

Neurology Training and Practice in Ethiopia

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Introduction to the global situation

Because of the epidemiological transition and improvement in medical techniques, the global burden of illness has changed during the last years. Several factors have contributed to this change, including improvements in maternal and child health, increasing age of populations, and newly recognized disorders of the nervous system. It is now evident that neurological disorders have emerged as one of the priority health problems worldwide. This generally accepted fact is reflected in the “Global Burden of Disease Study”, jointly published by the World Health Organization (WHO) and other groups ⁽¹⁾. For example, the proportionate share of the total global burden of disease resulting from neuropsychiatric disorders is projected to rise up to 14.7% by 2020 ⁽¹⁾. Although neurological and psychiatric disorders comprise only 1.4% of all deaths, they account for a remarkable 28% of all years of life lived with a disability (DALY) and represent therefore a health- and socio- economic challenge. This “Global Burden of Disease Study” provides compelling evidence that one cannot assess the neurological health status of a population only by examining mortality statistics alone, as this study endpoint is not adequate in such a subpopulation. It therefore also reflects the best-known problem of epidemiological studies to choose an endpoint that is comparable between different studies. The DALY concept, originally developed by the WHO, is therefore becoming increasingly common in the field of public health and health impact assessment.

It is especially designed to quantify the impact of premature death and disability on a population by combining them into a single, comparable measure. However, health ministries worldwide must prioritize neurological disorders for the beginning of the 21st century, and neurologists must be prepared to provide cost-effective care for increased numbers of people individually and in population (sub)groups ⁽¹⁾ based on the increasing importance of neurological diseases for the socioeconomic status.

According to WHO's projections, there were chosen 10 leading causes of disease burden in 2020 for developed regions ⁽¹⁾ (Table 1).

Table 1: The ten leading causes of disease burden for developed countries in 2020.

No.	Disease
1.	Ischemic heart disease
2.	Cerebrovascular disease
3.	Unipolar major depression
4.	Trachea, bronchus, and lung cancers
5.	Road traffic accidents
6.	Alcohol use
7.	Osteoarthritis
8.	Dementia and other degenerative and hereditary central nervous system disorders
9.	Chronic obstructive pulmonary disease
10.	Self-inflicted injuries.

While neurological service in Western countries varies from 1 to 10 neurologists per 100 000 inhabitants, neurology either does not exist or is only marginally present in major parts of the world ⁽²⁾. A study to assess the training and distribution of neurologists worldwide found out that the ratio of population to neurologist using WHO population data ranges between 6240 and 4,750,000, with the highest ratios in developing countries. In the majority of countries (35/57 or 61%), neurologists are able to complete training in their own countries.

But in 24/59 (41%) of countries, training is carried out partly or entirely abroad, and one out of six countries (10/59 or 17%) have even no neurology training programs at all. Many countries provide neurology training for physicians from other nations. Those programs sending residents elsewhere or training often choose countries with close geographical, historical, or political ties; France, the United Kingdom and the United States are the most common sites for training abroad. The most common language used for training abroad is English and French ⁽³⁾.

Neurology in developing countries

The burden of neurological diseases is increasing globally and particularly so in the developing nations of Africa, South America and Asia. In addition to the burden of infectious neurological diseases which are dramatically increasing in recent times due to the recent pandemic of Human Immunodeficiency Virus (HIV)/ Acquired Immunodeficiency Syndrome (AIDS), the upsurge of non-communicable diseases like stroke due to lifestyle changes and increasing prevalence of hypertension and diabetes mellitus is quite alarming. The later is nowadays also manifest in developing countries ⁽⁴⁾.

Measured by the economic parameter of disability adjusted life years (DALY), neurological diseases account for nearly 20% of all health problems in established market economies. The burden of neurological problems is higher in the developing regions of the world than in the first world ^(5,6). This is explained by the rise in the non-communicable diseases in addition to the already existing infectious and nutritional problems in these parts of the world. Several of these regions of the world suffer from over-population, poverty, illiteracy, ignorance and inadequate resources. Epidemiological data on neurological diseases in the developing world are inadequate: mortality

figures are often approximate and the occurrence of disease varies across different geographic regions ⁽⁵⁾. Epilepsy, cerebrovascular diseases, and head injury are the most common neurological disorders worldwide with a rapid increase of the importance of neuroimmunological diseases. Infections and diseases resulting from a lack of nutrition are on the other hand more frequent in developing regions. Tuberculosis alone accounts for nearly 1 million deaths in India and about 0.5 million in Sub-Saharan Africa and for 3.4% of DALY worldwide. But much of the morbidity and mortality associated with tuberculosis results from conditions affecting the nervous system, such as meningitis or spine disorders. These data underline not only the medical importance of tuberculosis; but also its socioeconomic one.

