ORIGINAL ARTICLE

MEDICAL STUDENTS' RESEARCH MENTORING PROGRAM AT CENTRAL PARK MEDICAL COLLEGE, LAHORE, PAKISTAN

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Background: Postgraduation programs, including clinical specialties, have inculcated a mandatory research component, yet no initiatives are taken for the promotion of research at the undergraduate MBBS programs across Pakistan. This study has highlighted a research mentoring program at undergraduate level conducted at Central Park Medical College (CPMC), Lahore, which developed research interest from the start of MBBS. The objective of the study was to explore the perception of mentees and mentors regarding the research mentoring program at CPMC. **Method**: This observational cross-sectional study, conducted from April-December 2019, included 500 MBBS students, along with their 50 research mentors. After institutional ethical approval and written informed consent, a survey questionnaire was circulated in November, amongst mentors and mentees, to explore their perspective regarding research program. The data was entered in SPSS version 21. Frequency and Reliability analysis by Cronbachs Alpha was done **Results**: The reliability of the questionnaire was 0.82. Around 80-90 percent of the mentors believed that it developed intellectual skills of both mentors and mentees, but the students had a mixed response. After 7 months, there was one article published, four were accepted for publication, ten were under peer review in HEC recognized journals, and majority was observational cross-sectional studies/case reports. **Conclusion:** It proved to be a mutually beneficial program and facilitated research activities of both mentors and mentees. It is suggested to introduce structured research mentoring program into the undergraduate curriculum of other medical institutions too.

Keywords: Research mentoring, mentors perceptions, mentees perceptions, students' publication.

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INTRODUCTION

Research in the medical profession is of utmost importance because of its direct impact on the health of the population.[1] Medical science is constantly evolving. This fact has led to the emergence of evidence- based medicine. Medical research, no matter at which level, affects the quality of care provided to the patients. This is the reason why efforts are being made to strengthen the culture of undergraduate medical research at the institutional level across Pakistan. Undergraduate research in the medical profession can inculcate critical thinking and reasoning skills from the start of their career.

Those undergraduate students who actively take part in research are more likely to follow the notion of evidence-based medicine and choose research-based programs in their postgraduation.[2,3] Pakistan has witnessed a rise in research activities at the post-graduate level over the last two decades.[4] Almost all medical and dental postgraduation programs, including clinical specialties, have inculcated a mandatory research component. Still, no significant initiatives are being taken for the promotion of medical research at the undergraduate level.

Multiple factors play a role in establishing a healthy research environment for undergraduate students at an institution. Faculty and administration of an institute play the key role in this regard, where faculty members provide adequate mentorship and administration helps by offering facilities like research labs, up-to-date libraries and access to medical journals. Moreover, it is the responsibility of the organization to improvise funds for different research activities. The demanding and stressful lifestyle of medical students makes them socially isolated[5], with limited faculty-learner relationships and they lack the confidence and opportunities for conducting research at this stage.

According to previous studies carried out in Pakistan, undergraduate medical and dental students acknowledge the need for research at the undergraduate level and want to participate in different research activities.[6] However, a large number of barriers like poor knowledge of research methodology, lack of funds and inadequate support from faculty and administration have a strong negative impact on undergraduate student's research productivity. In order to combat this, a research mentoring program has been established at Central Park Medical College, Lahore, which aims to provide help in developing research interest from the very beginning of undergraduate training.

Central Park Medical College is located on the outskirts of Lahore and is famous for its good reputation as an institution with excellent academics and state-of-the-art buildings. Here, the mentorship program takes

into consideration activities of undergraduate students related to research, academics and personal well-being. A mentor here is a role-model, motivator, research trainer and counsellor who helps the student in understanding the institution's culture and the medical course, becoming familiar with campus life and its support services, professional development for conducting scientific research and facilitating development of scientific standards (including selection of research question, data, authorship practices, norms of communication, interpretation, and judgment). It applies to all levels of professional development at the undergraduate level.

A research mentor helps in transferring knowledge in skills relating to communication, critical thinking, responsibility, flexibility, and teamwork that cannot be learned from books. Mentoring program is formally structured and faculty have been trained via workshops to mentor students. In order to evaluate the program, both the faculty and students give written feedback at the end of every academic session. This is done to ensure the successful running of the program. Mentoring here contributes to the professional development of both mentee and mentor. These faculty members function as faculty advisors to a certain number of students.

