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Editorial

Clinical Physiology: Opportunity or Liability for Physiologist?

"Physiology is basis of medical practice" is universally accepted but the role of physiologist in medical practice is open for discussion. Are physiologists part of medical practice? Should Physiologists even play a role in medical practice in form of clinical physiology? How to establish clinical physiology? And, what is the Role of Regulatory bodies?

Physiologist in Medical Practice:

In India, there are more than 450 Medical Colleges/Institutions and all of them have department of Physiology with faculty either from medical background (MBBS, MD) or non-medical background (M.Sc., PhD). More than 250 of these colleges/institutions offer courses in MD or M.Sc (Physiology). Every faculty member is expected to teach, undertake research and contributing directly in some aspect of patient care. Barring exceptions, most physiologists in medical colleges had restricted themselves primarily to teaching until research publications were made mandatory for promotions. It was a knee-jerk solution without necessary improvement in infrastructure and funding and led to creation of more problems than it attempted to solve. As far as direct involvement in medical practice is concerned, only a handful amongst thousands of physiologists of our country participate in it.

The curriculum of MD Physiology as prescribed by erstwhile Medical Council of India did attempt to cover these aspects by mandating establishment of clinical physiology laboratories under departmental resources that are required to provide clinical services. These laboratories were required to be established in Department of Physiology and to liaison with clinical departments and then to provide routine services for health monitoring and diagnostics. Reality as we all aware is far from it and embarrassing. The postgraduate training in psychomotor domain is primarily driven towards having postgraduates as helping hand in ongoing teaching of undergraduates. Most physiologists, especially younger ones want to teach, do research and contribute to clinical practice in whatever small measure. However, lack of funding and infrastructure eventually replaces the inherent enthusiasm with apathy, submission and resignation to circumstances leading to ritualistic research and absence of clinical physiology.

What is Clinical physiology?

Clinical physiology is direct use of physiology in patient care in form of diagnostic and prognostic function tests and in some contexts extending to therapy. The Registration Council for Clinical Physiologists (RCCP) of UK recognizes six disciplines for clinical physiology namely- audiologist, cardiac physiologists, gastro-intestinal physiologists, neurophysiologists, respiratory physiologists and sleep physiologists. The RCCP accredited degrees are offered in more than 15 universities in UK. Similarly the Clinical Physiologist Registration Board (CPRB) of New Zealand recognizes cardiac physiology, cardiac sonography, clinical exercise physiology, echocardiography, renal dialysis, respiratory science and sleep physiology. Similar certificate courses are offered in USA. In developed countries clinical physiology is offered as MSc degree or PG diploma and these courses are open to registered nurses, physiotherapist, and medical practitioners amongst other graduates in science.

Should Physiologists of India play a role in medical practice?

The curriculum of MD physiology referred above has already answered the question in affirmative. I make the following case in favour of having a physiologist participate in day-to-day medical practice in a medical college:

1. Clinical Physiologists will make better teachers for medical graduates: From perspective of medical education, in a scenario of Medical College, it is primary obligation that MBBS graduates are taught medically relevant physiology that enables them to practice medicine with a strong foundation on underlying physiology. The same is endorsed in proposal of Medical Council of India in its Vision 2015 document to start Early Clinical Exposure in 1st year of MBBS.

   "*The clinical training would start in the first year, with a foundation course, focusing on communication, basic clinical skills and professionalism. There would be sufficient clinical exposure at the primary care level and this would be integrated with the learning of basic and laboratory sciences. Introduction of case scenarios for classroom discussion/ case-based learning would be emphasized. It will be done as a coordinated effort by the pre, para-clinical and clinical faculty*" (page 12, italics added).

   I also make reference to the document "Medical Physiology Learning Objective" (revised-2012) prepared jointly by The American Physiological Society and the Association of Chairs of Departments of Physiology (italics and underline has been added).

   "It is, nevertheless, essential that all medical and health professional students receive sufficient exposure to the physiological concepts that provide the foundations needed for further studies in pharmacology, pathology, pathophysiology, and medicine. The mechanisms of deranged function cannot be appreciated without an in-depth understanding of basic biophysical and physiological mechanisms. The purpose of developing these core competency criteria is to provide guidelines for the breadth and depth of knowledge in the physiological principles and concepts that are considered minimal and essential for further progress in understanding mechanisms of disease and body defenses. Regardless of the specific didactic or educational approach used by any given institution, that institution must develop mechanisms to assure that the students are being inculcated with these basic principles and concepts at appropriate depth of understanding" and teaching "*material must be presented in a context that prepares students for their roles as physicians"*.

