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Profile of neurological disorders in an adult neurology clinic in Kumasi, Ghana

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ABSTRACT

Background: Although the burden of neurological disorders is highest among populations in developing countries there is a dearth of data on the clinical spectrum of these disorders.
Objective: To profile the frequency of neurologic disorders and basic demographic data in an adult neurology out-patient service commissioned in 2011 in Kumasi, Ghana.
Methods: The study was conducted at the neurology clinic of the Komfo Anokye Teaching Hospital in Kumasi, Ghana. Over a three year period, all medical records of patients enrolled at the out-patient neurology clinic was reviewed by a neurologist and neurological diagnoses classified according to ICD-10.
Results: 1812 adults enrolled for care in the neurology out-patient service between 2011 and 2013. This comprised of 882 males and 930 females (male: female ratio of 1.0: 1.1) with an overall median age of 54 (IQR, 39–69) years. The commonest primary neurological disorders seen were strokes, epilepsy and seizure disorders, and movement disorders at frequencies of 57.1%, 19.8%, and 8.2% respectively.
Conclusions: Cerebrovascular diseases, epilepsy and movement disorders were among the commonest neurological disorders and the major contributors to neurologic morbidity among Ghanaians in an urban neurology clinic.

1. Introduction

Neurological disorders account for more than 6% of the global burden of diseases with a greater preponderance of mortality and disability-adjusted life years represented in low-and middle income countries [1]. Available data suggest a dearth of trained neurologists in developing countries. For instance, while the estimated neurologist to population ratio in sub-Saharan countries is 0.03 per 100,000 population, that in the Americas and in Europe are 0.89 and 4.84 respectively [2–4]. The coupling of lack of skilled human resources with the absence of the needed health infrastructure for neurological services in developing countries means that outcomes of neurological disorders in these settings would be poor unless urgent actions are taken to redress this situation.

Another corollary of the lack of neurologists in resource-limited settings is that the burden of neurological disorders within the community and indeed within hospital settings are not well characterised. Data on the practise of neurology from African settings are required to shed light on the spectrum of neurological disorders and the available level of care for patients with these disorders. In Ghana, a West African country with a population of 25 million, there are 6 neurologists located in 3 referral hospitals in two major cities—Kumasi and Accra. In 2011, an out-patient clinic for neurology services was opened at the Komfo Anokye Teaching Hospital, a tertiary referral centre situated in Kumasi in the central belt of Ghana. The aim of this study is to profile the frequency of neurological disorders and describe basic demographics of patients in our neurology out-patient service over a 3-year period from 2011 to 2013.

2. Methods

This study was approved by the Committee on Human Research Publication and Ethics (CHRPE) of the School of Medical Sciences, Kwame Nkrumah University of Science and Technology, and the Komfo Anokye Teaching Hospital (KATH), Kumasi. This is a retrospective study conducted at the neurology clinic of the Komfo Anokye Teaching Hospital in Kumasi, Ghana. The neurology clinic was established in 2011 by the lead author upon completion of fellowship training. The clinic runs once a week and receives referrals for adults >16 years with neurologic disorders from 6 out of the 10 administrative

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regions of Ghana and serves an estimated population of 10 million. A quarter of referrals to the clinic are received from health centres located within the northern and middle belts of Ghana while the remainder are referred from within the teaching hospital particularly after patients have been discharged as in-patients. Occasionally paediatric neurology referrals are received. The clinic has two neurologists (F.S.S. and J.A.) and one nurse (E.B.). A review of neurologic disorders at the clinic from 2011 to 2013 was performed by a review of medical charts of patients by the two neurologists.

Neurologic diseases were classified according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD-10) as follows: [1] inflammatory diseases of the central nervous system, [2] systemic atrophies primarily affecting the central nervous system, [3] extrapyramidal and movement disorders, [4] other degenerative diseases of the nervous system, [5] demyelinating diseases of the central nervous system, [6] episodic and paroxysmal disorders, [7] nerve, nerve root and plexus disorders, [8] polyneuropathies and other disorders of the peripheral nervous system, [9] diseases of myoneural junction and muscles, [10] cerebral palsy and other paralytic syndromes, [11] and other disorders of the nervous system. Clinical diagnoses were made by history taking and neurological examination followed by laboratory, radiological and electrophysiological studies as indicated. The range of laboratory testing available included complete blood count, ESR, renal and liver function tests, radiological testing including X-rays, computerised tomography and magnetic resonance imaging and an EEG which became available in late 2013. Among data recorded were age and gender and these were entered into excel spreadsheets by data entry clerks.

