

EVALUATION OF NEWLY IMPLEMENTED UNDERGRADUATE MEDICAL RESEARCH CURRICULUM AT REHMAN MEDICAL COLLEGE, PESHAWAR, KP, PAKISTAN

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ABSTRACT

Introduction: Medical research is a low priority area in Pakistan, particularly at the undergraduate level. The graduate MBBS doctor hence suffers on the international arena in having a dearth of research knowledge or output. Rehman Medical College (RMC) embarked on an innovative venture of including an Undergraduate Medical Research Program (UGMR) in the MBBS curriculum since 2010. The present study was conducted to provide guidelines for evaluating the implemented UGMR program and its future continuity.

Materials & Methods: The questionnaire-based survey was conducted from May-June 2013 on RMC students of Professional MBBS years 1-3 who had been part of the UGMR program. A sample was also obtained from RMC faculty through a separate, though related questionnaire. Domains under study were acceptability of the program, implementation strategy, efficiency, outcome and future prospects / directions. Data were analyzed by SPSS version 15.0. The Chi square test and the Student's T test were used for comparing frequencies and means respectively between groups, keeping $p \leq 0.05$ as significant.

Results: Students were enthusiastic and satisfied with the UGMR program from first to third year MBBS as an aid to enhance their self-learning and problem-solving skills; several areas of basic and advanced research topics that were difficult for students to understand were identified. RMC faculty identified areas of program implementation that needed greater emphasis and/or modification. However the majority of students and faculty wanted to maintain the program for future and recommended that all medical colleges should have UGMR programs.

Conclusion: Inclusion of an undergraduate medical research curriculum proved to be a successful venture with good prospects for future continuity and further consolidation.

Key Words: Medical Education; Undergraduate Medical Education; Medical Research; Feedback.

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INTRODUCTION

Traditionally, medical research has been considered the domain of postgraduate professionals with various justifications such as conceptual maturity, experience, powers of logical thought, ability for critical thinking and analysis, etc. However there is very little scientific evidence to support such claims, particularly in view of the fact that the human brain and thought process is fairly well developed by early childhood and afterwards just accumulates knowledge and sifts useful information from unwanted experiences. Furthermore, a number of notable scientific discoveries and achievements have been attributed to medical students over the last few millennia. Student life is a phase of intense mental stimulation related to new and exciting knowledge input and skill acquisition that ultimately results in the creation of a professional attitude and behavior. In many cases, the course contents are more difficult to understand and grasp compared to actual experimentation or research activity, which is a first-hand experience and under the control of the researcher. Thus there seems little reason to justify the denial of research opportunity and/or resources to undergraduates. The comparative dearth of undergraduate research in developing countries^{1,2} is more likely related to the lower priorities of professionals in these countries compared to diagnostic or clinical expertise as a hallmark of the medical professional. Whereas the developed nations consider research an integral part of medical education and medical practice, in developing countries research is put on a high pedestal and considered an exotic

activity meant solely for the few lofty intellectuals who indulge in it.

A similar situation exists in Pakistan, where even postgraduate research is scarce, patchy and merely an exercise to write a few research papers for the sake of academic and professional promotion along the career path. Both quality and quantity of research output remains far below the desired levels. Considering the number of medical research journals and articles published each year from Pakistan, it can be said that we are close to the bottom of the list of nations in medical research output. There are only three indexed medical journals of Pakistan, with one being that of an undergraduate medical college.

The approach to solve this problem is to introduce medical research teaching and training in the MBBS curriculum as an integral part of the program. Not only is the learning curve of students highest at this time, they are more receptive to innovative ideas and challenges and are young enough to have the energy to carry out the physical and mental labors required for conducting research studies.

Rehman Medical College (RMC), a newly established institution with an innovative modular integrated MBBS curriculum also has a mission statement to produce research-competent medical graduates. Keeping this in mind, a Department of Medical Research was created in 2010 to teach and train medical students in the field of medical research from First Professional MBBS year onwards. A structured and tiered research curriculum was implemented supported by real-time conduct of research projects by students, right from the First Professional MBBS year, guided by mentors and supervisors who were in turn

trained through research workshops for capacity building. The present study is an attempt to evaluate the Undergraduate Medical Research Program (UGMR) at RMC, though it is in its very early phases of implementation.

