



Editorial

Strengthening research component into medical curriculum, the need to develop Physician scientists in India - An Introspection.

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Medicine is a constantly evolving field. In the progress of medical knowledge, Physicians have played an important role and their impact on human health has been significant. Not being an exhaustive list, few of the influential physician- scientists have been listed in this article. For example, Sir William Osler, developed the first residency program and was the first to bring medical students out of their classrooms to the bedside of patients for clinical training; Robert Koch's contribution to public health included identifying the causative agents of infectious diseases like tuberculosis, cholera and anthrax; Sir Federick Grant Banting remains the youngest Nobel laureate in Medicine for the co-discovery of insulin; and the work of John Snow, one of the Fathers of Modern Epidemiology, inspired noteworthy improvements in public health. Such monumental discoveries were the forte of physician scientists, a blend of clinical medicine and scientific research.

Mind-set that research can build up

Paul Langerhans contributed to medical discoveries even before he finished medical school. He first discovered dendritic cells which play an important role in cell-mediated immunity, following this he provided the detailed description of the nine different cells of the pancreas, the Islets of Langerhans.¹ Being a medical student in the 21st century may be a career of constant learning with the growth in knowledge and progressing technology. Exposure to research facilitates a better understanding of medicine; enables critical thinking, critical appraisal and builds teamwork.

Conducting research while still a student, provides an opportunity to explore various disciplines that one could be interested in. It enables students to think in a systematic manner. It also provides students with an early exposure to research ethics, a fundamental component of medical practice and research.

Today, practising medicine has become evidence based, emphasising the need to develop better understanding of research articles and the impact each of those papers would have in the life of patients or the field of medicine.

Research benefits students by helping them develop characteristics such as self-discipline, determination, time management and perseverance in order to obtain results in a short span of time, inspiring them to also work on framing research questions and research proposals. Doing research also opens up opportunities to publish and present their research findings. In the ever-evolving medical field, it is crucial for students to remain updated with the latest findings, they should also be motivated to contribute through their work to make a difference. Question is: how far it is being fostered?

Current scenario: Medical Student's interest in research

Medical education has grown rapidly over the years in India. According to the National Health profile 2019, India had 529 Medical colleges with 58756 admissions for 2018-19² academic year. However, research is an underexplored professional activity for many physicians, leaving many medical students forced to pursue a clinical career. The present times require that physicians perform research that revolutionizes their practice; for this it is necessary for medical students to have an early exposure to research so that it can be explored as a career path. This could be strengthened in the undergraduate program by encouraging students to participate in research workshops or through preparation of case reports, small research projects and short communications. Among two cross sectional studies in medical colleges, one study reported the major obstacles for pursuing research were, lack of time, lack of research curriculum, and

inadequate facilities,³ while the other reported lack of awareness, interest, funds, time, and difficulty in follow-up of patients.⁴

Majority of the study participants were interested in conducting research and half of them had participated in research.³ The senior semester students spent more time on research than those in the junior semesters (6th semester 72.2% and 8th semester 88.9%; 2nd: 66.7% and 4th: 77.8%).⁵ In another study, majority (76%) were part of a research team mainly as a part of the medical curriculum, while a few (8.3%) were confident of research as a career option.⁶

The ever increasing fees for medical education and the consequent debt experienced by medical students is a growing global issue. In the United States over 80% of medical students graduate with a debt, with a payable median amount of USD 183,000.⁷ In another study among medical students in Singapore, 40.5% would graduate with debt, inferring that student debt and the economic background of the student may distort their career choices.⁸ After reviewing literature, we found no data on debt among Indian medical students.

Do you need to pursue a MD/PhD to become a physician Scientist?

Physician-scientists include those with a graduate medical degree (MBBS), as well as those with MD and/or PhD degrees, few of them may also possess other professional degrees. Medical students who want to pursue research are at times in a dilemma as they believe that a MD-PhD training would provide a pathway in becoming a Physician Scientist. However, one does not need to have a dual degree to do research as a Clinician. If you desire to do research as a physician, one can begin at the undergraduate level and while completing one's post-graduation. Not having a PhD should not hold one back. In India medical doctors pursuing PhD are limited.

Combating strategies for the scarcity of physician scientists

India's MBBS curriculum acknowledges the importance of ethics, responsiveness to needs of patients and families; and fine communication skills required while interacting with the patients. This aligns the medical education with societal needs, weighting the importance on rural and social issues. Additionally, training budding doctors in public healthcare issues, enabling them to take measures to prevent communicable and non communicable diseases.

However, there is a need for more

institutions to adopt an explicit clinician-educator and physician-scientist tracks.

In Box1 we reiterate the strategies that could be adopted by Universities, Medical/Health professional institutions and Students to increase their exposure to research. Strong policies and monitoring mechanisms towards implementation are wanted.