   I strongly believe that 'medical physiology' is best taught by those who are actively involved in some aspects of medical practice. Once a physiologist is actively engaged in clinical practice, the content and context of teaching gets automatically aligned and relevant to the clinical needs. The concept that physiology should be taught as a 'pre-clinical' subject is outdated and must be rejected. Physiology forms the core of medical practice and physiology should be taught throughout the course of MBBS especially in the later years of MBBS course when students are more acquainted with the clinical context and can better appreciate details of physiological principles in clinical context. To be able to teach principles of medical physiology to final year medical students, the teachers have to be in-sync with current practices of the medicine and this cannot happen if physiologists are away from the patients and hospital. Clinical Physiology will provide opportunity for continuous exposure of physiologists to patients and ongoing medical practice.

2. Clinical Physiology is suitable and perhaps perfect eco-system for translational research: Translational physiology has been the 'buzz' phrase for decades now and I see it only as re-branding of physiology.

I cannot imagine physiological research that is not eventually translational. Establishment of clinical physiology units in Department of Physiology is will bring basic scientists and clinicians on a common operational platform leading to germination of clinically relevant research question. Only in practice of clinical physiology twain shall meet.

3. Clinical Physiology will improve job opportunities for Physiologist: The number of students joining for PG courses (especially for MD) in physiology is very low throughout the country and the primary reasons is lack of career development. The only job available to a physiologist is in a Medical College. On the other hand techniques and technology in 'physiological/functional' testing, a domain of clinical physiology has grown rapidly in medical practice and there is dearth of trained manpower to handle these techniques. Clinical Physiology will open up a un-tapped potential jobs/career growth in hospitals/private clinical physiology laboratories to physiologists.

4. Existential crisis: Most medical schools in the USA have eliminated the traditional semester long course in physiology and have incorporated physiology into a problem based learning. Similarly in UK, there is growing emphasis on teaching medically relevant material to medical students that too by clinicians (IUPS, 2017). In proposed 'early clinical exposure' of the new curriculum in India, who will teach the student in first year, physiologist or clinicians? Most private medical colleges in India keep the number of faculty in Physiology to bare minimum. Medical Institutions will always need clinicians, but with the changing paradigm of medical education in the developed world, the departure of Physiologists from medical institutions is looming though undesirable future and should be of concern to physiologists in India especially those in medical colleges. Another trend has started in a few Government medical colleges. Post-graduates and faculty of physiology with medical background are being assigned duties as Chief Medical Officer (CMO) or in Emergency Room/Casualty as MBBS doctor. The apparent rationale of the administration is optimum utilization of available manpower indirectly stating that physiologists are underutilized and it is better to utilize them as MBBS doctor than keeping them idle as specialist physiologist. Apart from value addition to hospital services, clinical physiology will provide opportunity for physiologists to contribute as a specialist (MD Physiology) rather than as a basic graduate of medicine.

Clinical Physiology: Opportunity or Liability

Even as I see Clinical Physiology as an opportunity for physiologists, one cannot be blind to the potential liabilities of taking it up. Will it come at the cost of teaching and basic research? It is unfortunately true that in most medical colleges/institutions, the faculty/resident to student ratio is very poor and the same manpower is utilized for teaching MBBS, BDS, B.Sc Nursing and other courses in many colleges/institutions. With number of students in each batch reaching 200, the whole department struggles just to manage the teaching schedule. Without concomitant increase in the number of faculty and technical staff, starting clinical physiology is not possible and will dent the ongoing teaching. The opportunity of clinical physiology can very quickly turn into liability and embarrassment, if adequately trained manpower, infrastructure and management is not in place. Clinical physiology is a commitment towards patient care, once started it shouldn't be stopped. Without proper planning, starting clinical physiology will eat into teaching time and wipe-out the research time and resources. The regulatory bodies must take note of this while determining the minimal requirements of faculty/residents/technicians for MBBS or MD/MDS courses. The administration of the medical colleges/institutions whether government or private, must also note that the regulatory bodies sets the minimum requirements and does not prevent them from employing more than minimum. If adequate manpower, infrastructure and management is in place, I am of the opinion, that clinical physiology is win-win for physiologists, administration, students and patients.

How to establish clinical Physiology?

Clinical Physiology is practiced in clinical space and that clinical space is around patients. The Departments of Physiology should develop infrastructure and skilled manpower to perform 'functional/physiological' tests that will help in prognosis, diagnosis and management of the patients. The clinical physiology in India should be developed into advanced 'functional testing' services for cardiovascular autonomic function, vascular function, gastro-intestinal function, respiratory function, cognitive function, sleep, nerve conduction studies, evoked potentials and intra-operative neurophysiology amongst others. There are examples of such services being provided by departments of physiology in a few medical colleges/institutions in our country.

