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# Knowledge, Attitude, Practice and Barriers Toward Research among Undergraduate Medical Students

**Kamal Raj Baral,[1] Saurabh Koirala,[1] Abhishek Kharel,[1] Hari Prasad Upadhyay,[2] Prerna Bansal[3]**

[1]College of Medical Sciences - Teaching Hospital, Bharatpur, Chitwan, Nepal, [2]Department of Statistics, Birendra Multiple Campus, Bharatpur, Chitwan, Nepal, [3]Department of Community Medicine, College of Medical Sciences - Teaching Hospital, Bharatpur, Chitwan, Nepal.

## ABSTRACT

### Introduction

Early exposure to medical research during undergraduate studies helps to establish a solid medical education by enhancing students' understanding and knowledge of the subject. This exposure also provides valuable experience with evidence-based medicine, which is crucial for success in the medical field. The objective of this study is to assess the knowledge, attitude, practice, and barriers toward research among undergraduate medical students.

### Methods

An analytical cross-sectional study was conducted among undergraduate medical students. Data was collected using a self-structured questionnaire using stratified random sampling. Data was entered and analyzed by using SPSS-20. p-value<0.05 was considered statistically significant.

### Results

The study found that 70.6% of students had good knowledge and 55.05% of students had a good attitude toward research. The good attitude was highest among final year students (71.10%) followed by second-year students (65.90%). The study showed that 28.9% had participated in at least one workshop on research methodology, lab research, or any other similar workshops. Barriers faced by students were lack of time due to the demanding nature of the MBBS curriculum, lack of opportunity to conduct research, lack of funding for research, and difficulty in patient follow-up.

### Conclusions

The students had good research knowledge, with increasing attitude toward research from first to final year but lowest among interns. Research practice among students is low. Barriers faced by students were lack of time, awareness, opportunity; funding, and difficulty in patient follow-up.

**Keywords:** attitude; barriers; knowledge; medical research; practice; undergraduate students.

**Correspondence:** Kamal Raj Baral, College of Medical Sciences - Teaching Hospital, Bharatpur, Chitwan, Nepal. Email: kamalrajbaral74@gmail.com. Phone: +977-9868098406.

## INTRODUCTION

Scientific research is a systematic approach to prove or disapprove theories and hypotheses,[1] and it has become mandatory in evidence-based medicine. For medical students, exposure to research at an early stage in their education is vital in building a strong understanding of evidence-based medicine, which is essential for their future roles as physicians.[2] Despite the importance of research in the medical field, it is not given much emphasis when it comes to the undergraduate medical curriculum of Nepal and the involvement of undergraduate students in research is unknown. The main variables responsible for dictating research in undergraduates are concluded to be knowledge, attitude, practice, and barriers toward research from various pieces of literature.[1–3] So, this cross-sectional study was done to assess the knowledge, attitude, practice, and barriers toward medical research, as well as to identify associated factors affecting them in conducting research.

## METHODS

An analytical cross-sectional study was conducted among undergraduate medical students of the College of Medical Sciences and Teaching Hospital (COMS-TH), Bharatpur. Ethical approval was taken from the institutional review committee of COMS-TH (Ref. No.: COMSTH-IRC/2021-132). Students currently studying MBBS (Bachelor of Medicine, Bachelor of Surgery) in COMS-TH were included in this research. Research conducted by Pallamparthy et al. in India showed that 70% of students had good knowledge of medical research methodology.[1] By taking this as a prevalence with a 95% confidence interval and 5% as the margin of error sample size was calculated as: $n' = n/\{1+(n-1)/N\}=323/\{1+(323-1)/592\}=209$ where, $n = Z^2 \times p \times (1-p)/e^2 = (1.96)^2 \times 0.70 \times 0.30/ (0.05)^2 =323$. By adding 10% non-response errors this research was conducted among 230 students. The sample was collected by using a stratified random sampling technique. Informed and written consent was taken from all the students before collecting data and then a self-structured questionnaire was used for data collection. To assess the level of knowledge, for each correct response a score of 1 was given and 0 for the incorrect response. Five pointsLikert scale was used to assess the attitude level of the students. After collecting the data, the data were checked for completeness and accuracy. Data were compiled and analyzed by using Statistical Package for the Social Sciences (SPSS) version 20. Data were analyzed using descriptive and inferential statistical tools. In the descriptive statistics for categorical variables, frequency and percentage was calculated while for a continuous variable, the mean and standard deviation was calculated. In the inferential statistics to find the association between levels of knowledge and attitude with selected sociodemographic variables, the chi-square test was applied. P-value <0.05 was considered statistically significant.

