ORIGINAL ARTICLE

PATTERN OF NEUROLOGICAL DISORDERS AT PEDIATRIC OUTPATIENT NEUROLOGIC SERVICES AT TIKUR ANBESSA SPECIALIZED HOSPITAL

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ABSTRACT

Background : *Description of the patterns of morbidity in a given population is an essential undertaking not only for healthcare finance planning & appropriation but also serves as a platform for additional analytical study. In this regard, studies about the patterns of pediatric neurologic morbidity are scarcely available in Africa.*

Aims of Study : *To describe the patterns of neurologic morbidities among patients attending the pediatric neurology clinic of TASH.*

Methods*: 228 patients were selected using consecutive/ convenient sampling method over a period of eight weeks using the patient registration log book while they were attending their follow-up visits at the pediatric neurology clinic of TASH. Data abstraction forms were used to collect the data. Diagnoses were categorized based on the International Statistical Classification of Diseases and Related Health Problems version 10 (ICD-10). Descriptive statistics were used to analyze the results using SPSS version 16 software. Frequency (percentage) and mean ±2SD, with appropriate graphic display, were used for nominal/dichotomous and continuous interval variables respectively*

Results*: The mean age for the sample was 63.7 (SD=48.4) months with a range of 2-192 months. Male sex contributed for 60.2% of the participants. Cerebral palsy (24.6%), Global developmental delay/mental retardation (21.5%), idiopathic epilepsy (13.2%), and CNS infections (12.7%) accounted for most of the morbidities seen in the pediatric neurology clinic of Tikur Anbessa Specialized Hospital. .*

Conclusion**:** *This study showed the wide spectrum of pediatric neurologic disorders seen in a pediatric neurology clinic. Cerebral palsy was found to be the most common pediatric neurologic problem seen in the clinic followed by global developmental delay/mental retardation, idiopathic epilepsy, and CNS infections respectively. The neuro -rehabilitation services have to be strengthened to address the needs of these patients. Further institution and community based large-scale studies about childhood neurological disorders are required to be done in Ethiopia. So, this study can serve as a baseline.*

Key words*: neurological disorders.*

INTRODUCTION

Neurological disorders in children are common occurrence in clinical practice. The disorder accounts for more than 20% of the world's disease burden with a greater majority of people affected living in Africa (1).

Understanding the local epidemiologic profile and effects of medical morbidities in a

given society is invaluable for rational utilization of medical resources, and facilitate individual patient management and public health intervention processes (2). The implications of epidemiologic morbidity data also extend to planning of resource allocation for medical education and research goals (3). The importance and utility of epidemiologic medical morbidly data is huge, and given unduly little emphasis in resource limited countries (4, 5). In particular, neurologic morbidity data are scarce and or outdated in most developing countries.

In a data compiled from 106 countries (covering 90% of world population) the reported frequencies of neurologic disorders seen by specialists were almost similar across regions and economic groups of nations (3). Globally, epilepsy (92.5%) and cerebrovascular diseases (84%) followed by headache (including migraine) (61.3%) are the top in the list of the diseases most frequently seen by a neurologist (3). Parkinson's disease (46.2%) and neuropathies (35.8%) were the other major diseases encountered in specialist settings (3). However, this global neurologic morbidity data were not collected and calculated using stringent epidemiological research methods and slightly differ in reported prevalence from other local studies (5-7, 8).

In developing countries, the available studies on distribution and pattern of neurologic disorders, and factors that affect their characteristics are very few, and largely from hospital-based surveys. In this regard, an important neurologic morbidity data for developing nations was found in global surveys conducted under conjoint effort of the World Health Organization (WHO) and National Institutes of Health (NIH) (5). In this landmark survey reports there were indications to the overwhelming and increasing burden of neurologic disorders in the developing world (5). It had been pointed out taken together neurologic disorders in developing countries contributed to the largest proportion of the overall global burden of nervous system disorders (5). In one hospital-based study in Nigeria neurologic morbidities accounted for 15.6% (604 out of 3,868) of hospital admissions (6). In another hospital-based study from Africa neurologic disorders contributed to 20-30 % of hospital bed occupancy (7). These few studies emphasized the need for an expansion and improvement of neurologic services in developing countries (3,5). The available resources including services for neurologic disorders are markedly insufficient with large inequities across regions and income groups of countries (3).

