompt exposure toward research orientation among undergraduates would promote critical thinking among them at a very early age with an insight of doing useful research for the benefit of the society. Most of the students entering medical school are unaware of how scientific research functions and its importance. Long-term, periodical strategy should be adopted to promote health research to target medical students early in their careers so that they are equipped with sufficient research training during their undergraduate studies.

Previous evidences reveal that research is becoming an unattractive career option for junior doctors worldwide.[7] Literature review shows the data regarding knowledge, attitudes, practices, and barriers toward medical research among medical undergraduate students are not much explored. Key factors that have an impact on the success of research can be assessed by studying the knowledge, attitude, and barriers toward research. Hence, this study was taken up with the main objective to assess the attitude, knowledge, and barriers toward research among medical undergraduate students of all the MBBS phases through a questionnaire.

## MATERIALS AND METHODS

The present cross-sectional study was carried out among MBBS students of different phases studying in Apollo Medical College. Ethical clearance was obtained from the Institutional Ethical Committee before the study was conducted .This study was conducted from May to July 2019. Out of total 400 students of different phases, 312 students participated in the study. A pre-validated questionnaire consisting of total 32 items assessing their knowledge, attitude, and barriers toward research was answered by the students after taking their written consent. They were explained about the objective and the need of conducting the present study. Finally, complete responses to all the 32 items of the questionnaire were obtained from 254 students', i.e., 70, 80, and 104 students from MBBS Phase I, II, and III, respectively.

Questionnaire assessing attitude toward research had a total of 11 items, barrier toward research had an overall of 11 items, and knowledge toward research had an about 10 items to be responded on a Likert rating scale of disagree (0), neutral (1), and agree (2) [Tables 1-3].

### Statistical Analysis

Data analysis was conducted using SPSS version 24 software. Data were presented as mean ± standard deviation (SD) of each parameter. Chi-square test was applied to study the analysis of association between A, BR, K across different

| Table 1: Attitude toward research | |
|---|---|
| Item No. | Items |
| 1 | I do not want to pursue a career in medical research as there are no monetary and financial benefits |
| 2 | I believe taking up research during MBBS is as important as focusing on clinical profession |
| 3 | I would like to take up research during MBBS phase even though it is not mandatory in the curriculum to become a competent doctor |
| 4 | I think involving in research activity will elevate my profession as a clinician |
| 5 | I think being oriented with research methodology is necessary to conduct a meticulous and factual research |
| 6 | Taking up research at an early medical life will promote critical thinking and reasoning skills in me |
| 7 | I feel taking up research at undergraduate level will help me deciding my postgraduation/PhD career |
| 8 | From my past research experience, I do not see any future in the research field |
| 9 | I want to do research only for the sake of its accountability in competitive examination for pursuing postgraduation/PhD |
| 10 | Research is very important in the medical field to get the present updates and its application in clinical field. |
| 11 | Taking up research at an early stage of medical life is waste of time and stressful |

### Table 2: Barriers toward research

| Item No. | Items |
|---|---|
| 1 | Lack of personal interest |
| 2 | Lack of knowledge about research methodology |
| 3 | Medical curriculum is very demanding, there is no time for research |
| 4 | Awareness about research among students is lacking |
| 5 | Lack of interest in research by faculty |
| 6 | Lack of supportive staff like professional guide, biostatisticians, bioethics |
| 7 | Difficulty in obtaining institutional research committee approval |
| 8 | Difficulty in obtaining ethical committee approval |
| 9 | Unavailability of samples, patients, or follow-up with patients |
| 10 | Lack of well-equipped laboratory for research and grants to conduct the study |
| 11 | Lack of professional supervisors |

### Table 3: Knowledge toward research

| Item No. | Item |
|---|---|
| 1 | I have attended a research methodology workshop/training previously |
| 2 | I am aware of all the steps in writing a research proposal |
| 3 | Review of literature is very essential prerequisite to conduct a research study |
| 4 | I understand the meaning of Aim, objective, hypothesis, study design, selecting samples for the study |
| 5 | Acquiring ethical committee clearance and written consent from the study subject mandatory before conducting the research |
| 6 | I have a prior knowledge of using appropriate statistical methods and tools for interpretation of data collected for the study |
| 7 | I know the sources of information for doing research |
| 8 | I have been a part of research team in the past |
| 9 | I have presented research papers in the scientific conferences (at least 1) |
| 10 | I have studies published in the scientific journals (at least 1) |

MBBS phases. Factor analysis was used to reduce the dimensionality and explain percentage of variation in all the three domains. The number of factors that were extracted and used was based on Kaiser's criterion, considers factors with an Eigen value greater than 1 as a common factor. One-way analysis of variance was used to compare the mean scores of all factors across the phases. $P < 0.05$ was considered to be statistically significant.

