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The impact of sensitizing 1st year undergraduate medical students to research methodology

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Abstract:

BACKGROUND: Research is a core essential component of evidence-based medicine. The current study was undertaken to sensitize the undergraduate medical students the concept of biomedical research to sharpen their clinical skills.

MATERIALS AND METHODS: This educational interventional study was done with a systemic random sample of 120 medical students in a tertiary care hospital. A workshop on biomedical research was conducted by the institutional ethics and medical education committee members followed by group activity regarding how to write the protocol of a research study. The protocols were then assessed using prestructured checklist by facilitators and feedback from the students and facilitators were assessed using student *t*-score.

RESULTS: The pretest (5.86 ± 1.75) scores and posttest scores (11.82 ± 2.47) of multiple choice questions and open-ended questions showed statistically significant difference. The feedback of students showed that 49.48% of students strongly agreed that contents discussed in the workshop were adequate, 61.85% agreed about better understanding of the topics of the workshop, 60.80% agreed that their queries and doubts are cleared, 53.6% agreed that the workshop motivates them to do research, and 44.3% agreed that they will attend the similar workshops in future. The protocols submitted by groups of students using the checklist showed 26%–80% scores.

CONCLUSION: The student's knowledge on research methodology was significantly improved and teaching basic research methods to medical students at an early stage motivates the student to do research.

Keywords:

Biomedical research, protocols, research methodology, undergraduate students

Introduction

Evidence-based clinical practice is core component to become an competent medical graduate thus research becomes a crucial component in their present curriculum.[1] Competency-based medical education for Indian medical graduate is stressing on the behavior of self-learning process and prepares students for actual professional practice.[2] Incorporating research-based competencies is challenging and requires careful planning and attention.[3] There is also facilitation of research training by different organizations such as the Indian Council of Medical Research (ICMR)-Short Term Studentship projects.[4] The importance of integration of research in undergraduate medical student's curriculum has been highlighted in many reports.[5,6] Medical Council of India in the document of Regulations on Graduate Medical Education (2016) states that students should have the skill to carry out a small research project.

Future medical research, depends on the interaction between physicians, medical faculty and other health care providers undertaking innovative patient, and

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disease-focused research.[7] Fostering the development of writing research skills among medical students should now be a priority in the present competency-based training of IMG. Teaching research methodology to undergraduates medical students have an impact on their research knowledge, and it will sharpen their skills for practising evidence-based medicine and doing quality research.[8,9]

There are limited opportunities for medical students to opt a career in research. There is no formal path for medical students in India to become physicians, scientists, or academicians.[10] Students can act as young promising researchers and they should be encouraged and awarded.[11]

The present study was conducted to incorporate biomedical research module in the present medical curriculum to help student at an initial stage to acquire analytical and critical thinking skills.

The aim of this study was to study the impact of sensitizing 1st year undergraduate medical students to research methodology.

The aims of this study are:
- To sensitize undergraduate medical students to research methodology
- To obtain the feedback of students and faculty regarding research methodology workshop
- To assess the impact of research methodology on the knowledge of students.

Materials and Methods

Study design and setting
This Educational interventional study was conducted in a medical college and tertiary care hospital in Himachal Pradesh for 6 months.

Study participants and sampling
All undergraduate medical 1st year students on voluntary basis were included in this study who had given their voluntary consent. A systemic random sample of 120 students was taken initially.

Sample
Students of MBBS 1st year students of batch 2018–2019 who signed consent form to participate in the above educational study were included in this study. Students were divided into 10 groups and five group facilitators will be allotted to them (20 students to one facilitator).

Ethical approval
The study was conducted at Dr. Y. S. Parmar Govt. Medical College, Nahan, H. P. The approval from the Institutional ethics committee was sought. Module of the workshop was developed and validated by other faculty members of Medical Education Unit (MEU). Informed consent was taken from the students.

A pretest in the form of validated multiple choice questions and open-ended questions consisting of 20 marks was taken. Content validity of the questionnaire of pre- and post-test was determined by experts in medical education.

One day educational workshop was conducted and students were taught about research methods. The topics of the workshop were be: Title framing, Study design, Introduction, Aim and Objectives, Methodology, Results, Conclusion, and References.[12]

Students were divided into 10 groups and five group facilitators will be allotted to them (20 students to one facilitator). Resource faculties of MEU of this institution were their facilitators.

Group activity regarding the framing of title and how to write the protocol of a study was conducted by group facilitators to these groups.