It is reasonably assumed that the profile and effects of neurologic disorders characteristically differ among adults and children, and requires an independent research enquiry for each population age-groups (9). As a matter of fact pediatric neurology is a separate and developing medical discipline with a distinctive demand for neuro-pediatricians and subspecializations (3, 10). Nonetheless, published epidemiologic morbidity data for pediatric neurologic disorders are even scarcer than for adult neurologic morbidities (6). In one study preventable infectious diseases were found to be the major causes of emergency neurologic morbidities and mortality among children five years of age and under (6). In this study febrile convulsion (35.1%), cerebral malaria (28.0%) and meningitis (27.0%) were the most common pediatric neurologic morbidities (6).

There are no available reports on the morbidity characteristics of patients seen at the outpatient pediatric neurologic services in Ethiopia. Similar scarcity of data is observed in most other African countries (11). The majority of studies of neurological disorders in Africa are done in adults (7, 9,11). Therefore, there is a need for additional descriptive data on morbidity patterns of pediatric neurologic disorders in developing countries like Ethiopia. It will not only help in rationale allocation of the meager health resources available but also in the design of future analytic studies.

There are only four Pediatric neurologists in Ethiopia with a population of more than 90 million among which under 15 children account for about 44% of all population. This also has a significant impact in the care of children with neurological disorders.

Assessing the pattern and magnitude of neurological morbidities in a population is an important step for appropriate medical resource utilization and rational practice of clinical neurologic care. There is no study describing the patterns of pediatric neurologic diseases and disorders in outpatient neurology services in Addis Ababa. Having the basic neurologic morbidity data in these setups will have multifaceted constructive utilities. Particularly, it gives an understanding of the extents of use of standard neurologic diagnostic procedures, and paves the way for evidence based service improvement. This study described the patterns of pediatric neurologic disorders in a pediatric neurology clinic at Tikur Anbessa Specialized Hospital (TASH), Addis Ababa, Ethiopia.

METHODS

STUDY SETTING: This survey was performed at pediatric neurology clinic of TASH, Addis Ababa, Ethiopia in January and February 2013. TASH is located in the capital city, Addis Ababa, and serving as a teaching center for College of Health Sciences, Addis Ababa University. The pediatrics neurology clinic is under the Department of Pediatrics and Child Health (DPCH), College of

Tuesday afternoons and provides follow-up care to an average of 30 patients per clinic session. It receives all pediatric neurologic patients evaluated at DPCH who requires follow-up neurologic care (except pediatric patients with only seizure/epilepsy who are evaluated at the pediatric seizure clinic every Thursday afternoons.) The DPCH has medical record keeping and card room separate from other departments and units of TASH. TASH routinely provides common hematologic, serum chemistry, parasitological, microbiologic, immunologic laboratory tests and imaging studies. Neuroimaging studies and electrodiagnostic services (such as Electroencephalography, electromyography, nerve conduction studies) are available at TASH but the electrodiagnostic services give service mainly for adult patients only as they are under adult neurology clinic. Pediatric patients with neurological disorders get these services from private in institutions and other governmental institutions in Addis Ababa.

STUDY POPULATION: The survey study population incorporates all patients attending the pediatric neurology clinic of TASH.

STUDY DESIGN and SAMPLING STRATEGY: This is a descriptive cross-sectional institution based study done by chart review. Patients were consecutively sampled over a period of eight weeks using the patient registration log book while attending their follow-up visits at the pediatric neurology clinic of TASH.