## RESULTS

Factor analysis and reliability analysis were used to test the psychometric analysis of the questionnaire.

**Suitability of Data for Factor Analysis**

Sample size of 254 participants is adequate for factor analysis. The correlation matrix revealed statistically significant, moderate correlations among the observed variables. Kaiser-Meyer-Olkin Measure of Sampling Adequacy test 0.764 indicating that there were sufficient items predicted by each factor. Principal component analysis with varimax rotation was performed to identify and interpret the number of factors that could explain most of the common variance and to remove non-reflective or redundant items. The results revealed that the 27 items of the questionnaire resulted in eight factors with an Eigen value >1.00. The eight factors that emerged from the factor analysis accounted for 70% of the total variance. From the initial 32 items, 5 items were removed from the analysis.

The questionnaire inscribed a total of 8 factors out of 27 items, as shown in Table 4. Factor 1 included 6 items, factor 2 included 6 items, factor 3 included 4 items, and factor 5 included 3 items, factor 5 included 2 items, factor 6 included 2 items, factor 7 included 2 items, and factor 8 included 2 items.

The eight factors were named as below:
Factor 1: Research difficulties
Factor 2: Awareness of research methodology and ability to carry out an effective research
Factor 3: Utility of research for future career
Factor 4: Personal interest in research
Factor 5: Importance of ethics in research and its usefulness in future career
Factor 6: Importance of research to become a competent clinician
Factor 7: Benefits of research in medical field
Factor 8: Research promotes critical thinking

**Reliability Analysis**

The Cronbach's alpha coefficients of the eight factors of the questionnaire were ranged between 0.925 and 0.3. The overall Cronbach's alpha for the total items was 0.875 which indicates high level of reliability.

Table 5 shows that the highest mean value was obtained related to the personal interest of the students toward research which was less followed by students agreeing that research promotes critical thinking. The lowest mean value was observed in their awareness toward conducting an effective research study. Another low mean value was noted for factor 6 related to importance of research to become a competent clinician.

Table 6 shows that the factors 5, 6, and 7 had a significant mean difference between the three MBBS phases with $P = 0.001$, 0.05, and 0.004, respectively.

**Table 4:** Reliability statistics using Cronbach's alpha

| Factor | Number of items | Contents of each item | Factor analysis (%) | Reliability | Overall reliability |
|---|---|---|---|---|---|
| Research difficulties | 6 | BR (6-11) | 16.8 | 0.925 | 0.875 |
| Awareness of research methodology and ability to carry out an effective research | 6 | K (1-2), K (7-10) | 16.7 | 0.912 | |
| Utility of research for future career | 4 | AT (7-10) | 8.6 | 0.726 | |
| Personal interest in research | 3 | BR (1,2,3) | 7.3 | 0.681 | |
| Importance of ethics in research and its usefulness in future career | 2 | AT(4), K(5) | 5.6 | 0.30 | |
| Importance of research to become competent clinician | 2 | AT(2,3) | 5.2 | 0.465 | |
| Benefits of research in medical field | 2 | AT(1,11) | 4.9 | 0.609 | |
| Research promotes critical thinking | 2 | AT(5,6) | 4.8 | 0.519 | |
| Total | 27 | 27 | 70 | | |

**Table 5:** Means and SD of the eight factors derived from the questionnaire ($n=254$)

| Factor | Number of items | Mean | SD |
|---|---|---|---|
| Factor 1: Research difficulties | 6 | 1.681 | 0.116 |
| Factor 2: Awareness of research methodology and ability to carry out an effective research | 6 | 0.445 | 0.231 |
| Factor 3: Utility of research for future career | 4 | 1.478 | 0.234 |
| Factor 4: Personal interest in research | 3 | 1.791 | 0.011 |
| Factor 5: Importance of ethics in research and its usefulness in future career | 2 | 1.234 | 0.212 |
| Factor 6: Importance of research to become a competent clinician | 2 | 0.887 | 0.344 |
| Factor 7: Benefits of research in medical field | 2 | 1.311 | 0.276 |
| Factor 8: Research promotes critical thinking | 2 | 1.824 | 0.021 |

