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Original Article

Education Section

Innovative Practice of Involving Medical Student in Community Based Research Projects and Scientific Writing

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ABSTRACT

Introduction: The present MBBS curriculum does not provide an adequate platform for promoting research aptitude among under-graduates in India. To overcome this limitation an innovative approach was introduced, to involve each student in the 6th semester in planning and conducting a research project.

Aim: To teach medical students how to identify research questions, plan and conduct a research study.

Materials and Methods: In the month of January 2017, a two days Research Methodology workshop was organised for the 6th semester MBBS students (n=141) by the Department of Community Medicine. During the workshop, sessions were taken on need for research, framing a research question, steps in conducting research studies, sample size calculation, sampling methods, data collection methods and tools, data analysis, data presentation, interpretation and writing a report. Plenary sessions were followed by group formation. The students were divided into groups of three each. Each group was guided by a faculty from Community Medicine Department. By the end of workshop all the groups finalised their research topics, framed objectives and decided on basic methodology like type of study design and estimated sample size. Each research project underwent Institutional ethical clearance. All the projects were completed by 30th May 2017 and on June 15th 2017 the Department organised and conducted a Poster competition for all the 47 projects. Individual student in the research group was assessed by his/her group facilitator and was awarded marks out of 5.

Results: A total of 47 research projects were completed. The mean score of internal assessment marks of students for research projects was 4.02 out of 5. Students presented 51 posters and three papers in various Local, State, National and International conferences. They won five outstanding awards and eight project reports were converted into publications.

Conclusion: This innovation has successfully involved 6th semester MBBS students in planning and conducting community based research projects. Students could understand the various steps involved in conducting scientific research and writing and presenting a research report. This study empirically demonstrated that with some extra effort from teachers, undergraduate medical students can be exposed to a hands-on learning experience in population-based research, without using additional resources.

Keywords: Curriculum, Public health, Research question, Research methodology, Teaching, Undergraduate

INTRODUCTION

In 21st century, practice of medicine is based on understanding of Evidence Based Medicine (EBM), which is the conscientious, explicit, judicious and reasonable use of modern, best evidence in making decisions about the care of individual patients. EBM integrates clinical experience and patient values with the best available research information [1].

Research is a mandatory component for doing post-graduation but is largely not expected from undergraduate students. Involvement of Medical students in research is not a new concept [2]. There have been many instances where medical students have ventured into research with substantial outcome e.g., Jay Mclean, a second year medical student working at John Hopkins University, was first to isolate a fat-soluble phosphatide anti-coagulant in 1916, which was later termed as Heparin [3].

Western literature shows that performing research allows undergraduate medical students to gain critical thinking skills, ability to evaluate literature, provides lessons in teamwork, gain experience in writing and practice in communicating data with the scientific field [4,5].

According to Graduate Medical Education Regulations 2018, Institutional goals, an Indian medical graduate should possess the attitude of self-learning and pursue research in a chosen field of medicine [6]. In the revised Competency based curriculum given by Medical Council of India, one of the competency that has to be acquired by a Indian medical graduate is that he or she must be able to formulate a research question [7].

As far as research in medical sciences is concerned, India scored 12th position among the productive countries of the world in medicine during 1999-2008 with a mere 1.6% share in the world research output [8]. Most of the research in India is contributed by researchers who are faculty members/scientists from reputed medical institutes, and very little is contributed by medical students [9]. Currently, MBBS curriculum does not provide an adequate platform for promoting research aptitude in under-graduates in India [10].

In India basic research methodology and bio-statistics is one of the topics in undergraduate Medical curriculum taught by Community Medicine department. To apply the knowledge into practices and also to give Medical students foundation for dissertation work during their post-graduation, Community Medicine Departments of many Colleges across India have tried to involve medical students in research activities during either 1st or 2nd year of study or Internship. However their approach faced some challenges as students were often busy with 1st and 2nd year study subjects and in Internship they were more focused for postgraduate entrance examination [11,12]. To overcome this limitation in the Department it was decided to train Final MBBS Part 1 (6th Semester) Medical students to learn the need and practice the steps in carrying out basic research since during this phase medical students focus on the Community Medicine subject. Hence the department adopted to teach 6th semester medical students how to identify research questions, plan and conduct a research study.

MATERIALS AND METHODS

The present study was a descriptive study which was conducted in the Department of Community Medicine, Saveetha Medical College, Chennai, Tamil Nadu, India, for the duration of six months (January-June 2017). All the students of 6th semester (141 students) participated in the study.