DATA COLLECTION TOOLS AND PROCEDURE: Data were collected using data abstraction form with review of the information available on their treatment charts by Pediatric residents and verified by attending pediatric neurologist.

In the pediatric neurologic clinic a data abstraction form was used for data collection. The data included basic patient (and family characteristics), description of neurologic diagnosis or diagnoses, modes of diagnosis ascertainment process and other related information. Every sampled patient will have a filled data abstraction form by the attending physician (pediatric resident) at the end of each clinical encounter. The data collection process was also monitored by collaborating pediatric residents and investigators.

STATISTICAL ANALYSIS: Data were organized and prepared on a spreadsheet. Diagnoses were categorized based on the International Statistical Classification of Diseases and Related Health Problems version 10 (ICD-10) (13). All statistical tests were run on SPSS for Windows version 16.0 software.

Frequency (percentage) and mean ±2SD, with appropriate graphic display, were used for nominal/dichotomous and continuous interval variables respectively.

RESULTS: The 230 patients in this survey were consecutively sampled during a continuous 8 week period in 2014 from registration log book. Two (0.9%) patients were excluded as their data were incomplete. Two-.

hundred twenty-eight (99.1%) patients were included in the study

Participants ranged 2-192 months of age with a mean of 63.7 (SD=48.4) months. 60.2% (136 of 228) of the patients were male. 59.2 % (135 of 228) of the patients were residents of the capital city Addis Ababa. Overall global developmental delay (mental retardation), cerebral palsy, idiopathic epilepsy, and infectious diseases contributed to the majority of morbidities observed in the clinic, accounting for 72.0 % of the cases.

Table-1 depicts the distribution of the neurologic morbidity among the sampled patients. Among cerebral palsy patients, the proportion of subtypes were Spastic hemiplegic 30.4 % (17 of 56), spastic quadriparetic 8.9 % (5 of 56), Spastic diplegic 5.4 % (3 of 56), extrapyramidal (dyskinetic) 7.1 % (4 of 56) and cerebral palsy of unspecified type accounted for 48.2 % (27 of 56). Symptomatic and/or idiopathic seizure occurred in 45.6% (104 of 228) patients.

Table 1: Frequencies of neurological disorders at pediatric neurology clinic at Tikur Anbessa Specialized Hospital.

Diseases' Category	Number	Percentage (%)
Cerebral palsy	56	24.6
Global developmental delay (MR)	49	21.5
Idiopathic epilepsy	30	13.2
Central nervous system (CNS) infection*	29	12.7
Disorders of the peripheral nervous system[#]	15	6.6
Injury to the nervous system[$]	13	5.7
Congenital malformation of CNS	11	4.8
Extrapyramidal disorders[!]	6	2.6
Other paralytic disorder[a]	6	2.6
Intracranial tumors	3	1.3
Generalized tetanus	2	0.9
Other disorders	8	3.5

Table-2 shows etiologies of the commonest neurologic morbidities seen at the pediatric neurology clinic of TASH. Etiology was not identified in 66.1% of cerebral palsy cases and in 59.2 % of cases of global developmental delay/Mental retardation. Idiopathic epilepsy accounts for 28.8% of children with seizure disorder seen in the clinic. Neonatal etiologies and congenital etiologies accounted for 14.3% & 19.6 % cases of

cerebral palsy respectively (total of 33.9%). Some of these etiologies like perinatal asphyxia are preventable causes.

Table 2: Etiologies of the commonest neurological disorders at pediatric neurology clinic at Tikur Anbessa Specialized Hospital.