Recent knowledge of tropical neurology from India stated that most tropical medicine consists of infectious diseases and parasitic infestations ^(7,8). The same can be said of tropical neurology, except that there are several specific conditions in India that are almost unknown in other countries, as for example Japanese B encephalitis, subacute sclerosing panencephalitis or manganese intoxication. Of course, all the diseases that are familiar to Western neurologists such as epilepsy, stroke, headache, neurodegenerative and neuroimmunological diseases are also seen in India, in some cases with a somewhat different prevalence and incidence, or even in a different form. For example, increased intracranial pressure in an Indian child is tantamount to a clinical diagnosis of tuberculosis, and treatment is immediately started without first proceeding to any kind of diagnostic tests or procedures. It is impossible to list all the ills that affect the nervous system in India because of peculiar environmental conditions ^(7,8). This example of India points out the need for strong local neurological education programs as the

diseases and their prevalence differ in different regions of the world. The advantage of such a kind of training is that the residents will learn in their own country with the prevailing disease situation, which is different from that in the developed nations and is cheap.

In India, the discipline of neurology has, at least in some of the major cities, reached the same degree of diagnostic and therapeutic sophistication as in most Western countries: state-of-the-art genetic studies, neuroimaging, immunological investigations and epidemiological surveys are available and carried out, certainly in the major medical centers of the big cities. This also applies to most, if not all, developing countries. Nevertheless, it seems unlikely that these new and expensive methods will become widely used, since such a large proportion of the population has little, if any, access to, or can afford, appropriate primary medical care^(7,8).

Common neurological problems account for more than 20% of our global disease burden, and poorer countries are disproportionately affected. Population-based studies in developing countries have identified treatable entities, such as epilepsy, neuropathies, and central nervous system infections, as most prominent problems. Cerebrovascular disease already impacts heavily on these populations and may be on the rise because of demographic and behavioral changes and is assuming the trend in the developed part of the world^(4,9). Birbek's observation on the burden of diseases from Zambia for example showed that patients with neurological disease comprised 10% of the 1886 admissions at Chikankata Salvation Army Hospital; 13% of the 19 577 inpatient hospital days, and 27% of the 392 intensive care unit bed days. Common inpatient neurological issues included febrile seizures, CNS infections, and epilepsy⁽⁴⁾.

Dahodwala's observation from Botswana showed that the percentage of patients with non-infectious neurological problems is increasing in addition to the already existing infectious and nutritional problems in the general population⁽¹⁰⁾. Of the 98 patients he saw in the out patient department, 30% presented with seizure, 21% with ischemic stroke, 12% with neuropathy, 9% with intracranial hemorrhage, 6% with intracranial mass, and 6% with myelopathy. About 75% of these patients were additionally HIV positive making the underlying disease different from that generally known in Western countries. These observations show among other things that the number of patients with stroke is increasing also in Africa and this was explained by the high prevalence of hypertension and diabetes in that country⁽¹⁰⁾. This may be explained by the changing pattern of life style in this population assuming a Western kind of living.

A recent review also stressed the most important health neurological problems in Sub-Saharan African countries: HIV/AIDS, epilepsy, infectious diseases and stroke⁽¹¹⁾. With regards to HIV, Sub-Saharan Africa is still the most affected region globally, with 64% of new infections occurring there. Neurological complications occur in 39 to 70% of the patients with HIV. Diagnosing neurological disease in the HIV-infected individual is important for further treatment and improved survival. Although highly active antiretroviral therapy is established, it is still not available to many patients in sub-Saharan Africa like it is in developed countries. Only 9% of people living with AIDS and in need of antiretroviral therapy are on treatment⁽¹¹⁾.