In the beginning of 6th semester, a two day workshop was organised on 10th and 11th January 2017. During the workshop, sessions were taken on need for research, framing a research question, steps in conducting research studies, sample size calculation, sampling methods, data collection methods and tools, data analysis, data presentation, interpretation and writing a report. Sessions were taken by faculty of the Department of Community Medicine including statistician. Plenary sessions were followed by group formation. The students are divided into groups of three students each=47 groups (141/3=47). Each group was guided by faculty from Community Medicine Department.

On the second half of Day 1 of the workshop the students were brainstormed to decide on the broad area of research. The idea was to focus the participants thinking and attention for framing the study objectives by active participation in the group discussion. By the end of day two all the groups finalised their research topics, framed objectives and decided on basic methodology like type of study design and estimated sample size.

All the groups were invited to present their project proposal to senior faculty from the Institution, and they received critical inputs from them. Workshop successfully resulted in initiation of 47 research projects. A gantt chart was given to all the students and facilitators for completion of the projects [Table/Fig-1].

After the workshop student groups were guided by the facilitators to help them to write the research proposal, which were submitted to the Institutional Review Board (IRB) of the Institution. In order to finish the research projects within the stipulated time frame of six months, IRB was requested to hold extra meetings to judge all 47 projects by 15th February 2017. After obtaining the IRB approval student groups were asked to start data collection.

For facilitating data collection in the community, students were provided transport to go to the community on fixed four saturdays in February and March 2017. Students were accompanied by the para medical workers, interns and postgraduates of Community Medicine department. Following data collection, the students were trained on data entry and analysis using MS Excel by the statistician in the small groups of 50 each during practical sessions.

Following data analysis students completed their research report writing under the guidance of their facilitators. A poster presentation competition was organised by the department on 15th June 2017 where all the 47 student groups presented posters. A panel of judges was selected comprising of two external subject experts and one internal expert from the college who judged the poster presentations by the students and best three project presentations were felicitated by cash prize from the Department. All students were given participation certificates. Individual student in the research group was assessed by his/her group facilitator and was awarded marks out of 5. Research marks were added in internal assessment marks of the student for Community Medicine subject.

RESULTS

There were 141 students in the 6th semester during January 2017. Students were divided into batch of three each which resulted in the formation of 47 student groups for the purpose of starting student research projects. A total of 47 student projects were completed in 2017. Six faculties from Community Medicine department were involved in the projects as the student project facilitators; each faculty guided 7-8 student research groups. Head of the department was the overall in-charge and guide for the student projects.

All 47 research projects were descriptive cross-sectional studies. Out of 47 projects majority projects were community based (70.2%) followed by institutional based (19.1%) and hospital based (4.26%) studies; 23 (48.9%) projects were knowledge, attitude and practice (KAP) studies followed by 21 (44.6%) prevalence studies and 3 (6.3%) surveys [Table/Fig-2].

Place of research	No. of projects	Percentage
Rural field practice area	18	38.3
Urban field practice area	15	31.9
Hospital	2	4.26
College students, faculty, staff	9	19.1
Schools	3	6.38
Type of research		
KAP studies	23	48.9%
Prevalence studies	21	44.6%
Survey	3	6.3%

[Table/Fig-2]: Distribution of projects according to their place of research and type of research.

Students presented 54 scientific presentations in the form of oral and posters in various local, state, national (e.g., INCLEN 2017 in Kerala) and international conferences (e.g., Lifestyle conference in AIMST University, Malaysia 2018) with five outstanding performance prizes. Till date eight student projects have been converted into publications in reputed indexed journals [Table/Fig-3].

Assessment of the projects: Each student of the project group was individually assessed by the facilitator and was awarded marks out of 5; assessment was based on student's involvement in the various steps of conducting research project starting from choosing the research topic till completion of report and poster presentation. Marks ranged from 2 to 5 with mean of 4.02 and Standard deviation of 0.803. Majority students scored 4 marks (41.1%) followed by 3 (19.9%). Only 5 (3.6%) students got 2 marks out of 5 [Table/Fig-4].

Sl. No	Activity	Jan 10-Jan 31st 2017	1-15th February 2017	15th February-15th March 2017	15th March-15th April 2017	15th April-15th May 2017	30th May 2017	15th June 2017
1	Preparation of project plan and project proposal	■						
2	IRB approval, working out logistics, permissions		■					
3	Data collection			■				
4	Data analysis and compilation				■			
5	Draft report					■		
6	Final report submission						■	
7	Poster presentation							■

[Table/Fig-1]: Time-line chart for project completion (10/01/2017-15/06/2017).