Diseases' Category	Number	Percentage (%)
Cerebral palsy	56	
Unknown etiology	37	66.1
Neonatal etiology	8	14.3
Congenital etiology	11	19.6
Global developmental delay (MR)	49	
Unknown etiology	29	59.2
Neonatal etiology	6	12.2
Congenital etiology	9	18.4
Down syndrome	5	10.2
Seizure disorders	104	
Idiopathic epilepsy	30	28.8
Cerebral palsy	28	26.9
Global developmental delay	24	23.1
Post-CNS infection	13	12.5
Intracranial tumors	2	1.9
Post-traumatic	3	2.9
Others*	4	3.9
Central nervous system (CNS) infection	29	
Pyogenic meningitis	13	44.8
Tuberculous meningitis	2	6.9
Intracranial tuberculoma	9	31.1
Encephalomenigitis	5	17.2

DISCUSSION: Our study demonstrated that cerebral palsy (24.6 %), global developmental delay/mental retardation (21.5%), idiopathic epilepsy (13.2%), and CNS infections (12.7 %) contributed to the majority of morbidities observed in pediatric neurology clinic of TASH, accounting for 72.0 % of all cases (144 of 228).

These childhood neurological disorders like cerebral palsy and global developmental delay/mental retardation need a long-term management and follow up not only with a

pediatrician/pediatric neurologist but also with a team of health professional comprising of speech /language pathologists, occupational therapists, physiotherapists, clinical psychologists, child psychiatrists, ophthalmologists and ENT specialists. To this effect, one needs to have a neuro-rehabilitation unit/ center, which is not the case here in Ethiopia, for proper management and follow up of these children.

In our study, seizure disorders (both idiopathic and secondary) alone or as co-morbidity, were found in 45.6 % of all cases (104 of 228 cases) among which 28.8 % (30 of 104) were idiopathic and 71.2 % (74 of 104) were secondary to other disorders. This shows that nearly half of the children at follow up in our pediatric neurology clinic have seizure disorders. Some of the causes of seizure disorders in these children were preventable causes such as CNS infections, trauma, and perinatal asphyxia.

This was somehow similar to the study done in Eritrea by Z.ogbe et al (11) where the commonest neurologic disorders were epilepsy 25.9%, cerebral palsy 19.3 %, post febrile illness neuro problems 12.5 %, speech and language problems 10.9 % and mental retardation including Down syndrome 10.7 %.

Our finding was also similar to a study done in Port Harcourt, Nigeria by A. I. Frank-Briggs et al (1) where the most frequent pediatric neurological disorders were epilepsy (24.6%), cerebral palsy (15.4%), and central nervous system infections (9.5%), microcephaly (7.6%) and mental retardation (7.2%).

The major difference of our study from the above two studies (1, 11) was that the proportion of patients with seizure disorders and global developmental delay/mental retardation was very high and that of cerebral palsy was relatively higher.

Our study also showed that 66.1% (37 of 56) of cases of cerebral palsy, 59.2 % (29 of 49) of cases of global developmental delay/ mental retardation and 28.8 % (30 of 104) of cases who had seizure disorders were of unknown etiology. In a study done in an outpatient pediatric physiotherapy unit of a Nigerian Tertiary hospital by Omole J.O. et al (12) cerebral palsy accounted for the highest rate (50.3%) of cases referred for physiotherapy among which only 9.5 % (14 of 148) of cerebral palsy cases had unknown cause.

Similarly, the higher proportion of children with global developmental delay/mental retardation and seizure disorders in this study were of unknown etiology as stated above. This shows the lack of diagnostic investigations or detailed history/physical examination or search for causes of common childhood neurological disorders in our setting. In most cases the patients may not afford even for the locally available investigations (PI's observation).

CONCLUSION

Our survey demonstrated the wide spectrum of pediatric neurologic disorders seen in our setting. It has illustrated the challenges in diagnostic investigation of pediatric neurologic patients in resource limited settings like ours. It also generated a research question for further studies to identify possible preventable causes of cerebral palsy, global developmental delay/mental retardation and symptomatic seizures in our setting so as to prevent these long term neurologic disorders which have huge impact on the patient, family and our country in general.

The unique feature of this study is the high prevalence of seizure disorders, global developmental delay/mental retardation and cerebral palsy which calls for further community based large scale studies of these. neurological disorders and public awareness and education about them.

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