Introduction of a Research component in the undergraduate medical curriculum – Review of a trend

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Editorial

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Introduction

The question of whether a research component should be an integral part of medical curriculum has been debated in the past and is still controversial. Patient care is the most important aspect of a medical graduate but teaching, administration and research are also essential aspects. The implementation of a research component is more important at a student level as it helps to develop a judicious insight in their academic and clinical practice, which every medical person should possess. Evidence based medical practice[1] is now receiving great emphasis internationally. Scholarly activity programmes are essential components of the modern undergraduate medical curriculum[2]. To make 'importing' knowledge to indigenous generation of knowledge it is important to develop research oriented educational programmes both at the undergraduate and postgraduate level[3]. In the past few decades, there is a trend of including research component in the undergraduate medical curriculum and this is shown to increase the interest of the students to conduct research after their graduation[4]. The changes of including the research component as curricular or extra-curricular component in undergraduate medical curriculum in many countries during the last few decades began in some of the universities in US and Europe. Many of the South Asian countries are going to start the change in the next few years. Thus there is an increasing trend of including research component in the medical curriculum over the years.

Nature of the trend

Many developed countries have introduced research programmes for medical students in recognition of the importance of imparting knowledge on how to conduct research in the medical curricula. In Case Western Reserve University School of Medicine (CWRU) in the US, a mandatory four months research block is included in the school curriculum. During this period, students work fulltime with a mentor identifying research questions, framing research methods, carrying out the research, conducting an analysis, and communicating their results in a write up[5]. The University of California in US runs the University of California, San Diego (UCSD) Research Associate Program to incorporate undergraduates with emergency medicine research[6]. One of the urban medical schools in the US has made it mandatory for medical students to develop, design and implement a research project during their clinical years of study[7]. In the US, during the last decade, two large programmes that have sought to engage students in research are the National Institutes of Health (NIH) sponsored Medical Student Research Fellowship Programmes (MSRFs) and the Doris Duke Clinical Research Fellowship (CRF) Programme[8-9].

School of Medicine and Dentistry in Queen's University, Belfast, introduced a new curriculum in the year 2005-2006, which included more research components to help students understand the principles underpinning scientific research[4]. University of Western Ontario, Canada introduced a rural summer studentship program with instructors in small communities. This program provides students the opportunity to perform rural health research combined with clinical learning[10]. A survey was conducted among second and fourth year undergraduate students of Queens University, University of Ottawa, and University of Western

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Ontario to assess their attitude towards research methodology, and their involvement in research projects as well as perceived barriers. It was observed that 83% agreed that some participation in research was likely valuable within their medical education. In the study only 15% of respondents felt that there was sufficient training in research methodology in medical school[11].

In the Netherlands, students are required to do full-time individual research projects between years 4 and 6[12]. Research training is provided to all undergraduate students in the Leiden University Medical Center (LUMC) in Netherlands, where the critical appraisal of scientific reports is a core element in the curriculum. Students with above average academic ambitions are encouraged to participate in high level medical research projects and voluntary courses to develop their skills more. Students who are motivated, with good academic performance spend about 20% of their time on extra research[13]. All medical schools in South Africa expose their undergraduate students to research methodology and statistics training. Except in one university, all other universities it is a mandatory course[14].

In Bangladesh, a research component is included in the medical curriculum. University of Gadjah Mada, Indonesia where integrated teaching is practiced, research has been incorporated as one of the components. In Sri Lanka, during phase two of the undergraduate curriculum community medicine, clerkship and research projects are included. Dedicated time for data collection and report writing is included in the curriculum[15].

Research is not considered a part of the medical curriculum in many of the developing countries. In many South Asian countries, research component has not been made mandatory in the medical curriculum[16]. Studies report that some of the medical schools in India, Pakistan and Nepal also conduct research projects and community based epidemiological studies during their studentship and internship though it has not become an integral part of the medical curriculum[16-18].

Even six decades after independence, medical research, which is the mother of new knowledge, has remained a non-issue in India and students rarely get a chance to acquire knowledge on research during their undergraduate course. Research methodology is not included as part of the medical curriculum[3]. One study in India reported that 91% of interns reported no research experience in their medical school[19]. Experts opined that as the current medical curriculum is over burdened, instead of including research component in the medical curriculum, focus should be given to "strengthen the short term studentship" program for the students[20]. Deo suggested that it is time that we thought of "research training" as an integral part of the MBBS curricula in India by introducing a short duration (one week) research-training programme as a regular part of MBBS syllabus. He also suggested that it should be conducted at the beginning of the internship so that students do not face additional examination burden. He emphasized that it would benefit those interested in research[3]. In India, a fair number of students are interested in research, which is evident from the increasing popularity of the ICMR Short Training Studentship (STS) programme[21].