Poster presentations (51)			Paper presentations (3)		Outstanding awards (5)		Publications
Local (College)	State	National	National	International	National	International	
47	1	3	2	1	4	1	8

[Table/Fig-3]: Presentations and publications from student research projects.

IA marks (out of 5)	No. of students	Percentage
2	5	3.6
3	28	19.9
3.5	1	0.7
4	58	41.1
4.5	10	7.1
5	39	27.7
Total	141	

[Table/Fig-4]: Distribution of students according to their research marks.

DISCUSSION

Dr. Abraham Flexner who was appointed to look into the medical schools of USA, recommended that "*Medicine is a science and only on its strong foundation can the art of the practice of medicine be built*". These recommendations are relevant to every nation to make medical education and research globally competitive. Any nation, which is unable to do so, is doomed to fail [13].

An earlier study by Hren D et al., showed that training of medical students in research methodology helps students to develop a positive attitude towards research [14]. Other studies have suggested that medical students with research experience have a greater scientific output after graduation compared with peers without such experience [15]. Current medical curriculum in India provides opportunity in the Final year part 1 to teach Basic Epidemiology and bio-statistics to the medical students. Traditionally, these topics are dealt during theory and practical sessions.

By involving the students in carrying out research using the steps in Research Methodology and guiding them in each step (choosing topic, defining population, calculation of sample size, choosing methodology, designing tools, data collection, compilation, analysis and writing report etc.,) made the students learn the topic in much better way in a pragmatic manner. Moreover, when students choose a particular topic for research, their understanding for that topic becomes deeper and vaster, as they conduct an extensive literature review for that topic [11]. Accordingly marks in internal assessments is an added motivation for students to conduct quality research projects, and publications [16].

Different medical colleges in India have tried giving experiential knowledge to medical students in the field of population based research, by involving them during different phases of medical teaching starting from first year to internship [11,12]. Involvement of medical students in research is still in its experimental phase, there is no uniformity across the country involving all the medical institution.

In the present study, students of 6th semester were involved in planning and conducting a research project. Focus of students on learning and carrying out research projects was found to be good, average score for research projects was 4.02 out of 5. During 6th and 7th semester MBBS student's main attention is mainly on three subjects including Community Medicine subject. Taking out time for research projects was the challenge for the department as currently conducting research projects is not the part of regular Community Medicine curriculum for MBBS. Few practical hours from the Community Medicine study hours could only be converted into research hours, students were asked to make use of their non college hours like evenings, sundays etc., for activities like literature search, writing report etc. Students were motivated to come during lunch hour for discussion with the faculty regarding their research projects. Competency based Undergraduate Medical Curriculum 2019 has included community based projects as one of the General electives which can be opted by the medical student for a month after competition of MBBS part 1 [17], this is a welcoming step for enhancing research aptitude among Medical Graduates but once more it will be elective and not will be core competency.

Students were instructed to complete the research projects within 6-months time duration. Among 47 research projects completed all were descriptive cross-sectional studies. Almost 50% of the studies were KAP studies followed by prevalence studies. Sample size of the studies was kept minimum possible between 100-400 depending on the topic and place of research keeping in mind the time factor for completion of research projects.

Students were motivated to choose the topics from important public health problems like non communicable diseases, malnutrition, geriatric health, maternal and child health, substance abuse, adolescent health, environment etc., for their research projects. Medical students are more interested in clinically oriented hospital based studies, motivating them to choose from community based public health problems was not easy. Three projects were carried out in the school, getting permission from school authorities and balancing the time of data collection with the other groups was a problem. Data collection in the field was done during the college hours on the earmarked Saturdays, being a working day some houses were found to be locked and in some places study participants were not available in the house.

Role of guides/facilitators (faculty of the department) was imperative; they guided the students at each step from project proposal writing to report submission and poster presentation. Motivating the faculty to employ the students in meaningful research was again a challenging job for the department.

LIMITATION

All students were not found to be equally involved in the learning process as they did the projects in a group of three each. In future we can motivate every medical student to carry out individual research project.

CONCLUSION

This innovation has successfully involved 6th semester MBBS students in planning and conducting community based research projects. Students could understand the various steps involved in conducting scientific research and writing and presenting a research report. The mean score of internal assessment marks was 4.02 out of 5 which corresponds to 80.4%. This study empirically demonstrates that with some extra effort from teachers, undergraduate medical students can be exposed to a hands-on learning experience in population-based research, without using additional resources.

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