Nearly 85% of the 50 million people with epilepsy live in developing countries. In developed countries, cost-effective therapeutic interventions are theoretically available. But more than 80% of the estimated 10 million patients with epilepsy in

sub-Saharan Africa receive no treatment at all. Few antiepileptic drugs are available although the average cost of phenobarbital is around \$5 USD per person per year and could be affordable in many sub-Saharan countries⁽¹¹⁾. The possible reasons for this obvious undertreatment are: (i) the lack of awareness as to the availability of treatment of the condition, (ii) social stigmas (parents tend to hide their affected children) and (iii) inaccessibility of health care facilities to the majority of the population in the under-developed world^(12,13).

Infectious diseases that involve the nervous system affect millions of people and represent a severe problem in sub-Saharan Africa. Malaria, African trypanosomiasis and Schistosomiasis are still rampant in this continent.

Stroke causes about 5.54 million deaths worldwide, and two thirds of these are in less developed countries. Reliable data on the global incidence of stroke are lacking, but it is assumed that 90% of stroke-related deaths occur in developing countries. Governments and health planners in these countries may have underestimated its importance and not allocated resources for primary prevention of stroke⁽¹¹⁾.

Young physicians from developing countries continue to seek specialty-training programs in Western Europe and North America, although it has now become possible to obtain this education in the home country. Clinical neurology has become increasingly dependent on laboratory tests and to an even greater degree on imaging procedures, at the expense of the history and the physical examination, a practice described by George Schumacher under the felicitous term 'mechanodiagnosis.' Although this kind of technological support has become available in much of the developing world, albeit to a limited extent, it is unlikely that investigative facilities are poised to become widespread because of the high

cost of apparatus and the shortage of specialists to interpret the results. Clearly, the practice of tropical neurology will remain a 'hands-on' clinical discipline for many years to come. Young neurologists coming home from abroad, who have been accustomed to the easy availability of an avalanche of ancillary diagnostic aids, may find it difficult to go back to relying on not much more than a thorough history and a detailed neurological examination. With the exception of epilepsy, they will find that the pattern of neurological practice is different from that experienced during their training. The shorter lifespan of most inhabitants of tropical climates means that the commonly encountered strokes, dementias and Parkinsonism of the developed world are more likely to be replaced by the neurological complications of AIDS, malnutrition, malaria and trauma, as well as various unusual bacterial and viral infections in patients with impaired immune systems, sleeping sickness and other parasitic infestations. Regardless of what kinds of neurological diseases they must deal with, it will be hard for them to use the medications they know to be effective as long as their prices remain far above what most people or even governments are able to afford⁽⁷⁾.

There are some successful neurology training programs started with the help of the World Federation of Neurology (WFN) that underline that the basis of the "Ethiopian way" may reach their goals of success. In 1998, Honduras had one neurologist per 325,000 inhabitants and exclusively all the neurologists were trained outside the country. The Education Committee of the World Federation of Neurology (WFN), in collaboration with the Postgraduate Direction of the National Autonomous University of Honduras, the Honduran Neurological Association, and the Honduran Secretary of Health helped establish the country's first Neurology Training Program in 1998. This

program was established using a problem- and epidemiological-oriented methodology with oversight by an external WFN review board. By 2006 the program has resulted in a 31% increase in the national neurologist ratio per inhabitant, significantly improved the quality of patient care and promoted research in the neurosciences⁽¹⁴⁾. The Honduras Neurology Training Program has provided a valuable model for other developing countries with similar needs for neurological care. Based on this Honduras experience, members of the Education Committee of the WFN have established guidelines for neurology training programs in developing countries⁽¹⁴⁾. This is a very good example that developing countries can improve their neurological services by training neurologists with-in their home countries.

With all the above-mentioned problems like disease burden, economic constraints, lack of facilities and the high number of population to neurologist ratio, the practice of neurology is hugely hampered in most of the developing nations of the world, like in Ethiopia. But it points out, that higher medical education, even though it has a similar basis in all countries, have to be adapted to every country or regions request. This was the scientific basis on which we developed our own way of Neurology Training in Ethiopia.

Neurology in Ethiopia

Ethiopia is one of the world's oldest civilizations, with a history dating back more than 2000 years. It is also the oldest independent country in Africa. Ethiopia's population reached an estimated 80 million in mid-2007, and is expected to grow by over two percent annually through 2025. Ethiopia's population is young with 44% under the age of 15 years and a median age of 16.9 years. Eighty-five percent of the population is rural. The annual per-capita income is currently estimated to be US\$ 100.