SD: Standard deviation

**Table 6:** One-way analysis of variance for examining the differences between the mean values of the three MBBS phases

| Factors | Phase I ($n=70$) | Phase II ($n=80$) | Phase III ($n=104$) | *P*-value |
|---|---|---|---|---|
| 1 | 0.7±1.37 | −0.06±0.43 | 0.0009±1.02 | 0.738 |
| 2 | 0.08±1.4 | −0.18±0.39 | 0.08±0.98 | 0.144 |
| 3 | 0.164±1.07 | 0.0012±0.46 | −0.11±1.21 | 0.202 |
| 4 | 0.15±1.55 | 0.05±0.55 | −0.14±0.75 | 0.121 |
| 5 | 0.34±1.03 | 1.03±0.48 | 0.12±0.054 | 0.001* |
| 6 | −0.024±1.06 | 0.47±0.52 | 0.127±1.19 | 0.05* |
| 7 | −0.192±1.30 | −0.55±0.73 | 0.249±0.89 | 0.004* |
| 8 | 0.146±0.99 | 0.009±1.009 | 0.105±0.98 | 0.265 |

The mean difference between the three MBBS phases was observed significantly higher with factor 5, stating that Phase II students considered the importance of ethics in research and its usefulness in future career when compared to other MBBS phases. Phase 1 students have less significant value for factor 6, stating that they did not consider research as important to become a competent clinician and also had the least significant value for factor 7 which proves that Phase 1 students were not aware of benefits of research in medical field. The reason which can be quoted here for significant least value for factor 6 and 7 is that Phase 1 students are that they are novice to the medical field and just learning to link basic medical science subjects to clinical medicine. Factor 5 is of highest value among Phase II students could be because they may be exposed to some research related events as it is the longest year in the whole MBBS curriculum, henceforth having some lax time to understand research protocol.

## DISCUSSION

According to the results obtained, students had an optimistic attitude toward research and also believed that research develops critical thinking at the undergraduate level but had no enough knowledge to conduct research effectively with proper protocol. On the other hand, when it came to assess the barriers toward research; the main barriers were lack of time to conduct research because of educational tasks. Factor 8 "Research promotes Critical thinking" had the highest mean value of 1.824 indicating that students believed research promotes critical thinking which is very important in any career. A mean value of 1.791 for factor 4 "Personal interest in research" which proved that they lacked personal interest in research as MBBS course is very demanding and taxing. They lacked time to carry out research as they are completely engaged in MBBS curriculum. The least mean value of 0.445 was obtained for factor 2 "Awareness of research methodology and ability to carry out an effective

research." Students responded to the factor 6 with a low mean value of 0.887 demonstrating that students feel research is not important to become a competent clinician. The students also lacked fair knowledge regarding the institutional research committee, ethical committee clearance before any research study is conducted. They had meager knowledge about the sampling methods of subjects, selection of subjects for the study, statistical analysis of the data collected, seeking help from professional guide.

The study conducted at Auckland, New Zealand, on 558 medical students showed that only a few number of students were passionate and interested in pursuing research during the intercalated undergraduate degree option. They reported that it requires more time to complete MBBS degree and spending time on research which would be more stressful.[8]

Similar results were obtained by Meraj *et al*. who conducted a study on 172 students at Shifa College of Medicine, Islamabad, that most students considered research useful but at the same time regarded it as stressful and complicated.[9] The study conducted by Ibrahim *et al*. showed that lack of mentorships, limited time, and inadequate funding were the major obstacles to conduction of research.[10]

Similar findings were observed in accordance with our work in a study conducted on Egyptian medical school students. They reported to have low knowledge scores regarding the research methodology and addressed lack of time, funding, and proper mentoring.[11]

The principle behind facilitating the research experience during undergraduate medical education is to develop and appreciate the research methodology. Eventually, fostering their interest in medical or basic science research as an academic career.[12,13] Having known the various barriers into consideration, all opportunities to bring research active staff and research passionate undergraduates together must be encouraged and the worth of undergraduate research must be recognized by the funding authorities.[14]

Students must be periodically sensitized to basic research methodology course. This initiation would inculcate the proper understanding of the rationale behind conducting a research, importance of review of literature, aim and objective for taking up particular research activity, and what could be the implications of the study. Students should be made aware of short-term student research projects undertaken by the government and also be encouraged to be a part of faculty research project as an assistant. If time is a biggest barrier as reported by the students, short duration workshops can be conducted during vacations for interested students. Students who have taken up research should be appreciated and awarded with scholarships. Credit hours should be allocated in their educational activity for taking up research.