The current undergraduate academic programmes in Pakistan are not producing enough personnel for research purposes in the various medical fields. The main reason for this is the medieval curriculum which focuses on didactic learning. This curriculum does not motivate students' interests in research during their study in medical school and hence they are less likely to seek a research experience[22].

Undergraduate medical curricula in some of the medical schools in Nepal are community oriented, student-centered, self-directed and problem-based with integrated teaching and learning. Community-based learning is carried out in many medical schools in Nepal following its initiation at the Institute of Medicine, Kathmandu in 1978[15,23-26].

Previously, the core curriculum of most of the medical schools in Malaysia was derived from traditional British system of medical education and tended to focus on three main themes that dictated teaching and learning; diagnosis and treatment, procedural and communication skills, and key advances in biomedical knowledge and technology. Over the last 20 years, the curricula of these medical schools became more integrated, interactive and community-oriented and included elements of research and evidence-based medicine[27,28].

A study conducted in GCC countries (which included Saudi Arabia, Kuwait, Bahrain, Qatar, UAE, Oman and Yemen) among 30 medical colleges reported that in two colleges research methods are not included in the curriculum, in seven colleges it was a separate required course and in 10 colleges it was part of required course[29]. Students' research is an integral part of the undergraduate curriculum in the UAE University, University of Sharjah and Gulf Medical University in UAE[30].

Factors determining the trend

First and foremost, student research is dependent on research activity at a regional and national level. Many factors determine the trend of introducing research component in the undergraduate medical curriculum. The main reason for this is the medieval curriculum which focuses on didactic learning. Good mentorship is a vital component of effective student research. Some faculty lack experience in research. Other problems reported are lack of time for meaningful research, routine studies and deterioration of skills in day to day clinical practice due to more time being spent on research activities and

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inadequate faculty-student interaction[11,22,31]. The influence of research experiences is seen as a significant predictor of undergraduate students' participation in research[32].

Advantages and Disadvantages

The nature of work even in developed settings makes it difficult to recruit the qualified health professionals into research. Hence it is better to equip the students so that at the time of qualifying they are conversant with various aspects of research methodology. Studies report that participation in undergraduate medical research motivates students to pursue further research[33-34]. Ability to conduct research is an important skill for the academic and professional advancement of an individual[35]. Research methodology courses at the undergraduate level will be helpful in sensitizing medical students to research. An American study strongly suggests that student research increases interest in an academic career and stimulates additional research[36]. Frishman in his paper explains that research experience will improve the skill of students in searching and critically appraising medical literature which will enhance the ability for independent learning[37]. It would be helpful in making students aware of the health problems of the community and country. Appropriate research training for students should lead to a change in research related practices over time[35]. For the general population to benefit from new locally developed practices there is a need to promote research as a culture among health professionals[32]. In Germany, 28% of publications from a particular institution are based on student research[38]. One of the questions raised is whether the research projects deprive the student time that could be used for didactic training.

Guideline for implementation

WHO, South East Asia Region meeting suggested that "Field-oriented/field-based research is an important component of the undergraduate training in Community Medicine in all countries. Linking the research activities in community medicine and clinical disciplines was considered a useful approach" [15]. It has been reported that one of the long-term approaches for promoting research in the healthcare professional courses is to target medical students early in their careers[39-40]. A change from traditional curriculum to integrated curriculum may help to implement the research component in medical curriculum. Faculty should be trained in research methodology as in many of the schools where the research component is not included, studies report lack of trained faculty.

All institution and research funding agencies must use a certain portion of their budget for promoting student research. Family Medicine department at the University of Colorado, US provide financial support for student research[41]. In Europe, Norwegian Medical Student Research Programme assist students who want to do research in parallel with their other studies[42].

In conclusion, research methodology is an important component in the undergraduate medical curriculum and the trend showed that in many countries the component is included in the curriculum or is being planned to be included. Studies showed that the major barrier of including research methods in the curriculum is the time and volume of content in the undergraduate medical curriculum.

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