Like the rest of the developing nations, there is a rise in neurological problems evidenced by the number of neurological patients admitted to major hospitals in the country. The most common reasons for admission are diseases related with HIV/AIDS and strokes. It has also caused a burden in the out patient setting with increased prevalence of neuropathies, which we often encounter in our practice. Despite the rise in the burden of neurological diseases, the number of practicing neurologists in the country is only seven and all of them practice in the capital city, Addis Ababa.

A community-based study to assess neurological disorders was undertaken between 1986 and 1998 in the rural sub district of Meskan and Mareko (with a population of 181,883) in the Shoa administrative region of central Ethiopia, 130 kms south of Addis Ababa⁽¹²⁾. The commonest neurological disorders in the rural population according to that survey were: epilepsy, postpoliomyelitis paralysis, mental retardation, peripheral neuropathy (mainly due to leprosy), and deaf-mutism (which followed early hearing loss as a result of infectious diseases, mainly suppurative otitis media and meningitis). Other less common neurological disorders identified were: hemiparesis (including those due to cerebrovascular accidents), cerebral palsy, optic atrophy, tropical spastic paraparesis and so on⁽¹²⁾.

Another review in 1992 by Tekle-Haimanot about the neurological problems in Ethiopia stated the misconceptions of the public about the neurological disorders and the difficulty in differentiating between neurological disorders and psychiatric illnesses⁽¹⁵⁾. As a result, a person with neurological disorder may be seen at a mental hospital and the one with clear psychiatric problems may be seen at a neurology clinic. For e.g. the majority of patients with epilepsy were labeled as having a psychiatric problem and most of them have follow-ups there.

This points out that not only in Western countries but also in developing countries the interdisciplinary communication and knowledge gains more importance. In that review, infections of the nervous system were the commonest neurological disorders in Ethiopia, as they are in any other developing countries. The most common infections were poliomyelitis, leprosy and HIV. These were followed in frequency by epilepsy, mental retardation, cerebrovascular accidents and myelopathies.

Another survey was undertaken ten years later to evaluate the burden of inpatient neurological diseases in two Ethiopian hospitals and found out that neurological cases made up 18% and 24.7% of all medical admissions⁽¹⁶⁾. The study also showed a rise in the burden of non-infectious neurological diseases, which made up 36.7% and 31.7% of the cases (Table 2). Only 42.9% and 24.1% had at least a high level of diagnostic accuracy. There is a difference in the diagnostic certainty between the hospital staffed by a neurologist and the other one without a neurologist. Mortality rates also showed some difference (21.8% and 34.4%). The in-patient situation from Ethiopia showed that, like in most of the developing nations, there is a rise in the number of admissions for non-infectious neurological problems in addition to the already existing infectious ones.

Table 2: Patient demographic, etiologies and death rate from two Ethiopian Hospitals

	Addis Ababa*	Gondar§
Median age, y (range)	35 (13–74)	35 (15–80)
Infectious cases	32 (14–55)	28 (15–70)
Noninfectious cases	41 (15–74)	56 (16–80)
Etiology, no. (%)		
Infectious	28 (19.0)	64 (38.3)
Noninfectious	54 (36.7)	53 (31.7)
Both	3 (2.0)	0 (0)
Unknown	62 (42.2)	50 (29.9)
HIV relationship, no. (%)		
HIV-related†	49 (33.3)	51 (30.5)
Not HIV-related‡	76 (51.7)	86 (51.5)
Unknown	22 (15.0)	30 (18.0)
Deaths, no. (%)	32/147 (21.8)	58/167 (34.7)

* The total number of cases in Addis Ababa, where this information was available, was 147.

† Includes probable and definite.

‡ Includes probably and definitely unrelated.

§ The total number of cases in Gondar, where this information was available, was 167.

Taken with permission from: "Bower JH, Asmera J, Zebenigus M, Sandroni P, Bower SM and Zenebe G. The burden of inpatient neurologic disease in two Ethiopian hospitals. *Neurology* 2007; 68(5): 338-342."

The number of neurologists serving in the countries of Africa is yet small. A survey to assess neurological services in the nations of Africa in comparison to the service in US found out that the population to neurologist ratio in all African nations far exceeds that of US and other developed nations⁽¹⁶⁾. Neurological services in the African nations range from no formal care at all to established neurological care with residency training and ancillary equipment. When this is applied to the Ethiopian situation, where there are only 8 neurologists for the whole population, the population to neurologist ratio becomes 10 million to 1 neurologist which far exceeds that of the situation in the developed part of the world where the ratio is 20,000 to 1 neurologist and even beyond other developing countries like Pakistan where it is 2 million to 1 neurologist⁽¹⁷⁾. The recommended number of neurologists in a given country is 1-5 per 100, 000⁽²⁾. So that, we can estimate that 800-4000 neurologist are needed for Ethiopia with this WHO recommendation, which is far more than the number of physicians in all specialties currently.