The current study was carried out to assess the role of research mentors at CPMC and its affiliated teaching hospital in facilitating students in formulating a research question, conducting research and publishing articles in HEC recognized journals. Many studies have been conducted in the past regarding mentoring of students[7,8], but they are not specifically aimed at research mentoring of students. This study was the first of its kind, which basically highlighted introducing and propagating research in all five years of medical training.

MATERIAL AND METHODS

The present cross-sectional study was conducted at CPMC, Lahore, from April to December 2019, which included all 500 students enrolled in the MBBS program from 1st year to final year and their 50 research mentors. The Institutional Review Board of CPMC approved the study protocol (CPMC/IRB-No/126). Fifty faculty members were selected equally from the basic and clinical sciences, including all grades, from professors to senior demonstrators and senior registrars, for the purpose of conducting research activities and training students of all five years as researchers. The training sessions were conducted by a medical educationist who held workshops on mentorship weekly for a period of six weeks in three hourly sessions. Workshops were also conducted by a well-trained faculty member from the Department of Community Medicine on research methodologies, data collection tools and SPSS. All 50 of the research mentors used to attend these sessions regularly. It was decided that two mentors were to train 20 students (4 from each year) and each group was given the task to publish at least one research paper per year. That was to make around 25 research papers every year for a total of 50 mentors. As five students could author one research paper, therefore, out of a group of 20 students per mentor, five students were to author one research paper every year.

The Dean of CPMC, Prof. A.S. Chughtai, had envisioned preparing a certain number of research proposals every year. The research topics were to include cases from Central Park Teaching Hospital (CPTH), epidemiological studies, or topics related to medical education. During the session, the faculty was to submit their proposals to Institutional Review Board for approval. After completion of research and writing of the manuscript, the authors had to submit their work to HEC recognized journals. It was decided that the principal investigator would be the research mentor, and the remaining authors were to be the students, whereas the article processing charges of a manuscript were to be covered by the institution. A research fund for the students had been established for this purpose and it was confined only for laboratory tests or technical assistance, including data collection tools. Mentoring sessions were included in the timetables of all five years in the same time slot, every Wednesday, from 8 to 10 am.

A survey was conducted in November 2019 amongst the students of all five years to assess their level of interest and involvement in research work. A survey was also conducted amongst the research mentors to assess their level of commitment to their work related to research activities and their perspective regarding the ongoing projects. All 500 students filled in the questionnaire, 100 from each year, and by two research mentors from each group, amounting to 50 research mentors. It was planned that the same mentors will remain for five years and will not be rotated until the end of all five years' session. Students from initial three years were encouraged to engage in formulating research questions related to the epidemiology of patients, whereas the students of 4th and 5th year were engaged in conducting clinical research, which involved collection of samples from operation theatres and laboratories of CPTH.

The source of the questionnaire were some similar research studies conducted in different medical colleges globally.[8–10] Some of the questions were self-constructed, keeping in view the objectives of the mentorship program at CPMC. Overall, the reliability of the questionnaire was determined by measuring the related Cronbach's Alpha, which was equal to .82, indicating good consistency in the responses from study participants. The validity of the questionnaire was also established and it was pilot tested on a subset of

participants. The content validity was determined by two senior faculty members and questions were modified accordingly.

The questionnaire was comprised of topics pertaining to students' awareness and orientation towards research, their perspective on research opportunities, provision of facilities for conducting research, including evaluation of significance of journal clubs conducted frequently for students, and estimation of research barriers the students were facing. A Likert scale format was used to elicit each mentee's responses which were all close-ended questions. A section on biodata of students was also included in the questionnaire, in which they also had to mention the system of education at the secondary level, apart from other details.

Weekly interactions between mentors and mentees were held for the purpose of personal grooming and research activities. It was a group activity in which formal course work was conducted throughout the five academic years, including the formulation of research questions, statistics, writing of the manuscript and other research-associated activities through workshops and Journal clubs.