MATERIALS & METHODS

The questionnaire-based survey was carried out on First, Second and Third Professional MBBS students of RMC during May to June 2013, comprising a total admission of 300 students who were administered a pre-designed questionnaire containing questions on various aspects of the UGMR program so that evaluation could be done on the basis of acceptability, success, outcome and future prospects of continuing the program. The estimated sample size for 300 students with $1-\alpha=95$, $1-\beta=90$ and $p=0.50$ was 73 students. Sampling was done by convenience sampling based on the number of students who volunteered to respond after informed consent.

A slightly modified questionnaire was also administered to Faculty members who agreed to volunteer for the survey after informed consent.

The study was approved by the RMC Research Ethics Committee (REC).

Data were entered into SPSS version 15.0 for analysis. Calculations were done for frequencies, proportions, percentages and ratios. Comparisons were done between groups where relevant using the Chi Square test, with $p \leq 0.05$ denoting significance.

RESULTS

Respondents totaled 108 medical students and 27 faculty members. Basic demographic data of both are presented in Table 1.

Table 1: Basic demographic data of RMC students and faculty respondents.

S #	Variables	Percentages	
RMC Students (n=108)			
1.	Professional Year	One	25.5
		Two	36.3
		Three	38.2
2.	Gender	Male	64.2
		Female	35.8
3.	Previous research experience	No	66.7
4.	Previous publications	No	94.5
RMC Faculty (n=27)			
1.	Designation	Lecturer	65.4
		Senior Lecturer	15.4
		Assistant Professor	7.7
		Professor	11.5
2.	Gender	Male	66.7
		Female	33.3
3.	Departments	Basic medical departments	51.8
		Preclinical departments	48.2
4.	Previous research experience	No	44.4
5.	Previous publications	No	72.0
6.	Currently research supervisors	No	70.4

Figures in bold represent unsatisfactory outcomes.

It is evident that the majority of students did not have any research experience or publications prior to their admission in RMC. Similarly, a good number of faculty members also did not have adequate exposure to medical research or had published articles, perhaps because most of the faculty respondents were younger staff of Lecturers and Senior Lecturers.

Data regarding responses to the 20 questions of the questionnaire by students are provided in Table 2.

Regarding their own UGMR program, several important red and yellow areas were identified by students, so that a good number of students expressed reservations about their ability to understand the theoretical aspects of research as well as the acquisition of practical skills to carry out research projects. There were comparatively more red areas in the higher levels of the UGMR, where students stated that they had

weaknesses in Biostatistics and independent research work; moreover only about 26% students expressed satisfaction with the current UGMR program. The responses of attitude towards UGMR were more encouraging, with most students in favor of having UGMR programs in their college as well as in the MBBS curricula of all medical colleges. The vast majority of students were in favor of continuing the UGMR program at RMC; almost 69% were in favor of continuing their research activities after graduation and surprisingly, 29% stated that they would like to become full-time researchers.

Class wise analysis revealed a gradually increasing trend in acceptance of and participation in the research program from First Year to Third Year. Gender analysis for both these items did not reveal any significant differences.

Table 2: Responses of RMC students to 20 questions of their questionnaire (n=108).

S #	Questions	Yes (%)	Partially (%)	No (%)
1.	Understand basic concepts of medical research?	26.7	57.1	16.2
2.	Can you perform a scientific literature search ?	26.4	36.8	36.8
3.	Can you formulate a specific research question ?	39.0	38.1	22.9
4.	Can you make a research hypothesis ?	21.0	44.8	34.3
5.	Understand importance of controls in research ?	17.9	27.4	54.7
6.	Can you collect data systematically?	58.5	24.5	17.0
7.	Can you analyze data statistically?	22.6	34.9	42.5
8.	Can you interpret data satisfactorily?	19.8	38.7	41.5
9.	Are you adequately trained in research?	10.5	45.7	43.8
10.	Can you do a research project independently ?	14.9	24.8	60.4
11.	Satisfied with UGMR at RMC?	25.7	40.0	34.3
Questions		Yes (%)	No opinion (%)	No (%)
12.	In favor of UGMR?	62.3	11.3	26.4
13.	Like to do UG research projects ?	75.5	06.6	17.9
14.	UGMR should be part of MBBS ?	65.4	15.0	19.6
15.	UGMR helps in academics ?	71.0	09.3	19.6
16.	UGMR helps make better doctors ?	84.9	06.6	08.5
17.	Would you become a full time researcher ?	29.0	26.2	44.9
18.	Continue medical research after graduation?	68.9	16.0	15.1
19.	Should UGMR be continued at RMC ?	83.6	-	16.4
20.	UGMR programs in all medical colleges ?	87.5	-	12.5