Then validated posttest was taken for the assessment of students regarding their knowledge about research methods. Answer keys were prepared for proper scoring of pre- and post-tests. Statistical analysis was done of pre-test and post-test scoring. Student's perception regarding the contents and clarity of concepts of research methodology workshop was taken as feedback on a 5-point Likert scale.

Following this, the students wrote the protocols of the allotted topics and after 15 days, submit the protocols of their studies to facilitators. Their protocols were assessed by facilitators by prestructured checklist. Then the data were analyzed using the Student *t*-score.

Results

Tables 1 and 2 demonstrate the feedback of students and faculty, respectively. Table 1 demonstrates that 49.48% of students strongly agreed and 46.39% of students agreed that the contents discussed in the workshop were adequate.

About 61.85% of students strongly agreed that better understanding of the topics covered in the workshop and 53.6% of students strongly agreed that the workshop motivates them to do research in the future.

Most of the students approved that they will attend similar workshops in future and the workshop on research methods was useful for their future career (44.32% strongly agreed and 43.29% agreed).

Table 1: Feedback of students about the workshop on research methodology (*n*=97)

Observation	Strongly agree, *n* (%)	Agree, *n* (%)	Neither agree/nor disagree, *n* (%)	Disagree, *n* (%)	Strongly disagree, *n* (%)
Contents discussed in workshop was adequate	48 (49.48)	45 (46.39)	4 (4.12)		
The workshop was interesting and engaging	19 (19.58)	60 (61.85)	13 (13.40)	3 (3.09)	2 (2.06)
The workshop clears the concepts about the research methods	28 (28.86)	59 (60.82)	8 (8.24)	2 (2.06)	
The workshop was motivating	52 (53.6)	40 (41.23)	5 (5.15)		
Recommends similar workshops in the future	43 (44.32)	42 (43.29)	7 (7.21)	3 (3.09)	2 (2.06)

Table 2: Feedback of faculty (*n*=5)

Observation	Strongly agree, *n* (%)	Agree, *n* (%)	Neither agree/nor disagree, *n* (%)	Disagree, *n* (%)	Strongly disagree, *n* (%)
Contents discussed in workshop was adequate	40	40	20		
The workshop was interesting and engaging	30	30	40		
The workshop clears the concepts about the Research methods	50	50			
The workshop was motivating	60	30	10		
Recommends similar workshops in the future	40	40	20		

Faculty were also asked to comment formally regarding the strengths and weaknesses of this workshop so it can be modified and made more effective in the future.

Table 2 illustrates the feedback of faculty (n = 5) regarding the workshop. About 80% agreed that the contents discussed in the workshop were adequate. All the faculties agreed that the workshop cleared the concepts about the research methods. About 60% strongly agreed and 30% agreed that the workshop was motivating. About 80% of faculty recommends similar workshop in future.

Pre- and post-test of students are shown in Figure 1. The mean ± standard deviation (S.D.) of pretest score was 5.86 ± 1.75 and mean ± S.D. of posttest score was 11.82 ± 2.47. The analysis showed statistically significant difference (P = 0.00) by paired t-test between the two scores.

Although we attempted to obtain responses of the protocol writing from all medical students groups, we only managed to get 8 protocols of 10. Protocol I and Protocol IX were not submitted. Out of the eight groups of the students, six groups showed interest in writing the protocols with scoring > 60% in writing their protocols. Protocols submitted by groups of students using the checklist showed 26%–80% scores. Two groups show low motivation (score between 25% and 33%)

Checklist items for scoring the protocols submitted by the student groups are Title framing, Aims and objectives, Introduction, Methodology, Review of Literature, and References with 5 marks each. The scoring of protocols submitted by students after 15 days was done by faculty members. The students did well in framing the title, framing the Aim and Objectives, but were weak in writing the Introduction and Review of Literature of their protocols.

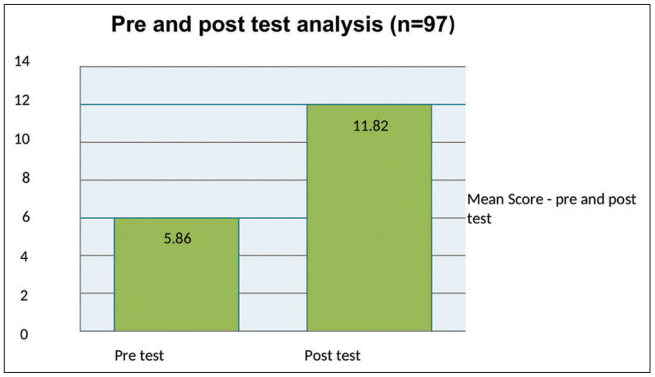

Figure 1: Pretest and posttest analysis

Discussion

The present study added to previous work by adopting a workshop-based method to study the impact of sensitizing 1st year medical students to research methods.

