

Translational research in physiology

Translational research has been made a priority in the health sectors of many countries. Translational research programs have been established in medical academic centers, medical foundations and industries, disease-related organizations, and individual hospitals. Translational research has become the centerpiece of all medical schools in nations with developed healthcare delivery systems. The concept of translational research is the cornerstone of medical research that spearheads the progress of clinical medicine. Therefore, translational research is also referred to as translational medicine, which strives to take the discoveries from the bench-side to the clinical care in the community.

In general, translational research refers to the “bench-to-bedside”, which means the effort to harness knowledge from basic sciences to produce new drugs, devices, and treatment modalities for management of diseases. This envisages the effective translation of the new knowledge, mechanisms, and techniques generated by advances in basic science research into new approaches for prevention, diagnosis, and treatment of diseases, which is essential for improving health.^[1] Thus, translational research is the interface between basic medical science and clinical medicine, in which the beginning is the new research discovery and end point is the production of a promising new treatment that can either be used clinically or commercialized. For researchers in health services, translational research is the translation of research into practice, which means the research knowledge actually reaches the population for whom the research was intended.^[2] In this system, production of a new drug is the first step. The second step is to “improve quality by improving access, reorganizing and coordinating systems of care, helping clinicians and patients to change behaviors and make more informed choices, providing reminders and point-of-care decision support tools, and strengthening the patient-clinician relationship”.^[2] Therefore, for effective implementation of translational research, cooperation is required from clinicians, practitioners, public health administrators,

employers, and patients. Hence, in translational research, conducting scientific studies to make the results of research applicable to the population under study is the starting point. In medical practice, for meaningful health outcomes, governmental fund-providers of research and pharmaceutical companies spend a large amount of money on basic research but fail to achieve the target outcome due to missing link between the results of the laboratory and the effective health implementation at the population level. Thus, a multidisciplinary and multi-pronged approach is needed for effective community-oriented output of translational research.

The first step, which provides cost effective, high-quality preclinical or pro-clinical product development should support services to meet the country’s growing healthcare needs. Presently, physiology is a pro-clinical subject and many physiology laboratories are well-equipped for research in clinical science and physiologists are well-experienced in clinical research. However, in recent times, the discoveries from physiology laboratories have not contributed enough for the growth of clinical medicine, unlike the contributions that have been robust from pharmacology or microbiology laboratories. Especially in developing countries like India, most research works in physiology are conducted on basic topics with less clinical perspectives. Often the research is performed on healthy volunteers for generating some normative data or presenting information which is already available in some different way. This is mainly due to lack of seriousness among the physiology researcher for clinical research. When a research is conducted on the topics of clinical interest, most often the sample size is too less or the design is not good enough to derive any precise conclusion. Researchers have to understand that the studies have to be scientifically sound and ethically approved. This process has to be scrupulously encouraged and inculcated among the researchers. Often, in medical schools in India, the research is performed to obtain few publications for promotion in their hierarchical position. Research is not done with a genuine interest to develop a new treatment model for the disease management. Motivation, orientation, and interest for clinical and translational research are grossly lacking.

In the process of translational research, the key element is the use of best technology available to ensure the quality research outcome and then to adapt to technology innovation to facilitate translation of scientific know-how into viable products. These are possible through

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intense stepwise research conducted in Centers of Excellence (CoE) in clinical research, the institutions that are well-versed in conducting clinical trials. In India, there are good numbers of researchers who have obtained comprehensive and sustained training in clinical research through these CoE and have become a cadre of world class investigators capable of conducting clinical trials for regulatory submissions. Translational research is a multidisciplinary approach that involves basic scientists, clinical researchers, physicians, and epidemiologists. However, the major problem is to create multidisciplinary groups that can work together to conduct studies in areas of basic science, clinical medicine, and public health. Bringing together dedicated and focused researchers to find common ground to conduct cooperative research is a tough task. In countries with a vast population such as India, obtaining a good sample size (number of subjects or patients) for any clinical oriented research is not a problem. Also, there are large numbers of clinical researchers, physicians, and epidemiologists. Physiologists in the present era of medicine with adequate knowledge and experience of basic and clinical research can play the pivotal role in bringing together the researchers, clinicians, and epidemiologists to form a cohesive group for translational research. Research facilities may not be adequate in an institute for all types of research. Therefore, inter-institutional collaboration in research is the need of the hour for a quality output and for an effective translation of the research knowledge into patient management or public health promotion. Compared to other categories of researchers, physiologists are better equipped to give the proposals

for research collaboration with CoE. Physiologists have the responsibility to galvanize the basic research into the effective translational research. They should understand the value of a translational research. Our system should encourage researchers and research in the arena of translational science as we move towards an era where an integrated approach will help provide better care to patients in terms of diagnosis, treatment, and prevention.^[3]

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