

3-2019

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## Recommended Citation

Ahmad, Imran and Rathore, Farooq Azam (2019) "Current situation and future recommendations For neurophysiology services in Pakistan," *Pakistan Journal of Neurological Sciences (PJNS)*: Vol. 14 : Iss. 1 , Article 11.

Available at: <https://ecommons.aku.edu/pjns/vol14/iss1/11>

# CURRENT SITUATION AND FUTURE RECOMMENDATIONS FOR NEUROPHYSIOLOGY SERVICES IN PAKISTAN

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**Date of submission:** November 11, 2018 **Date of revision:** December 23, 2018 **Date of acceptance:** December 29, 2018

Clinical neurophysiology is defined as “a medical specialty that studies the central and peripheral nervous systems through the recording of bioelectrical activity, whether spontaneous or stimulated”.<sup>1</sup> There are different models of practice for clinical neurophysiology around the world. In some countries it is considered to be an independent specialty, while in other countries it is integrated with neurology.

While Clinical neurology in Pakistan has undergone some major developments in the last two decades including establishment of stroke centers, use of thrombolytic therapy, cerebral angiograms and interventional neurology, Clinical neurophysiology is still underdeveloped and services are not widely available all across the country.

Neurophysiology deals with the evaluation of electrophysiological function of the brain, spinal cord, peripheral nerves and muscles. This includes five major investigations; electroencephalography (EEG), electromyography and nerve conduction studies (EMG/NCS), evoked potential studies (EP) intra-operative monitoring (IOM) and polysomnography. There are further specialized extensions of these investigations like video and ambulatory EEG and intraoperative monitoring for source localization in epilepsy surgery. Similarly, EMG/NCS, also includes specialized test like single fiber EMG. Neurophysiology is primarily diagnostic in nature but can also guide prognosis especially in cases of Paediatric epilepsy where it can define an electro-clinical syndrome and predict prognosis.

Clinical neurophysiologists provide services not only in neurology but is also helpful in psychiatry, neurosurgery, pediatrics, plastic surgery and orthopedics. Recently neurophysiology evaluations have gained importance in the intensive care settings where they have helped identify patients with non-convulsive status epilepticus and guide therapy and also to identify those who develop critical illness polyneuropathy and myopathy and are difficult to wean off from the ventilator.<sup>2</sup> Hence the scope of neurophysiology has widened beyond the domains of neurology and is now considered an integral part of any tertiary care center across the globe.

## CURRENT SITUATION IN PAKISTAN

Pakistan is a low middle income country with a population of 22 millions. Neurological diseases are on the rise while the number of practicing neurologists at present is around 200<sup>3</sup>. Most of them work in the major cities and in tertiary care hospitals thus leaving a large population with no access to a specialist neurologist. Moreover, the number of institutes in Pakistan imparting FCPS and MD neurology training with an adequate set-up for neurophysiology services can be counted on the fingers of one hand. Notable among these are the neurophysiology services department at the Aga Khan University Hospital, Karachi and Shifa International, Islamabad. The Clinical Neurophysiology and Electro-diagnostic Medicine section at the department of neurology, Aga Khan University Hospital is currently offering the only postgraduate training programme in Clinical Neurophysiology in Pakistan.<sup>4</sup> As per the curriculum specifications residents in neurology should learn neurophysiology as part of their training, but the sad ground reality is that many neurologists are qualifying the FCPS part II and MD neurology exam without having the expertise to independently perform neurophysiology including electrodiagnostic medicine (EMG/NCS, EEG, visual evoked potentials and repetitive nerve stimulations). It is important to mention that American Association of Neuromuscular and Electrodiagnostic

Medicine only recognizes neurologist and Rehabilitation Medicine physicians as qualified physicians to perform electrodiagnostic studies.<sup>5</sup> Many Rehabilitation Medicine physicians across Pakistan regularly perform electrodiagnostic studies.

Different organizations and institutes have started training courses in different aspects of neurophysiology. Pakistan society of Neurology and Neurology Awareness & Research Foundation (NARF) in the Annual PSN conference in 2018 arranged a full day training workshop on EEG and EMG/NCS for the residents. National epilepsy center in 2017 conducted two-day comprehensive workshops on EEG in collaboration with an international faculty at two different centers. However, there is a need to organize these events on a regular basis and at multiple centers to create competent specialists in the field.

## **THE WAY FORWARD**

There is a need to develop neurophysiology services in Pakistan. Considering the time and financial constraints of neurology residents in Pakistan it is important that we should explore alternate channels of training and knowledge delivery.

Virtual Epilepsy academy( VIREPA) is one such initiative of International League Against Epilepsy, providing a comprehensive online training programme for epilepsy and EEG. It covers three topics Basic EEG, Paediatric EEG and Advance EEG.<sup>6</sup> The faculty of the course consists of global experts in EEG and epilepsy. VIREPA is a six months programme with nine learning modules. The cost of the full course is 1080 Euros but for neurologists based in developing countries like Pakistan reduced cost is only 270 Euros. Till to date only four Pakistani candidates have been VIREPA certified by ILAE.

The detail of the course is beyond this editorial but can be accessed at <https://www.ilae.org/education/virtual-epilepsy-academy-virepa>

Similarly, TeleEMG.com is a large database of online videos of NCS and EMG techniques and findings which is freely available to any professional interested in learning or improving his /her skills of electrodiagnostic medicine.<sup>7</sup>

Apart from the online training options there is also a need for different professionals involved in the training and delivery of neurophysiology in Pakistan to collaborate among each other. It is suggested that the faculty of Neurology and Rehabilitation Medicine at the college of physicians and surgeons of Pakistan should work together to launch a fellowship program in Neurophysiology. Pakistan Society of Neurology and Pakistan Society of Physical Medicine and Rehabilitation should also work closely to hold more training sessions as part of conferences and as independent events. The training programs in neurology must be improved to include demonstrating a certain level of expertise in neurophysiology to be mandatory before one can qualify the exam. Only those professionals who have required expertise in neurophysiology should be considered for the supervisorship.

To develop comprehensive and integrated neurophysiology services for the whole country might be a distant dream at present but coordinated efforts by the all the professionals involved in this field can make this happen.

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Conflict of interest: Author declares no conflict of interest.

Funding disclosure: Nil

Author's contribution:

**Imran Ahmed;** concept, data collection, data analysis, manuscript writing, manuscript review

**Farooq Azam Rathore;** data collection, data analysis, manuscript writing, manuscript review