Our study revealed that the majority of the study sample agreed that research workshop removes their queries and doubts about research methods and motivates them to do research in future with critical thinking.

Before the workshop, the students lack confidence, as shown by the pretest taken before the educational workshop was conducted. The pretest score showed that the undergraduate medical students were unaware of the research methods and posttest score revealed that the intervention by conducting the workshop not only improved their medical information about research methods but also encourages them to write protocols on the given topics and motivates them to do research with critical thinking.

Protocol writing suggested that students had been motivated to do the research. They not only completed a

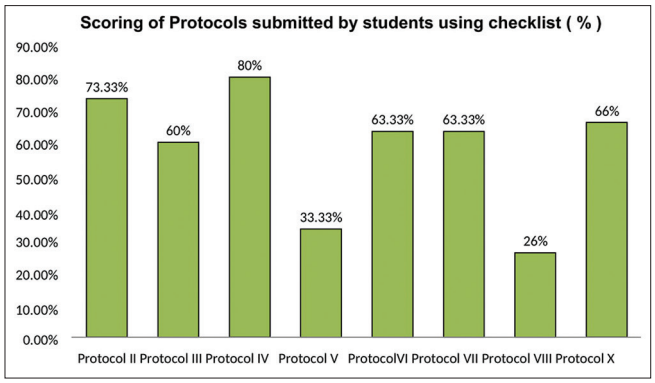

Figure 2: Scoring of protocols submitted by groups of students

compulsory group research protocol but also Improved clinical skills as shown in Figure 2.

Our workshop not only removes the lack of confidence among the students but also motivates them to complete their research project successfully.

The main problems faced by students while writing the protocols of their topics research are: Curriculum overload, time restriction, lack of staff guidance, and cooperation. The solutions for the above problems are more training workshops on research methodology, integration of research methodology into the undergraduate curriculum, and engaging students in mentored research projects by more staff guidance and cooperation.[13]

Furthermore, before this workshop, the majority of students were unaware of the research activities and methods of research. Their attitudes toward pursuing a career in research were positive but their lack of awareness of the research activity demotivates them to adopt research as career.

The previous studies also reported that workshops about research skills potentially improved research knowledge of medical students. Nahla Khamis and others in Jeddah reveal similar results,[14] where they suggested that knowledge of the medical students was markedly improved after the educational intervention program and elective courses on research methodology with good mentorship and workshop-based research training.

In another study done by Reinders *et al*., it was shown that students who gained extracurricular research experience publish more articles after graduation (average four articles) than students without such experience (average one article).[15]

Another study portrayed that medical students demonstrate the low level of knowledge toward health research before teaching research and intensive training to medical students was associated with significant improvement in knowledge.[16]

Our results also coincide with the results of S. Chaturvedi and V Devi which also concluded that Mentored Student Project program not only increased students' research skills but was also successful in fostering a positive attitude in students toward scientific research.[16,17]

There is an urgent need for motivations of medical students at their initial stage for research. Our workshop increased confidence, promotes collaborative group work, provides research skills support and supervision for fostering research skills,[18] and motivates the students to do research.[19]

Our study goes further by including the medical students of all phases of MBBS, by increasing the time availability and involvement of higher authorities which were considered barriers and can be countered by the involvement of other faculties of this institution.

Limitation and recommendation

The study was conducted only in 1st year undergraduate medical students. Only short-term impact was analyzed. It could be followed for its long-term effects such as submitting their ICMR short-term projects in subsequent years. Sample size can be increased or study can be done multicentric.

Conclusion

The present study concluded that workshop-based teaching developed a basic research skill in undergraduate medical students. Research experience helps an undergraduate student to understand its value when done as a team and even to consider research as a career. Teaching basic research methods to medical students at an early stage motivates and guides the progress of the student to do research.

The medical curriculum planners must ensure that the medical students are provided with a suitable foundation which includes introducing and illustrating the concepts of medical research from which they can develop specialized research skills as may be required in their careers.

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Conflicts of interest

There are no conflicts of interest.

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