Critical inquiry is a pedagogical practice that questions the social, environmental and personal factors around us. Gaining skills in critical inquiry is important as it enables students to explore, collect data, and ask questions. Educators could scaffold this mode of thinking to build a critical inquiry approach, enabling the Students to move beyond simple research and towards finding answers to difficult questions.

World Health Organization (WHO) in 1995 defined social accountability of medical schools as "a commitment to focus education, research, and service activities towards acknowledging the leading health concerns of the community and nation they have an obligation to serve".⁹ The concept of social accountability is helpful in this context as it emphasises the need for developing research questions and interventions that will benefit the community. Undergraduate and post graduate medical education could offer opportunities to this end, supporting an unequivocal commitment towards recognizing the health needs of the community and encouraging the upcoming health professionals to suggest research models that would benefit the people. Attempts have been made in Karnataka, India to measure social accountability of medical education with the approach proposed by WHO in Medical Colleges affiliated to Rajiv Gandhi University of Health Sciences.¹⁰

Available programs to increase the number of physician scientists

Increasing the number of physician-scientists involves either adding more physician-scientists to the faculty, and/or having fewer leave the physician-scientist workforce. The Indian council of Medical Research-Short Term Studentship Program (ICMR-STSS) initiated in 1979 continues to promote the aptitude for research among undergraduate medical students.¹¹ The program aims to provide an opportunity to undergraduate medical students to familiarize themselves with research through ongoing research programs or by undertaking independent research. ICMR also has another scheme which supports MD/MS-PhD programme.¹² This programme intends to motivate medical graduates/postgraduates to pursue a career in research. In 2018

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ICMR introduced a scheme “Nurturing Clinical Scientists” to support the development of research skills among medical students with a focus on health research and other areas identified by ICMR in the National Health Policy 2017.¹³ Dr C.R Soman, started “Health Action by People (HAP)” with an aim to involve young researchers in the field of public health. One of its earliest program was “Problem solving for better health” - since 1993 HAP has associated itself with 71 medical colleges in India. Through participatory workshops, the program offers

approaches to tackle health challenges in the community. It equips the under graduate medical students to identify “problems” in the local areas which are then developed into research protocols with the help of a facilitator.¹⁴ Another initiative by Welcome Trust/DBT India Alliance was a workshop titled “Developing Indian Physician Scientists” (DIPS) which aims in fostering research temperament amongst medical graduates, providing them an opportunity to converse the relevance of research as a career option.¹⁵

Box 1: Role of Universities, Medical/Health professional institutions and Students to promote research by medical students.

Role of Universities

- Ensure medical curriculum includes research methods or a distinct learning aspect
- Provide funding for student research projects
- Recognizing faculty who serve as mentors
- Periodic monitoring of extent of student research
- Student research performance considered as a criterion for affiliation of the institution

Role of Medical/Health professional institutions

- A dedicated funding for research
- Student mentorship
- Encourage publication of student research
- Establishing Clinical epidemiology units
- Research methodology workshop for student’s/faculty guides
- Making one research project mandatory in the under graduate medical course

Role of Students

- Develop an insight for research and critical inquiry
- Utilise opportunities for medical research
- Participating in periodic research methodology workshops for medical students

The way forward

A strong physician-scientist workforce is key to bridging the gap between scientific knowledge and medical practice. The success in this endeavour relies on retaining diverse, talented, and well-trained individuals. Even though it is mandatory for every medical postgraduate in India to conduct “original research” for thesis, and every position in health-care research setup requires publication of original research papers. The number of healthcare innovations or therapeutic advances are limited in India. In view of our limited resources, it is understandable that we cannot invest on basic research in medicine. However, the huge healthcare needs of our growing population and clinical expertise available in our country, we can undoubtedly strive to conduct outstanding clinical and public health research.

In the current medical curriculum, the

subjects are segregated and new fields of science are less touched upon. The students specialise in a particular subject in order to get employed/set up practice. In this process, all research is ignored. Amidst the specialization fad, medical institutions must take up the responsibility to familiarize students with the varied aspects of medical education. Emphasis on evidence based medicine in the curriculum, elective research credits, strong funding commitments, structured mentorship, and incentives to motivate the mentors would all help in increasing the population of physician-scientists in the future. We also hope that the various programmes initiated by ICMR and other organizations will encourage undergraduate medical students to pursue careers in research. A milieu that assures them that their endeavours are fundamental for the improvement of lives. It is imperative to convey to the aspiring physician-scientists that now is an exhilarating period

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to pursue research and the opportunities for scientific discoveries are unprecedented. We anticipate that this perspective would draw significant thought, research and resources in this direction.

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