## RESULTS

**Table 1.** Demographic profile of students. (n=218)

| Variables | Number (%) |
|---|---|
| **Age** | |
| 18 - 22 | 62(28.4) |
| 23 - 26 | 152(69.7) |
| 27 - 30 | 4(1.8) |
| Mean±S.D. | 23.15±1.772 |
| **Gender** | |
| Female | 83(38.1) |
| Male | 135(61.9) |
| Total | 218(100) |
| **Year of MBBS** | |
| First | 40(18.3) |
| Second | 41(18.8) |
| Third | 61(28) |
| Final | 38(17.4) |
| Internship | 38(17.4) |

The age of respondents was range from 18 years to 30 years. The Mean ± SD of the age of participants was 23.15±1.772 years. The maximum number of participants was 152 (69.7%) in the age group of 23 to 26 years, followed by 62 (28.4%) in the 18 to 22 years, and 4(1.8%) in the 27 to 30 years age group. Among respondents, 38.07% (83/218) were female and 61.92% (135/218) were male. According to the year of MBBS, 40(18.3%) were in the first year, 41(18.8%) were in the second year, 61(28%) were in the third year and 38(17.4%) were in the final year and 38(17.4%) were doing their internship. (Table 1)

**Table 2.** Knowledge of research among students (n=218).

| Knowledge Questions | Correct Response |
|---|---|
| Meaning of research | 176(80.7) |
| Research design | 169(77.5) |
| Importance of literature review | 167(76.6) |
| Methods to search for scientific research | 115(52.8) |
| Meaning of close-ended questions | 180(82.6) |
| Data analysis tools | 128(58.7) |

Regarding knowledge, 80.7% gave a correct response to the meaning of research, 77.5% knew about research design, 76.6% knew the importance of literature review, 52.8% were aware of the methods to search for scientific research, 82.6% had an idea about close-ended questions and 58.7% gavea correct response about the data analysis tools. (Table 2)

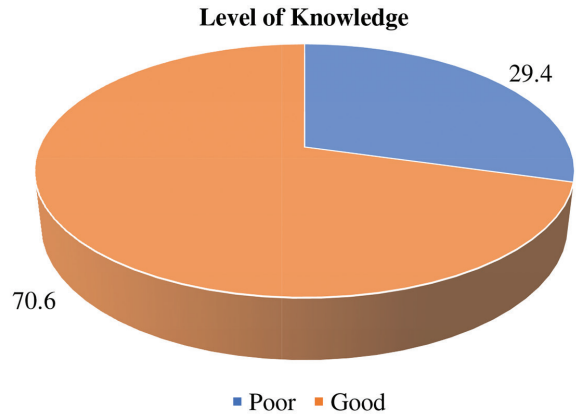


**Figure 1.** Level of knowledge(n=218).

Our research showed that 70.6% of students had good knowledge of research. We categorized a participant giving a minimum of 5 correct responses from 6 questions as good knowledge and 4 or fewer correct response(s) among 6 questions as poor knowledge (Figure 1)

**Table 4.** Association between levels of knowledge with demographic characteristics (n=218).

| Characteristics | Level of knowledge | | Chi-square | p-value |
|---|---|---|---|---|
| | Poor | Good | | |
| **Age** | | | | |
| 18-22 | 24(38.70) | 38(61.30) | 14.599 | <0.01 |
| 23-26 | 36(23.70) | 116(76.30) | | |
| 27-30 | 4(100) | - | | |
| **Gender** | | | | |
| Female | 29(34.90) | 54(65.10) | 2.014 | 0.156 |
| Male | 35(25.90) | 100(74.10)) | | |
| **Year of MBBS** | | | | |
| First | 21(52.50) | 19(47.50) | 35.228 | <0.01 |
| Second | 6(14.60) | 35(85.40) | | |
| Third | 10(16.40) | 51(83.60) | | |
| Final | 6(15.80) | 32(84.20) | | |
| Internship | 21(55.30) | 17(44.70) | | |

Regarding the level of knowledge, 61.30% of students in the age group 18 to 22 had good knowledge while 76.30% of students in the age group 23 to 26 had good knowledge and all 4 participants from the age group 27 to 30 years were found to have poor knowledge. A higher percentage of males (74.10%) was found to have good knowledge regarding research than females (65.10). The level of knowledge was highest among second-year students (85.40%), followed by final-year students (84.20%), followed by third-year (83.30%), followed by first-year students (47.50%), and least (44.70%) among internship students. Most of the students in the second, third, and final year had good knowledge about research while most of the internship and first-year students had poor knowledge regarding research. The overall statistically significant variables to the level of knowledge were age (p-value < 0.01), gender (p-value 0.156), and year of MBBS (p-value <0.01).(Table 4)