In Ethiopia, neurological education was started in 1973 with the opening of a Neurology unit by the Department of Internal Medicine of Addis Ababa University, which trains both undergraduate medical students and postgraduate internal medicine residents⁽¹⁸⁾. But basic neurological services are unavailable to the great majority of Ethiopians who need it most and the available services limited to patients living in Addis Ababa and to those who are able to come to the capital city. To alleviate this inequity of service, there must be sufficient number of neurologists and facilities in the country as there are many neurological conditions that can be effectively treated or prevented if appropriate and timely interventions are carried out. To some how alleviate this problem in service and teaching, the neurology residency

program was started in 2006 and currently there are 8 neurology residents following their training. One full time neurologist and about 12 honorary staff members both from local and international neurology societies staff the department. The long-term plan of the department is to staff the medical schools and all referral hospitals with in the country with sufficient neurologists to enhance the service and generate more health professionals through local training. It has the advantage of training local practitioners with in their own set-up and prevailing condition, which will enable them to deal with the most important problems effectively. In addition, it is cost effective and saves the amount of money spent training a neurologist abroad⁽¹⁸⁾.

This program as trainings in other developing nations is faced with a lot of problems. The major problem is the lack of adequate diagnostic facilities: there are only five EEG recorders, two EMGs, six CT scanners, and two MRI scanners among all private and public institutions.

What should be done to improve the neurology training and practice in Ethiopia?

1. Improving the already started neurology-training program: As has been mentioned above, it has been two years since the establishment of the neurology-training program in the Addis Ababa University, Medical Faculty. It is obvious that if we could train and provide qualified neurologists even at the secondary and tertiary care hospitals in the country, the management of many acute and chronic neurological problems could be achieved. Currently, there is only one institution in the country, which gives neurology residency training, and there are only 8 residents following the program. This is a very small number with the huge burden of the problem as has been mentioned above. Currently all the neurologists in the country are practicing in the

capital city, Addis Ababa. There are no neurologists in all medical schools in the country except the Addis Ababa University. This will definitely hamper the quality of education given to the general practitioners who graduate from these medical schools and those of the internists from other medical faculties. Indirectly, this has an impact on the overall quality of neurology service, as these are the ones who are expected to serve in the primary health care facilities, which are far from the capital. So delivering basic and quality neurology training to the general practitioners, which is one of the major aims of the neurology training program (i.e. providing at least one neurologist in the main teaching centers), who are in contact with the majority of the rural population in the country where the practice of neurology is poor, will improve the basic problems like epilepsy and infectious neurology. In addition it will change the attitude of the rural population towards neurological problems where majority of them are considered caused by some supernatural power, like the situation in epilepsy.

- In order to accomplish this, the quality of the neurology residency program should be strengthened. Currently, the main problems encountered in running this program are: the lack of adequate diagnostic facilities like imaging studies (CT, MRI, myelography), electrodiagnostic studies (EEG, EMG, NCS), and even some basic chemistry studies are lacking in the major hospital where the training takes place. So, major organizations, like the WHO and WFN, and developed countries in Europe and America can assist in this aspect.
- With regards to manpower, currently there is only one dedicated fulltime neurologist running the program. Interestingly, there are about

twelve honorary staff members with different sub-specialties from abroad and locally who are participating actively in teaching and research with the neurology residents. We found this very helpful in alleviating the shortage of manpower we had from the country and by so doing we got a lot of experienced neurologists in different sub-specialties which would have been unthinkable in the near future in our setup. The visiting professors:

- a. 1. Will give lectures to the staff, residents, and medical students.
 - b. 2. Will make teaching rounds.
 - c. 3. Teaching and opportunities to train staff and technicians in CT Scanning, EMG, EEG, and EP.
 - d. 4. Opportunities to explore expanding neurological services in areas of neurological specialization, such as, but not limited to: movement disorders, infectious disease, pediatrics, neuro-ophthalmology, rehabilitation and occupational medicine, and headache.
- It is also interesting for most of the neurologists from abroad as the kind of diseases encountered are somewhat different from their own country and we hope they will enjoy their stay in the country as we had witnessed from the already participating staff members.
 - In addition, student exchange programs will also assist in improving the quality of training here and some of the residents have already got such a chance in USA and UK and have enjoyed their stay there. This will definitely give a chance for the residents from here to look in to what is going on in the better developed world and will learn the use of some of the latest materials they have and best of all the patient management skills from more experienced physicians in all disciplines. We also welcome residents and

undergraduate students from the developed world to see what is going on here and to see some of the disease situations, which they will probably not see through out their life. They can also collaborate with us in research, which is a very interesting area for both of us.

- The problem in this aspect is with regards to accommodation and other expenses for the visiting professors from abroad and also for the students going abroad for their observer ship. This is another area where help is required from both the international organizations and the countries where the training is sought.

2. Training other health professionals in basic neurology:

There are only 2500 physicians in the whole country in Ethiopia in all disciplines. This is a very small number in delivering the expected care for major diseases in the country. Can we involve other professionals like nurses in the care of neurology patients? In one study in rural Ethiopia, nurses were trained for some time in the management and follow-up of epilepsy patients⁽¹⁹⁾. Over an eighteen month period, 813 patients aged 1-75 years (median age 20years) with active epilepsy were registered and started on Phenobarbital. The duration of epilepsy ranged from 1 month to over 50 years (median 4 years) and 87% of patients had not previously been treated with anti-epileptic drugs. They concluded that, it is possible to provide effective epilepsy treatment using existing infrastructure in the country with few additional resources⁽¹⁹⁾. A two year follow-up of these patients showed that good follow-up can be achieved even after two years and response to treatment in those who remain under follow-up is very good falling little short of what is seen in more developed countries⁽²⁰⁾. This will definitely change the societies' attitude towards epilepsy which is considered as

being caused by an 'evil-spirit' and lead to a better awareness of the society about epilepsy as they see patients getting better with treatment. So, extrapolating this to other major problems like infectious illnesses, the nurses can be trained in the identification and early referral of patients to major facilities if that is accessible. We believe that this is the immediate solution in delivering basic neurology to the needy rural people of Ethiopia as training neurologists with the current rate may take long years to meet the WHO needs of 1-5 neurologist per 100,000 populations. There is some activity going on in incorporating basic neurology to the curriculum of psychiatry nursing program and also to train the psychiatry nurses in the whole country as they are in better position to access the rural population. This is one interesting area where WHO or other organizations like WFN may assist financially and also in manpower.

3. **Continuing medical education (CME) for neurologists in the country:** The WFN continuum study groups have resulted in strengthening of national neurological societies and improvements in training programs. Several primary study centers have established secondary study centers such as Argentina, Honduras, Russia, Turkey, and India ⁽²¹⁾. A multi-stage program evaluation was undertaken to explore the WFN CME, in an effort to understand how global CM programs are organized and understand the success factors and the challenges of delivering global CME ⁽²²⁾. The programme evaluation was conducted between June 2005 and March 2006. The preliminary results were shared with the WFN education committee and national coordinators and international experts to check and confirm the findings from the study. The study results reveal that global CME programmes could be

designed effectively with minimum costs. These programmes contribute to meeting the continued learning needs of neurologists in resource poor settings. Further, the WFN initiative provides, some initial evidence that these programs can contribute to systems level improvements ⁽²²⁾. Currently, the WFN has started a CME program for neurologists and neurology residents in Ethiopia through the Association of Neurological Sciences of Ethiopia (ANSE). They are sending Continuum journal for the activity. The aim of this CME activity from the American Academy of Neurology is to help practicing neurologists stay abreast of advances in the field while simultaneously developing lifelong self directed learning skills. In a situation where there are no enough materials like the electronic media and texts, the value of this CME activity is huge in updating the knowledge of the practicing neurologists and also the residents in neurology. One minor problem to be mentioned when this material comes to our situation is that, since the material is prepared for neurologists in America, it mainly focuses on diseases of the developed nations though with the changing pattern of diseases in our situation we often see more of these diseases nowadays. If there are similar CME activities from countries of similar disease situation like ours, we can also learn a lot from those programs too as it is better suited for us. The organizations, like WHO and WFN, can assist in this area too.