Table-1: Demographics of mentees enrolled in research mentorship program at CPMC

Characteristic	Year 1	Year 2	Year 3	Year 4	Year 5
Number of students	**100 n (%)**	**100 n (%)**	**100 n (%)**	**100 n (%)**	**100 n (%)**
Gender					
Male	39 (39)	51 (51)	45 (45)	32 (32)	62 (62)
Female	61 (61)	49 (49)	65 (65)	68 (68)	48 (48)
Previous education system					
Matric	82 (82)	89 (89)	90 (90)	88 (88)	92 (92)
0 levels	18 (18)	11 (11)	10 (10)	12 (12)	8 (8)
Type of students					
Day Scholar	45 (45)	55 (55)	48 (48)	56 (56)	38 (38)
Boarder	55 (55)	45 (45)	52 (52)	44 (44)	62 (62)

Table-2: Perception of mentees on research mentorship program at CPMC

Statement	Strongly Agree n (%)	Agree n (%)	No Response n (%)	Disagree n (%)	Strongly Disagree n (%)
Research is stressful, difficult and time consuming	-	-	50 (10)	250 (60)	150 (30)
Research is interesting and rewarding	325 (65)	50 (10)	25 (5)	100 (20)	-
Research should be an optional activity	25 (5)	150 (30)	50 (10)	150 (30)	125 (25)
Research reenforces the spirit of team work	350 (70)	100 (20)	10 (2)	40 (8)	-
Sufficient time is available at the campus for conducting research activities	-	250 (50)	100 (20)	-	-
Training courses on research methodology throughout the session were beneficial in formulating a research question	300 (60)	100 (20)	25 (5)	75 (15)	-
Obtaining approval from IRB is time consuming	-	50 (10)	100 (20)	50 (10)	300 (60)
Unavailability of subjects / samples is the main obstacle in conducting research		50 (10)	250 (50)	50 (10)	150 (30)
Poor accessibility to patients and their records is the main hurdle in completing my research project	-	75 (15)	250 (50)	25 (5)	150 (30)
Adequate guidance by the mentor is provided to conduct research	225 (45)	175 (35)	50 (10)	50 (10)	-
The college has adequate facilities to conduct research	250 (50)	100 (20)	100 (20)	50 (10)	-

Table-3: Perception of mentors on research mentorship program at CPMC

Statement	Strongly Agree n (%)	Agree n (%)	No Response n (%)	Disagree n (%)	Strongly Disagree n (%)
You are satisfied with your role as a research mentor	25 (50)	18 (36)	2 (4)	5 (10)	-
This activity is beneficial for the personal grooming of students	33 (66)	15 (30)	1 (2)	1 (2)	-
You believe this program is contributing towards the professional grooming of students in the field of research.	35 (70)	10 (20)	3 (6)	2 (4)	-
Conducting research mentoring at undergraduate level is beneficial for professional development of mentee.	35 (70)	10 (20)	1 (2)	4 (8)	-
Conducting research mentoring at undergraduate level is beneficial for professional development of mentor.	30 (60)	15 (30)	3 (6)	2 (4)	-
Research should be an optional activity.	8 (16)	7 (14)	10 (20)	15 (30)	10 (20)
Sufficient time is available at the campus for conducting research activities.	28 (56)	5 (10)	7 (14)	8 (16)	8 (4)
Training through workshops has been effective to perform your role as a research mentor	23 (46)	12 (24)	7 (14)	6 (12)	2 (4)
The administration provides you enough facilities to conduct research activities.	35 (70)	7 (14)	3 (6)	5 (10)	-

The data were statistically analysed using SPSS software version 21.0. The outcome of the program was assessed by validated structured questionnaires, which were collected from both the mentors and mentees (Table 1,2,3). Cronbach's alpha coefficient test was used to assess the validity and reliability of the questionnaire collected from the mentees. Likert scale was used for the qualitative analysis of the responses obtained.

RESULTS

Around 80–90 percent of the mentors believed that research mentoring developed not only the intellectual skills of students, but also theirs. It enhanced their critical thinking and research skills. For them, it was an interesting task to formulate a research question and designing a study. They enjoyed training the next generation, watching a student mature intellectually, and knowing that they played an integral part in that process. Remaining 40 percent of the mentors thought it was a difficult task as they were still coping with the challenges in interacting with their mentees. It was taking time to formulate research questions and designing a study. This kind of response was expected on the part of faculty and students, as it was the first year of the launch of the mentoring program and in spite of rigorous training of faculty in the form of workshops, most of the faculty members were not used to conducting undergraduate research training sessions. There was a need to train the faculty further in this regard.

Pertaining to the students' perspective, the response was mixed. It was assessed from the proformas that only those students were performing well in research activities who had qualified Cambridge O levels and A levels for admission into CPMC, compared to those who had obtained admission after scoring well in FSC exams (Table-1). The reason might have been that the curriculum of Cambridge is designed to enhance critical thinking of students by ensuring their participation in various activities involving team-work, whereas the ones having cleared their FSC exams are used to the rote system for obtaining high grades and lack the ability to think critically.