2.1. Statistical analysis

Means and medians were compared using either the student's t-test or Mann–Whitney's U-test for paired comparisons or ANOVA or Kruskal Wallis tests for more than 2 group comparisons. Statistical significance was set at a two-tailed p-value < 0.05 with no adjustment for multiple comparisons. Statistical analysis was performed using GraphPad Prism version 7 (GraphPad Software, Inc).

3. Results

3.1. Demography and frequency of classes of neurological disorders

In 2011, 2012 and 2013 a total of 715, 542 and 556 new patients respectively were enrolled for care at the neurology clinic. Thus a total of 1812 patients have been referred to the neurology clinic between January 2011 and December 2013. This comprises 882 males and 930 females (male:female ratio of 1.0:1.1) with an overall median age of 54 (IQR, 39–69) years. The median (IQR) age of females of 55 (38–72) years compared with that of males of 54 (40–66) years, $p = 0.04$. As shown in Table 1, the commonest primary neurological disorders seen were strokes, epilepsy and seizure disorders, and movement disorders at frequencies of 57.1%, 19.8%, and 8.2% respectively. However a patient could have more than one diagnosis hence a total of 1836 diagnoses were made. The top two most frequently co-existing neurological disorders were post-stroke seizure disorders ($n = 12$) and vascular dementia ($n = 8$).

As shown in Table 2, the number of visits to neurology clinic has increased from 1399 visits in 2011 to 2144 in 2013. Similarly, the proportion of visits to the OPD outfit for neurology services increased from 2.0% to 4.1% over the period. Patients after enrolling at the clinic are followed up between one to six monthly appointments.

3.2. Strokes and cerebrovascular disorders

Out of 1048 patients with stroke and other cerebrovascular disorders, 483 were males and 565 were females with a male:female ratio of 1.0:1.2. The median (IQR) age of females of 61 (50–74) years was significantly higher than that of males, 57 (49–67) years, $p = 0.0003$ with an overall median age of 59 (IQR, 49–72) years. The modal age range for males and females were 51–60 years and 71–80 respectively as shown in Fig. 1. 207 out of 1048 (19.8%) had cranial CT scan performed soon after stroke to allow for stroke typing — 115 had ischaemic strokes, 61 had intra-cerebral haemorrhagic strokes and 31 had sub-arachnoid haemorrhages. The median (IQR) age of patients with haemorrhagic, sub-arachnoid and ischaemic strokes were 50 (43–57) years, 52 (43–67) years and 65 (52–72) years respectively with $p < 0.0001$ (Kruskal Wallis test) and the male/female proportions for the respectively CT-typed strokes were 34/27, 61/54 and 8/9. There were only 6 referrals of transient ischemic attacks for evaluation.

Medications available for the control of hypertension among stroke survivors include ACE-Inhibitors, Angiotensin Receptor Blockers, Beta-blockers, Calcium Channel Blockers, Diuretics and methyldopa and hydralazine when needed. A range of oral hypoglycaemic agents including Metformin, first and second generation sulphonylureas, and thiazolidinediones are available on National Insurance for patients as is Insulin. Commonly prescribed statins include Atorvastatin, Rosuvastatin and Simvastatin while antiplatelets such as Aspirin and Clopidogrel are available for secondary stroke prevention. Available

Table 1
Neurological disorders in Kumasi, Ghana according to ICD-10 classification.

ICD-10 Classification	Neurological disorders	Frequency, n	Percent (%)
Episodic & paroxysmal disorders	Stroke	1048	57.1
	Epilepsy & seizure disorders	363	19.8
	Headaches	30	1.6
Extrapyramidal & movement disorders	Movement disorders	151	8.2
Nerve, nerve root & plexus disorders	Peripheral nerve disorders	40	2.2
Diseases of myoneuronal junction & muscle		12	0.7
Inflammatory diseases of the Central Nervous System	Intra-cranial infections	16	0.9
	Transverse myelitis	6	0.3
Demyelinating diseases of the central nervous system	Multiple sclerosis & Neuromyelitis optica	7	0.4
Other neurodegenerative diseases of the nervous system	Dementing illnesses	42	2.3
	Friedreich's ataxia	3	0.2
Cerebral palsy & other paralytic syndromes	Neuro-developmental disorders	5	0.3
	Compressive myelopathy	50	2.7
Non-neurological disorders	Neuro-psychiatric disorders	18	1.0
	Brain tumours	16	0.9
	Neuro-cutaneous disorders	1	0.1
	Cranio-trauma	1	0.1
	Unclassified	27	1.5
	Total	1836	100