4. **Government commitment:** The Ethiopian government is showing a serious commitment in upgrading the higher education training capacity both in quality and quantity. To this effect, the number of universities in the country has increased from two some five years ago to eight. Out of these eight universities, six of them

conduct training in medicine. Except for the faculty of medicine in Addis Ababa University, the rest of the medical schools do not have neurologists to teach undergraduate or post-graduate students. With the government's commitment to expand the postgraduate programs in the country and to fill these gaps in the field of neurology, the neurology post-graduate program was started. In addition, the Ministry of Health has also contributed a lot in arranging hospitals for the training to be conducted.

5. **Working together with other neurology societies in Africa and the Task and Advisory Force for Neurology in Africa (TAFNA):** In a recent review about neurology in Sub-Saharan African countries where the WFN president was the main author, a lot of issues were raised in how to improve neurology service and training in the continent ⁽¹¹⁾. TAFNA will advise, support, fundraise, evaluate, and accompany the WFN African Committee. The African Committee will be set up at the end of 2007 and will be composed of African neurologists working and residing in the continent. A first task for the committee is to prepare a directory of neurologists in Africa, similar to the directories of American Academy of Neurology (AAN) or the European Federation of Neurological Societies (EFNS). The directories are essential also for the selection of candidates for international training and for research funding. Educational activities are central in the WFN Program for Africa. First, there is a need for training of more neurologists. WFN hopes to assist in increasing the number of neurologists by 10 more annually. The long-term goal is that all countries on the continent train their own specialists in neurology ⁽¹¹⁾. We hope Ethiopia, registered under the WFN, will benefit from this

great program and it will also assist the already started neurology training in our country.

6. **The role of Telemedicine:** Recently, with the help of the Indian Government, a telemedicine unit was established in the Faculty of Medicine, Addis Ababa University. The aim of this program is to have consultations from specialists in India, and perhaps later in other countries in different disciplines. Residents will select difficult cases from their wards or the outpatient, investigate them and present them to the tele-medicine unit for discussion with Indian specialists. This is particularly useful for those subdisciplines where there are no trained personnel; a method that is also widely used in leading Universities in Europe and North America. When it comes to neurology, this is also helpful in strengthening the teaching process and also improves the quality of service giving activity.
- In addition, this will also allow in a second step for consultations to be made within the country too. Practicing physicians and health professionals from remote parts of the country will have access for specialists in Addis Ababa University when referral is difficult.
 - This area is currently on a trial basis and needs to be strengthened and the network should be distributed in major hospitals through out the country for better exchange of information and to utilize the scarce manpower resource effectively.
 - The country can benefit from the application of telemedicine to solve the problem of health care delivery in a cost-effective way.

Prospect to the Future

If the requested support can be found in the near future, we hope that the training program in neurology will be at its best and best suited for our own set-up and prevailing disease conditions. We

hope in the next ten years all the regional and zonal hospitals and all medical schools in the country will have neurologists delivering optimum care for the society and also adequate training for medical students. We will also expand the neurology post-graduate training to other medical schools in the country in the hope of increasing the number of neurologists faster to attain the required WHO standard of neurology care.

But currently, if adequate and effective Telemedicine units can be established in these universities and other rural referral hospitals, we can at least discuss cases with them and patients may have shorter ways to neurological advice.

The currently training institute at Addis Ababa University will be a good research centre for both local and international researchers, especially but not only for epidemiological studies. Having a research institute dealing with local prevailing disease conditions has great impact in devising our own disease prevention and treatment strategies on a scientific basis. Our University will gain therefore also interest for Western or North American students that haven chosen such subspecialty.

Conclusion

The burden of neurological diseases is increasing globally and particularly so also in the developing nations of Africa, South America and Asia. In addition to the burden of infectious neurological diseases which are dramatically increasing in recent times due to the recent pandemic of HIV/AIDS, the upsurge of non-communicable diseases like stroke due to lifestyle changes and increasing prevalence of hypertension and diabetes mellitus is quite alarming.

Ethiopia has a similar disease burden situation as of the rest of the developing nations and also share similar economic constraints evidenced by poor GDP, poor health care and so on. This has hampered the neurology training and service in the

country. In recent times neurology postgraduate training program was started in the country with the aim of alleviating the manpower shortage in delivering the required service. This program is supported by professionals from developed nations and organizations. We believe that strengthening it has great impact for better neurology service.

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