The attitude of participants regarding research is shown in Table 3. Regarding the attitude of students, most of the respondents strongly agreed (71.1%) that research is needed for a better understanding of the subject; the maximum number of students strongly agreed (66.1%) that research helps in updating ideas about clinical practice. Most of them agreed (37.2%) that research is not a waste of time and doesn't disturb studies; maximum students strongly agreed (45.4%) that research will help one's professional career and most of the students strongly agreed (45.4%) research should be included in MBBS curriculum. (Table 5)

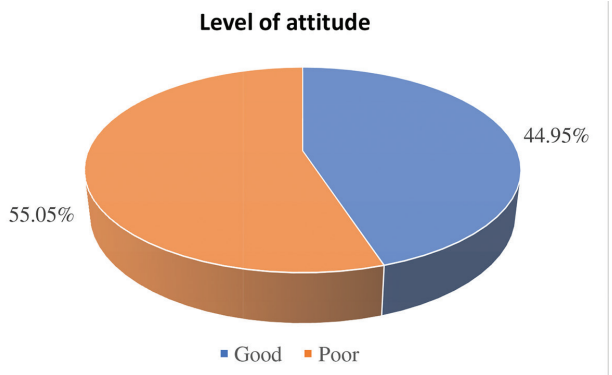


**Figure 2.** Level of Attitude (n=218)

We categorized students scoring 0-8 in attitude questions as having a poor attitude and scoring 9 or above as having a poor attitude. Score 1 was given for strongly agree and 5 for strongly disagree, 55.05% of students had a good attitude toward research (Figure 2).

**Table 5.** Frequency distribution of the participants in the research attitude scale. (n=218).

| Statement | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| Research is needed for a better understanding of the subject | 155(71.1) | 63(28.9) | - | - | - |
| Research helps in updating ideas about clinical practice | 144(66.1) | 74(33.9) | - | - | - |
| It is not a waste of time and doesn't disturb studies | 79(36.2) | 81(37.2) | 48(22) | 8(3.7) | 2(0.9) |
| That research will help one's professional career | 99(45.4) | 92(42.2) | 11(5) | 12(5.5) | 4(1.8) |
| Research should be included in the MBBS curriculum | 116(53.2) | 64(29.4) | 19(8.7) | 4(1.8) | 15(6.9) |

**Table 7.** Association between level of attitude with demographic characteristics (n=218).

| Characteristics | Level of attitude | | Chi-square | p-value |
|---|---|---|---|---|
| | Good | Poor | | |
| **Age of respondents** | | | | |
| 18-22 | 31(50.00) | 31(50.00) | 7.791 | 0.02 |
| 23-26 | 89(58.60) | 63(41.40) | | |
| 27-30 | 0 | 4(100) | | |
| **Gender** | | | | |
| Female | 42(50.60) | 41(49.40) | 1.069 | 0.301 |
| Male | 78(57.80) | 57(42.20) | | |
| **Year of MBBS** | | | | |
| First | 16(40.00) | 24(60.00) | 24.937 | 0.01 |
| Second | 27(65.90) | 14(34.10) | | |
| Third | 40(65.60) | 21(34.40) | | |
| Final | 27(71.10) | 11(28.90) | | |
| Internship | 10(26.30) | 28(73.70) | | |

Regarding the level of attitude, 50% of students in the age group 18 to 22 had a good attitude while 58.60% of students in the age group 23 to 26 had a good attitude and all 4 participants from the age group 27 to 30 years were found to have a good attitude. A higher percentage of males (57.80%) was found to have a good attitude regarding research than females (50.60%). The level of good attitude toward research was highest among final year students (71.10%) followed by second-year students (65.90%), followed by third-year (65.60%), followed by first-year students (40.0%) and least (26.30%) among intern year students. The overall statistically significant variables to the level of attitude were age (p-value = 0.02) and year of MBBS (p-value = 0.01). (Table 7)

Regarding the practice of research among students, most of the undergraduate students (72.9%) were not reading research articles regularly but most of them (75.7%) had searched for medical journals at a library/online. Only 28.9% had participated in any workshops on research methodology, lab research, or any other similar workshops. Very few students (8.7%) had conducted a medical research project (even

**Table 8.** Practice response (n=218).

| Practice Questions | Yes |
|---|---|
| Read research articles regularly | 59(27.1) |
| Searched for medical journals at a library/online | 165(75.7) |
| Participated in any workshops on research methodology, lab research, or any other similar workshops | 63(28.9) |
| Conducted a medical research project (even if not published) | 19(8.7) |
| Published research in a journal | 5(2.3) |

if not published) and only 2.3% of tudents had published their research in a journal. (Table 8)

