

## EDITORIAL

## DOCTORS' TRAINING IN A MEDICAL PHYSIOLOGY LABORATORY

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Practical physiology laboratory is to provide the students with necessary practical understanding of physiological principles that will enable them to become good practicing physicians. In Pakistan, laboratory curriculum of Medical Physiology has been updated extensively. Experiments using animals have been replaced by the experiments based on clinical examination of normal, healthy, human subjects. Physiology teachers integrate pre-medical subjects with the basic medical sciences and then to clinical sciences and ultimately to the professional practice. Student learns basic manual skills when he palpates arterial pulses and learns clinical skills of palpation and percussion. After that he learns to use some instruments on normal, healthy, human beings and then on the patients. Finally, the student is taught medical ethics of dealing with human beings. Laboratory curriculum should be revised after every few years to include the latest medical equipment and therapeutic techniques. Medical student is meticulously trained before handling the patients.

**Keywords:** medical students, medical physiology, laboratory curriculum

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Laboratory practical work increases students' interest, motivation, practical skills, problem-solving abilities, and understanding of the nature of science. Undergraduate medical students experience difficulties with basic and complex topics in human physiology. These difficulties increase the importance of using practical approaches to help students in understanding physiology. Practical activities are an interactive method of teaching and they associate theory with its application.<sup>2</sup> The aim of teaching practical physiology curriculum in a medical college is to provide the students with necessary understanding of physiological principles that will enable them to be good practicing physicians.<sup>3</sup> Practical activities are important for elucidating and improving students' understanding of physiology principals. Although, alternatives to lab work like computer simulations, Videos etc. are valid and help students' learning, they do not actually replace practical work.<sup>4</sup>

In Pakistan, laboratory curriculum of Medical Physiology has been updated extensively during the last few decades. Experiments using animals have been abolished and experiments based on clinical examination of human subjects have been included. Following practical assignments are included in the first year MBBS course: Study of Microscope, Estimation of Hb, Determination of ESR, Study of the Neubaur's chamber, WBC (TLC) Count, RBC Count, Platelet Count, ABO & Rh Blood Groups, DLC Slide Preparation and DLC Count, Examination of Arterial Pulses, Examination of Jugular Venous Pulse, Recording of Blood Pressure, Bleeding Time and Clotting Time, ECG Recording and ECG interpretation, Determination of Vital Capacity, Examination of Chest, Triple Response, Recording of Body Temperature,

Performing CPR. Many of the following practical experiments are included in second year MBBS laboratory course: Examination of superficial and deep reflexes, Brief examination of the motor and sensory system, Examination of the cranial nerves, Measurement of the field of vision, Demonstration of light reflex, Ophthalmoscopy, Colour vision, Hearing tests, Testing taste and smell, Measurement and interpretation of body temperature.<sup>5</sup> In spite of major shift toward human experiments, students still feel that many experiments are not clinically relevant and should be discarded. This is only because of their limited knowledge about training of a doctor, For example, they consider that RBC, WBC and Platelet counts using microscope, Haemoglobin estimation using Sahli's haemoglobinometer, Determining Packed Cell Volume, Testing taste, smell and for Colour vision, Measurement of the field of vision etc. are clinically irrelevant.

While deciding what should be taught to the medical students in general and in the laboratory in particular, medical physiology teachers should consider the whole educational continuum of the students from pre-medical classes to basic medical sciences to clinical sciences and ultimately to the professional life. A student coming to physiology teachers is having background knowledge of physics, chemistry and biology. First responsibility of Physiology teachers is to integrate basic sciences (Physics and Chemistry) with the basic medical sciences (Physiology and Biochemistry etc.). The second level integration is also the responsibility of basic medical science teachers, especially the physiology teachers, that is to integrate basic medical sciences with the clinical sciences and the doctor's professional practice. The first year student has no or

practically little knowledge of laboratory work. He has no manual skills and no knowledge of using instruments manually. On the other hand, a doctor uses his hands and other body parts very skilfully and uses different instruments very efficiently for the benefit of his patients. Just recall a doctor doing a venepuncture, lumbar puncture or CPR (cardio-pulmonary resuscitation) or doing a surgical operation, or operating through a laparoscope.

In the physiology lab, a medical student learns basic manual skills by first using inanimate objects such as laboratory equipment, e.g., determination of ESR and Haemoglobin. He learns basic manual skills when he palpates arterial pulses and learns clinical skills of palpation and percussion. After that he learns to use some instruments manually on normal, healthy, human beings, e.g., recording blood pressure by using a BP apparatus or recording body temperature by using a clinical thermometer in the physiology lab. In the skills lab, he is then trained to inject and suture on limbs made of artificial material; he also learns clinical skills, e.g., Performing CPR or delivering a baby by using manikins (the artificial humans). Finally, the student is taught medical ethics of dealing with human beings. Only after that much training he is allowed to touch the patient. So, the student is meticulously and rigorously trained before handling the live human beings, the patients. This may explain why a first year medical student is not allowed to handle the patients directly. This can also explain why some laboratory methods and experiments are still being used in physiology and

other basic medical sciences labs which at first sight seem irrelevant or outdated. Those experiments are included to provide manual skills to the students.

In spite of all above discussion, we believe that physiology laboratory curriculum should be revised after every few years to include the latest medical equipment and therapeutic techniques to teach physiological concepts to medical students. Any non-invasive investigation may be part of physiology laboratory like ultrasonography, echocardiography, audiometry, Spirometry and computerized data acquisition system. These may be included to show and explain physiological mechanisms to the medical students on a living human. Medical universities should take a lead in this process of curriculum revision by organizing physiology teachers' meetings and conferences. Pakistan Physiological Society can also share the responsibility by making a core group of medical physiologists.

## REFERENCES

1. Hofstein A, Lunetta VN. The laboratory in science education: Foundations for the twenty-first century. *Sci Educ* 2004;88:28–54. doi:10.1002/sce.10106.
2. Silverthorn DU. Teaching and learning in the interactive classroom. *Adv Physiol Educ* 2006;30:135–40.
3. Goyal R, Garg R, Goyal PR. Need for Changes in the Practical Physiology Curriculum of Medical Undergraduates. *J Clin Diagn Res* 2017;11(6):CC06–CC08.
4. Neves BS, Altermann C, Goncalves R, Lara MV, Carpes PBM. Home-based vs laboratory-based practical activities in the learning of human physiology: the perception of students. *Adv Physiol Educ* 2017;41(1):89–93.
5. <http://uhs.edu.pk/downloads/mbsospepart2.pdf>

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