Satisfactory items (green); items needing improvement (yellow); unacceptable items (red); Unexpected finding (bright blue).

Significant differences in class wise analysis (from first to third years) were obtained for the following items: Previous research experience ($p < 0.001$); UG research helps in making better doctors ($p = 0.019$); Undertake research projects after graduation? ($p = 0.023$); Able to do a scientific literature search? ($p = 0.027$);

Understand importance of controls in research? ($p = 0.05$); Can you analyze data statistically? ($p = 0.05$); Can you do a research project independently? ($p = 0.05$); Satisfied with RMC UG research program? ($p = 0.036$).

The responses of RMC faculty members to their questionnaire are given in Table 3.

Table 3: Responses of RMC faculty members to 15 questions of their questionnaire (n=27).

S #	Questions	Yes (%)	Partially (%)	No (%)
1.	Are you satisfied with UGMR at RMC?	48.1%	29.6%	22.2%
2.	Is Faculty Supervision effective at RMC?	48.1%	25.9%	25.9%
3.	Is quality of UGMR Projects satisfactory?	59.3%	25.9%	14.8%
4.	Is implementation of UGMR Program satisfactory?	44.4%	37.0%	18.6%
5.	Is UGMR a hindrance to studies ?	18.5%	14.8%	66.7%
6.	Does UGMR enhance self-learning ?	81.5%	07.4%	11.1%
Questions		Yes (%)	No (%)	
7.	Currently RMC UGMR Supervisor ?	29.6%	69.4%	
8.	Should students be doing UGMR?	81.5%	18.5%	
9.	Did you do UGMR while a medical student?	66.7%	33.3%	
10.	Should UGMR be part of MBBS ?	81.5%	18.5%	
11.	UGMR helps make better doctors ?	85.2%	14.8%	
12.	Should UGMR be given more time ?	63.0%	37.0%	
13.	Should RMC faculty be given research training ?	77.8%	22.2%	
14.	Should UGMR be continued at RMC ?	85.2%	14.8%	
15.	UGMR programs in all medical colleges ?	85.2%	14.8%	

Satisfactory items (green); items needing improvement (yellow).

Faculty responses indicated about 50% satisfaction with various aspects of the UGMR program at RMC; however, a large majority supported the continuation of UGMR as an integral part of MBBS in RMC and all other medical colleges. They were also of the opinion that research training would produce better doctors and that further improvements should be done in the UGMR program in terms of allocating more time for it in the curriculum as well as provision of research training for RMC faculty.

Gender-based analysis of responses showed no significant differences, except for: Should UGMR be given more time? (Yes: F 100%, M

44.4%, $p=0.005$); Should RMC faculty be given research training? (Yes: F 100%, M 66.7%, $p=0.05$).

Supervisor-based analysis of responses did not show significant differences, except for: Previous research experience? ($p=0.030$); and Previous research publications? ($p=0.036$).

DISCUSSION

Despite the fact that the UGMR was implemented in the recent past in a medical college of KP where there was very little experience of UGMR, some important aspects of the evaluation were evident from both students and faculty. There appeared to be a vast amount

of enthusiasm for being a part of UGMR by both groups; however active participation in the program and carrying out research and supervision lagged far behind the target objectives for both students and faculty. It could be interpreted that both groups anticipated subjective benefits from being supportive of research, but could not take the pains and labor of actively performing research projects and their supervision. Both groups stated their lack of satisfaction with the UGMR program, demanding greater input and interaction in terms of training; however, research is best learnt by active participation in research projects, rather than by passive education and workshop training.

