

Building a Sustainable Research Culture in Pakistani Medical Universities

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Medical research is widely recognized as a fundamental driver of innovation and evidence-based clinical practice. Nations that have developed strong research culture consistently demonstrate better healthcare outcome and superior academic influence.^{1,2,3} Despite a growing academic infrastructure and medical universities in Pakistan, its contribution to global scientific literature remains relatively low and accounts for only 0.5–0.6% of global research output⁴. However, Pakistan's scientific productivity has expanded considerably over the past two decades, with a more than 300% increase in publications indexed in international databases between 2010 and 2019, it is still reflecting a substantial gap⁵. This development indicate that Pakistan possesses significant intellectual potential, but the sustainability and impact of this progress depend largely on the development of a strong and enduring research culture within the medical institutions. Locally generated research is particularly important because many healthcare challenges are context-specific and require solutions tailored to regional epidemiology and healthcare infrastructure.

There are many barriers that had led to comparatively slow development of research culture in medical institutions of Pakistan.⁶ Among it, the most significant challenges are inadequate infrastructure and scanty research funding. High-quality medical research requires well-equipped laboratory with access to modern technology, reliable database and institutional support, but unfortunately many institutions in Pakistan lack these essential facilities. Insufficient funding opportunity with limited research grant further discourage researcher from pursuing good quality large-scale research project. Without constant investment in infrastructure, it is difficult for an institution to produce high impactful and internationally competitive research.

Another important factor for low research productivity is the limited integration of research training within undergraduate and postgraduate medical training.⁷ Although research methodology with biostatistics is included in our under-graduate medical curriculum, the teaching often remains theoretical and does not adequately prepare student

for practical research. As a result, many medical graduates lack confidence in designing research study, analyzing data or writing scientific manuscript. Early exposure to practical research during medical education is indispensable for cultivating analytical thinking and scientific curiosity. Many studies conducted in Pakistan have shown that medical students frequently report limited opportunity for research involvement due to inadequate mentorship, lack of structured training and insufficient institutional support⁸.

Mentorship is widely recognized as one of the most critical factors in developing successful research careers. In established academic environment, experienced researcher guides junior colleague or student through the process of formulating research question, designing a study, interpreting its result and publishing manuscript. This type of mentorship is lacking in most of our institutions and thus strengthening it could significantly improve research among young investigators. Student research society, elective research rotation and structured undergraduate research program have been shown to enhance research interest and productivity in many countries. Encouraging students to undertake supervised research projects during their under-graduate medical training can improve scientific literacy with greater likelihood of future involvement.

Institutional and government policies for academic promotion also greatly influence research culture. In recent years, different academic regulatory bodies in Pakistan have increasingly emphasized research publication as a requirement for faculty promotion and annual appraisal. While this policy has encouraged research activity in many ways, it has also led to certain unintended consequences. The pressure to publish for career advancement may lead some researcher to prioritize quantity over quality which results in submission to low-impact or predatory journal. Concerns regarding plagiarism, duplicate publication and research misconduct have also been raised within the academic community due to it. Strengthening institutional review board and promoting training in research ethics and scientific integrity are therefore essential for maintaining the credibility of research produced in Pakistani institutions⁹. Universities and teaching hospitals should establish dedicated research support offices that should provide all types of assistance to researcher. This office must provide facility of a biostatistician, research methodologist and data analysts. Collaboration among institutions also has the potential to enhance research capacity where multicenter research studies

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can generate larger dataset. It can produce more robust and generalizable finding than a single center study. Establishing national research networks can facilitate data sharing, promote interdisciplinary collaboration and address important public health challenges through coordinated research efforts. Such collaborative initiatives are particularly important in low- and middle-income countries where resources may be limited.^{10,11,12}

Faculty members often face heavy clinical workloads and administrative responsibilities, leaving limited time for research supervision. As a result of time constraint most clinicians either do low quality basic research including retrospective or basic epidemiologic study or they ask for guest authorship from their colleagues to add their name in any ongoing research to fulfill promotion requirement. Providing protected research time for faculty members can enable clinicians to balance their clinical responsibilities with academic and scholarly activities. In addition, a strong research culture also requires a broader cultural shift within academic and clinical communities. Research should not be perceived merely as a requirement for academic promotion but rather as an integral component of professional responsibility for healthcare providers. Clinicians often encounter numerous clinical challenges and unanswered questions in their daily practice, many of which can form the basis for valuable research investigations.

National regulatory bodies and government policy makers can play an important role in shaping the research environment of the country. Strategic investment in research infrastructure can significantly enhance national research productivity. Continued support for research capacity-building program and international academic partnership will be essential for strengthening Pakistan's research ecosystem. Advancement in digital healthcare technology also present new opportunity for expanding good research culture. Use of electronic health record with AI application can facilitate large-scale studies. By leveraging this technology, researcher can generate high-quality evidences to form clinical practice and national health policies. International collaboration has increased significantly in recent years, enabling our researchers to participate in multinational research projects and gain exposure to advanced research methodology. Collaborative research partnership with international institution not only enhance the visibility of local research but also facilitate knowledge transfer and capacity building. Such collaboration can play a crucial role in improving the quality and impact of research produced in Pakistani medical institution.

In conclusion, strengthening the research culture in Pakistani medical institution is a mandatory need for enhancing the country's global academic standing. Although Pakistan has made significant progress in increasing its research output during recent years, substantial challenges remain in terms

of infrastructure, funding, mentorship, regulatory policies, faculty burn-out and training. Addressing these challenges requires coordinated efforts from academic institutions, policymakers, regulatory bodies and healthcare professionals. By investing in research education, promoting mentorship programs, strengthening ethical oversight and encouraging collaborative research initiatives, Pakistan can develop a sustainable research ecosystem that may contribute meaningfully to global medical knowledge.

Authors Contribution:

Iqbal Hussain Udaipurwala: Conception, writing, literature search, proof reading

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