In November, nearly seven months after the commencement of this program, there was only one article published, four were accepted for publication. Ten were in the pipeline under peer review in different local HEC recognized journals of Pakistan, and all of these research papers were cross-sectional studies. The program's aim was to get 25 articles published by the end of the session, but only 20 percent of the target had been achieved so far. All of these projects, accepted and ongoing, were either related to the clinical cases and surgeries encountered in the affiliated teaching hospital, or they were epidemiological studies based on the statistics of the type of diseases and patients observed visiting the hospital.

DISCUSSION

Many studies have been conducted across the world in various institutions, including medical colleges, on the effects of mentoring on the professional and personal development of students[8–10], but these are not specific to research training. For instance, a study was conducted by Kukreja *et al*. (2017) on the effects of mentoring on the overall training of students[11], but that was more focused on academic mentoring rather than on the aspect of research training. The present study was the first of its kind, which was solely focused on grooming students in the field of research, which has always been an essential step in applying the concept of evidence-based medicine into clinical practice.

Another advantage of this mentoring program was the association of students from all 5 years into small groups, giving an opportunity for the students of preclinical years to associate with those from the clinical years. Many studies have been conducted on mentoring of students which are specific to the year of study[12]. In this study, students from all 5 years were gathered into 25 groups. This created an atmosphere of peer mentoring too, and gave an opportunity to the junior students to learn and interact with their seniors. This led to professional grooming of students too, as they shared many of their point of views on a single platform.

It was observed that the students from clinical years were performing better in their clinical assessments, highlighting the implementation of evidence-based medicine into clinical practice through frequent sessions of journal clubs conducted on weekly basis. Similar studies have been conducted in the past, in which medical students are trained through journal clubs to implement evidence-based medicine into clinical practice.[13,14]

To ensure success of the mentorship program, it was obligatory to train faculty on the fundamental concepts of mentorship, research methodologies and evidence-based medicine. All this was achieved by conducting regular training workshops and seminars covering all aspects of these topics. Many studies have been conducted globally on the impact of training faculty on mentoring to ensure success of mentorship programs at undergraduate level[15,16], but this study

was unique in the sense that it was specific to training students of all 5 years for the purpose of conducting research and writing research papers based on their research projects. The long-term goal of this program was to launch a medical journal of CPMC, involving all students and faculty and training them well before hand.

It was observed that those students did far better in coming up with valid research questions who had qualified Cambridge O levels and A levels for admission into Central Park Medical College, compared to those who had obtained admission after scoring well in FSC exams. The reason behind this is the method of teaching adopted for the curriculum of O / A levels. It enhances critical thinking, reasoning and problem solving[17]. Students learn how to make informed and reasoned decisions and construct evidence-based arguments in order to make them life-long learners. On the contrary, students who have gone through FSC syllabus do not have the mental capability to think critically and give reasons. This is perhaps due to their system of education which encourages rote learning, rather than providing a platform for self-directed, life-long learning.

Apart from its beneficial aspects, many difficulties and pitfalls were also witnessed during mentoring program. The reason for these pitfalls was the lack of time, making it difficult for students to make contact with and getting to know their mentors well. Another reason why some students faced difficulty understanding the basic concepts of research methodologies was that these mentoring sessions were conducted in groups and every student was not getting individual attention. The reason behind not conducting mentoring sessions individually was the significance of team work in inculcating the practice of research activities, as students were encouraged to work together to come up with some brilliant ideas which could be transformed into research questions with the contribution of mentors.

Another reason why some students could not do well enough was due to the restriction imposed on selection of both mentor and mentee. Neither of the two could choose out of their own free will. The department of medical education allotted these groups based on the roll number of students, and the same mentor was assigned to teach the same group throughout 5 years of training.

Limitations and strength of the study:

The main limitation of this study was the short duration of this program. It could not be extended beyond the month of December because of the corona outbreak. At the same time, this study's main strength was the involvement of research mentoring into the timetables in the same slot on the same day of the week for all 5 academic years.

CONCLUSION

Despite of the fact that the number of publications by the end of the session was quite below the target, mentoring introduced the concept of research from the beginning of the MBBS program. Overall, it proved beneficial for the professional development of both the mentor and the mentee. Therefore, it is suggested to introduce research mentoring into the curriculum in other medical institutions too.

AUTHORS' CONTRIBUTION

MH: Conceived, design, statistical analysis, editing. SB: Data collection write-up, review.

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