Experiences from other studies on UGMR also present similar pictures. A recent study by Oliviera et al (2013)³ from a medical school in Brazil reports about 47% of students actually involved in UGMR activities, whereas the remaining students showed a keen interest in supporting and encouraging research. The main obstacles to research cited by students was lack of time, lack of protected space in curriculum, lack of motivated teachers as mentors, lack of research funding and lack of sufficient interaction with the research program organizers and supervisors.

Another recent study from Iran⁴ showed that medical students at Teheran University had a low-to-moderate understanding of theory and practice of research, which is in keeping with other previous studies. Inclusion of teaching sessions and workshops on research methodology were positively correlated with students' knowledge of research.

An Irish study (Burgoyne LN et al 2010)² also points to a lack of motivation and understanding of research as a useful or career-promoting activity by medical students related to the patchy undertaking of research activities by a handful of medical students. The authors emphasize the

need by educators to keep career-based motivation for students as a key point in introducing UGMR programs; this would be possible by having students realize the important contribution of medical research studies in patient care, diagnosis, disease prevention and health promotion.

A study from Aga Khan University Medical College, Karachi, Pakistan (Khan H et al. 2006)⁵, a college with a strong UGMR training program, further reinforces the findings of the present study, in that the students surveyed were moderately competent in concepts of research methodology; statistical analysis showed that competency scores increased with increasing years of medical school as well as participation in intensive research training programs.

Thus despite the presence of UGMR training programs with mentors and supervisors, it is only a select group of students who develop an interest in understanding and doing medical research; the question of why such activities are not more universal among medical students is very relevant, and may have to do with the mental image of what a doctor is, which in most cases, is that of a clinician and practitioner rather than a researcher. Most students are mentally geared up for practice and have no will to undertake research.

A large, multi-center study from 91 medical schools in 26 European countries (Van Schravendijk et al. 2013)⁶ also points out this discouraging tendency among undergraduates, in that despite three-fourths of these medical schools offering UGMR programs and two-thirds allowing independent student research, only 10% of undergraduates opted to do research. The authors conclude that most medical colleges lay too little emphasis on the importance of medical research for undergraduates, despite having UGMR programs.

Similarly a study from Bahria University Medical College, Karachi, Pakistan (Waqar H et al. 2014)⁷ concludes that most of the medical students scored low on basic knowledge of research, while maintaining a high interest in supporting UGMR. The barriers to research cited included lack of time, lack of incentives and rewards and lack of funding.

An interesting paper in this connection is that of Macdougall M (2012)⁸ from the University of Edinburgh, Scotland, where the problem of Research-Teaching linkage disconnect has been addressed after getting survey-based feedback of faculty research supervisors. Emphasis is placed on further strengthening the Research-Teaching nexus so that students are better prepared to undertake research projects easily. A disappointing note is the very low level effect (2.4-6.9%) of feedback from student research activities as a means of curricular change, so that the smooth integration of research as a form of active learning remains unfulfilled.

It was encouraging to see in the present study that almost 70% students showed an interest in continuing to do research after graduation, with about 30% willing to become full-time researchers. If this reflected a true feeling of these students, it would be very welcome and taken as a fair measure of the success of the UGMR. However, the literature tells us that

most doctors in developing nations tend not to do much research after graduation (Pawar DB et al. 2012);⁹ projects are undertaken only on some compulsion rather than as a routine part of the life of the practicing clinician. The relative paucity of research publications by medical doctors in the global literature compared to other biomedical professionals foretells that this is the state of affairs even in developed nations, which are nevertheless at the forefront of biomedical research. A study from the USA (Lopatto D. 2007)¹⁰ involving 2021 undergraduates of 66 institutions (universities & colleges) indicated that the vast majority of students continued with their chosen career paths, so that their research experiences had only a small effect (2.7-6.2%) on changes to the chosen career choices, despite the fact that students accepted research as an active form of self-learning.

CONCLUSION

The UGMR program at Rehman Medical College achieved successful implementation, acceptance, performance and continuity within the parameters defined for most such programs globally. Further strengthening of the program is likely to yield value in terms of creating medical graduates who would be competent to deal with the real-life medical problems on a global scale through targeted research-based solutions.

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