Building and operationalizing clinical physiology services takes time and requires participation by all involved in patient care including clinicians, administrators etc. Even at the peril of being politically incorrect, I am of the inferred opinion that physiologists were the cause of slow isolation of physiology from clinical practice and only the physiologists of today and tomorrow can re-integrated it. The problem is not of ability but of culture and it pervades all levels in the departments of Physiology from Junior Resident who joins physiology to the senior faculty in the Departments. I see it as a problem of work-culture rather an individual issue. Allow me to explain this in more detail with a scenario that most of us are familiar with. Junior residents in clinical departments like surgery, medicine etc. are expected to report early in morning, work throughout the day, are on-call, have emergency duties etc. and all they do it because of the work-culture prevailing in these departments. Many of the candidates who take up physiology for post-graduation make another attempt at entrance examination to look for 'clinical disciplines' for post-graduation. The candidates who continue in physiology slowly gets used to the work-culture, settle into a '9 to 5 office' routine and tend to get uneasy if they are told to report at 8.00 am and work continuously throughout day. How it is that the same MBBS doctor acts and behaves differently in two different disciplines? The work-culture, expected behaviour, perceived self-valuation of the departments where the doctor joins for post-graduation eventually entrains the postgraduate. The work-culture and approach to profession of Physiology needs to change before we get nitty-gritties of details for establishing clinical physiology. The work-culture is responsibility of the senior faculty members along with Heads of the Department of Physiology and I dare say charity begins at home.

Establishing clinical physiology will require infrastructure, equipment and training. It will require man-management and liaising with the administration and clinicians. How do we begin? Do we wait for regulatory bodies to force it upon us? The answer is preferably NO with physiologist taking up the mantle *suo-moto* and but eventually it will become Yes with regulations making physiologist do the needful.

The Heads of the Departments along with senior faculty members will have to push the administration and convince them to provide infrastructure and equipment for running clinical physiology services. The junior faculty members, residents are the working hands and they must take the responsibility of day to day running of clinical physiology facilities. The technical staff will have to be motivated and valued. A sense of pride will have to be instilled into the work-force. There will be a learning curve, the new skills will have to be acquired, a clinical competency will have to be established, and protocols of the reporting will have to be set up. It is going to take years if not decades but first step has to be taken for journey.

Administrative changes will have to be made. Clinical departments usually open early by 8.00 am and keep running as long it is required. The Departments of Physiology usually open 9.00 or 9.30 am and close before 5.00 p.m. This will have to change and departments of physiology will have to get aligned to rest of the hospital. The teaching schedules and academic activities will have to be reorganized so that it does not conflict with ongoing clinical physiology services. The clinical departments balance schedules of academic,

teaching, research and clinical responsibilities. Duty rosters will have to be made, faculty and residents will have to be rotated between patient care and teaching duties.

Another concern that is often raised in the physiology circles is about the acceptance of clinical physiology by clinicians. These concerns are shallow and perhaps are used to camouflage inaction. Every clinician is driven for best outcome of patients under his/her care. If clinicians find clinical physiology to be useful in improving the clinical management of patients, they will welcome it with open arms. However, I do agree that there may be some hesitation initially. Personal affability and soft skills of the senior faculty members and heads of the department will be extremely helpful in the initial stages.

Role of regulatory/official bodies

While I do prefer that physiologist themselves take action *suo-moto*, however, given the operational dynamics of our country, the only effective solution will be making clinical physiology services as mandatory in minimal standards for recognition of PG courses in Physiology by regulatory bodies. Clinical physiology should be mandatory part of the PG curriculum and award of MD/M.Sc degree. Once the minimal requirements are set, the administration of the medical colleges/institution will be forced to provide required funds and infrastructure to the Departments of Physiology. The Association of Physiologists and Pharmacologists of India (APPI) is well suited for spearheading the development of the detailed curriculum for PG course in Physiology. The office bearers of the APPI should take this issue, identify the experts and set the ball rolling. The experts committee should come out with an operational document. The document should identify the clinical physiology services that should be provided by the department of Physiology with details of equipment, testing protocols and interpretation. The document should clearly state the core clinical physiology competencies that should be acquired by the post-graduate students. The APPI must establish a system of Board Certification of Clinical Physiologists for different clinical physiology services that should be mandatory for physiologists to be able independently practice clinical physiology in government and private set-ups. Without minimal standards and certification, the dilution of competencies is likely and it will harm the reputation of the clinical physiologists.

I end with a hope that this editorial will at-least lead to an honest non-partisan discussion amongst the Physiologists. Let the argumentative Indian spirit come alive in constructive manner. The outline/mechanisms put forth here may be modified, rejected and replaced by better ones. That's precisely the idea.

"*The great end in life is not knowledge but action*" Thomas Henry Huxley

Dr. Ashok Kumar Jaryal

Associate Editor (IJPP)

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