## Strength

This study explores the attitude, knowledge, and barriers all three together in one study. It also focuses how the A, K, and BR differ across the different MBBS phases among medical undergraduates. The study gives us the insight that students should be encouraged at an early stage to have a clear concept about the course of research process and try to eliminate their barriers toward research.

## Limitations of the Study

It has the limitations of a self-reported survey without independent verification. Second, interns were not included for the study. Many students had not answered all the questions; hence, incomplete questionnaire was not considered which lead to loss of data and failure to assess their approach. Third, gender consideration was not included in the analysis.

## CONCLUSION

The study shows that the students had an optimistic approach toward research and considered to be very important for promoting critical thinking. They were not opting for it during the undergraduate level as they feel the MBBS curriculum is very demanding and time-consuming. According to the results, the students should be sensitized toward basics of research methodology at a very early stage so that they realize its need for the better career in future. The earlier they realize the importance of quality research for the benefit of medical field is better for the human society.

## REFERENCES

1. Moraes DW, Jotz M, Menegazzo WR, Menegazzo MS, Veloso S, Machry MC, *et al*. Interest in research among medical students: Challenges for the undergraduate education. Rev Assoc Med Bras 2016;62:652-8.
2. Murdoch-Eaton D, Drewery S, Elton S, Emmerson C, Marshall M, Smith JA, *et al*. What do medical students understand by research and research skills? Identifying research opportunities within undergraduate projects. Med Teach 2010;32:e152-60.
3. Gupta BM, Bala A. A scientometric analysis of Indian research output in medicine during 1999-2008. J Nat Sci Biol Med 2011;2:87-100.
4. Pawar DB, Gawde SR, Marathe PA. Awareness about medical research among resident doctors in a tertiary care hospital: A cross-sectional survey. Perspect Clin Res 2012;3:57-61.
5. Scaria V. Whisking research into medical curriculum: The need to integrate research in undergraduate medical education to meet the future challenges. Calicut Med J 2004;2:e1.
6. Burgoyne LN, O'Flynn S, Boylan GB. Undergraduate medical research: The student perspective. Med Educ Online 2010;15:3402.
7. Goldacre M, Stear S, Richards R, Sidebottom E. Junior

doctors' views about careers in academic medicine. Med Educ 1999;33:318-26.

8. Park SJ, McGhee CN, Sherwin T. Medical students' attitudes towards research and a career in research: An Auckland, New Zealand study. N Z Med J 2010;123:34-42.

9. Meraj L, Gul N, Zubaidazain AI, Iram F. Perceptions and attitudes towards research amongst medical students at Shifa College of Medicine. J Pak Med Assoc 2016;66:165-89.

10. Ibrahim NK, Al-Sharabi BM, Al-Asiri RA, Alotaibi NA, Al-Husaini WI, Al-Khajah HA, *et al*. Perceptions of clinical years' medical students and interns towards assessment methods used in King Abdulaziz University, Jeddah. Pak J Med Sci 2015;31:757-62.

11. Abushouk AI, Hatata AN, Omran IM, Youniss MM, Elmansy KF, Meawad AG. Attitudes and perceived barriers among medical students towards clinical research: A cross-sectional study in an Egyptian medical school. J Biomed Educ 2016.

12. Lloyd T, Phillips BR, Aber RC. Factors that influence doctors' participation in clinical research. Med Educ 2004;38:848-51.

13. Neilson EG. The role of medical school admissions committees in the decline of physician-scientists. J Clin Invest 2003;111:765-7.

14. Siemens DR, Punnen S, Wong J, Kanji N. A survey on the attitudes towards research in medical school. BMC Med Educ 2010;10:4.