

EDITORIAL

Research in Undergraduate Medical Education, Why, How, and How Much?

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The application of knowledge in medicine requires sound, evidence-based justification for patient care.¹ The rapid and unstoppable evolution of knowledge and ever-changing technologies have created a colossal challenge for medical professionals every day.²

The evidence comes from research, and research in turn generates new evidence. It is imperative for the medical practitioner not only to understand research methodologies but also to critically evaluate the existing evidence to confirm its validity and to generate new insights.³ A study conducted in Germany involving 165 hospitals showed that the survival rate in research-active hospitals is higher than in those that are not.⁴

The realization of the significance of this matter has led to the inclusion of the word 'scholar' in the definition of a 'competent physician'.⁵ The Association of Medical Education in Europe (AMEE) includes student research as a component in its Award for Excellence in Medical Education in the category of 'Student Engagement'.⁶ Many medical schools have now started teaching research in their undergraduate programs, and it is an integral part of their curriculum in an environment where there is already a dearth of clinical scientists.⁷

Many medical institutions have been imparting education in research for a long time. In the USA, 83.9% of students are engaged in research, while in China and Brazil the figures are 55.1% and 44%, respectively.⁶ However, there is a gross difference between high-income countries and low-middle-income countries (LMICs). The USA has 3867 researchers per million, whereas Colombia and Venezuela have 190 and 200 per million researchers, respectively.³ Publications also increase at the student level when research is taught.⁷ Research indicates that individuals who begin publishing earlier in the day produce 1.7 times more

publications than those who start later.

There are still few learning opportunities, especially in LMICs. The dearth of clinical scientists indicates that, to ensure patient safety, early research training should be made mandatory for all medical schools.

Apart from early adoption of evidence-based practice and research publication, there are many other advantages to engaging in research. For example, increased publications can facilitate entry into preferred residency programs and may enhance the likelihood of completing Masters and Doctorate degrees in a shorter time frame.³ Communication skills, teamwork, and leadership abilities are enhanced.⁸ Self-efficacy, critical thinking, and reflective skills improve further.⁴

The question of why research should be taught at the undergraduate level is self-explanatory. The more challenging issues are how to teach research and how much should be taught.

It is clear from the literature that early research education is a need of the hour. Different medical institutions adopt various approaches: in some, research is offered as part of electives or as a Student Selective Component (SSC), while others have made it a mandatory, short- or long-term component of the core curriculum.²

These programs either teach only basic research via didactic methods with assessments such as Multiple-Choice Questions (MCQs) and quizzes or they offer vertical and longitudinal modules that culminate in the practical application of research skills.²

The application of research skills may take the form of projects, poster presentations, conference presentations, or even journal publications.^{2,7} Modules that emphasize the application of research skills are far more productive than those relying solely on didactic teaching. For instance, at the University of Free States (UFS) in South Africa, research publications increased significantly,⁷ while at Stanford University School of Medicine in the USA, 90% of students participated in research and 75% published at least one article.³ All these tasks are guided by faculty supervisors and mentors.^{1,7}

Undoubtedly, research skills are essential at the undergraduate level in medical schools and should

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Received: March 10, 2025; Accepted: March 14, 2025

<https://doi.org/10.57234/jiimc.march25.2502>

ultimately lead to publications. However, all prerequisites for effective research application must be addressed. Although exposure to research modules motivates most students, many remain unaware of its benefits,⁸ and some even consider it irrelevant to clinical practice.⁶ While mentors and supervisors are crucial, their support alone is insufficient. Students face a high cognitive load and limited time, leaving little room for additional learning. Moreover, a lack of adequate funds and resources especially in LMICs further hinders progress.³

Although Pakistan recognizes the need for undergraduate research, its full depth and significance remain underappreciated. The Pakistan Medical & Dental Council (PM&DC) has incorporated research methodology into the curriculum; however, practical application of research is still lacking.⁹

In conclusion, the inclusion of vertical research modules in the core curriculum is imperative. Every medical student should participate in a research project and aim to publish an article either individually or as an active member of a group. Although challenges such as limited resources, funds, time, and space persist, neglecting this critical aspect will adversely affect patient safety and impede the advancement of new knowledge.

We must recognize the significance of undergraduate research and its clinical and practical applications. As the saying goes, difficult things take a long time, and impossible ones take a little longer.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

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