Regarding the barriers, the maximum number of students agreed (47.2%) about lack of research skills and knowledge, most of them agreed (38.5%) to lack of time due to the demanding nature of the MBBS curriculum as a barrier, the maximum number of students agreed (43.6%) that lack of opportunity to conduct a research was a barrier, most of them remained neutral (30.3%) to lack of self-interest as a barrier, maximum number of students agreed (36.2%) to lack of faculty encouragement and mentorship support as a barrier, most of the students agreed (43.1%) lack of funding for research was a barrier, the maximum number of students agreed (36.2%) to difficulty in patients follow up as a barrier. (Table 9)

**Table 9.** Frequency distribution of the participants in the research barrier scale. (n=218).

| Statement | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| Lack of research skills and knowledge | 56(25.7) | 103(47.2) | 38(17.4) | 12(5.5) | 9(4.1) |
| Lack of time due to the demanding nature of the MBBS curriculum | 64(29.4) | 84(38.5) | 28(12.8) | 37(17) | 5(2.3) |
| Lack of opportunity to conduct a research | 65(29.8) | 95(43.6) | 27(12.4) | 26(11.9) | 5(2.3) |
| Lack of self-interest | 15(6.9) | 59(27.1) | 66(30.3) | 60(27.5) | 18(8.3) |
| Lack of faculty encouragement and mentorship support | 77(35.3) | 79(36.2) | 42(19.3) | 15(6.9) | 5(2.3) |
| Lack of funding for research | 75(34.4) | 94(43.1) | 30(13.8) | 14(6.4) | 5(2.3) |
| Difficulty in patient follow up | 39(17.9) | 79(36.2) | 77(35.3) | 15(6.9) | 8(3.7) |

## DISCUSSION

The present study was conducted to assess the knowledge, attitude, practice, and barriers toward medical research, as well as to identify associated factors affecting them in conducting research and background characteristics among undergraduate students. 94.78 % (218/230) of students responded to the questions in the questionnaire. This study found that 70.6% of students had good knowledge of research. This finding was similar to a study done in Karnataka, India by S Pallamparthy et.al.[1]which showed a 70% score on knowledge, and another study from Nagpur, India with a knowledge score of 69% by Sharma et al.[4] However, a study from Pakistan by Khan et al showed a moderate level of knowledge (49%).[5] In this study, statistically significant variables to the level of knowledge were age (p-value < 0.01) and year of MBBS (p-value <0.001). The level of knowledge was highest among second-year students (85.40%), followed by final-year students (84.20%), followed by third-year (83.30%), followed by first-year students (47.50%), and least among internship students (44.70%). In a study done in Malaysia, the academic year of students was significantly associated with knowledge with fourth and fifth-year students having higher knowledge scores than third-year students.[6] The present study didn't show gender as a statistically significant variable to the level of knowledge but a study from Shiraz, Iran showed that female students had significantly better knowledge than male students.[3]

In this study, there is a increasing attitude toward research from the first to final year but was lowest among interns. The statistically

significant variables to the level of attitude were age (p-value < 0.02) and year of MBBS (p-value <0.01). This can be explained by the increasing burden of study, lack of time, and the demanding curriculum of MBBS. However, other studies showed an increasing trend of attitude with increasing years of MBBS.[1,4–8]

In the present study, 55.05% of students had a good attitude toward research while a study done in Pakistan showed 53.7% on the attitude scale.[5]

This study showed that most of the undergraduate students (72.9%) were not reading research articles regularly but most of them (75.7%) had searched for medical journals at a library/online. Only 28.9% had participated in any workshops on research methodology, lab research, or any other similar workshops. Very few students (8.7%) had conducted a medical research project (even if not published) and only 2.3% of students had published their research in a journal.

This study assessed some of the barriers to research that students were facing. They were; lack of time due to the demanding nature of the MBBS curriculum, lack of opportunity to conduct research, lack of faculty encouragement and mentorship support, lack of funding for research, and difficulty in patient follow-up. Studies from other colleges in Nepal, India, and Pakistan have reported similar findings regarding barriers to research.[1,2,4,5,9,10]

This study showed that undergraduates have good knowledge and there are a low number of publishedresearch projects. To improve this, it is suggested that the students should be trained and exposed to research methodology both theoretically and practically. They should be encouraged to conduct research, present their work and publish it through rewards. The researchersshould involve interested students as co-investigators in their projects. As this study was conducted in a single medical college, the results of the study might not be generalized to all medical undergraduates of Nepal.

## CONCLUSIONS

This study revealed good knowledge regarding research among undergraduates. Attitude toward research was increasing from the first to final year however, the good attitude was highest among interns. Despite having good knowledge of research, research practice among students is low. Some of the barriers faced by students were lack of time due to the demanding nature of the MBBS curriculum, lack of opportunity to conduct research, lack of funding for research, and difficulty in patient follow-up.

Conflict of interest: None.

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