



## Analysis of Neurological Diseases Seen in the Pediatric Neurological Outpatient Clinic in the Central Teaching Hospital of Pediatrics. A Tertiary Center from Baghdad, Iraq

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### ABSTRACT:

#### BACKGROUND:

Around 20% of the global disease burden is attributed to neurological disorders. In developing countries, neurological disorders are the leading cause of disability among children. Unfortunately many children with these conditions also face the additional burdens of poverty, ignorance, and inadequate healthcare facilities. Most of the time, these children are not able to receive the proper care and support they need.

#### OBJECTIVE:

To observe the pattern of childhood neurological diseases that are encountered in the neurology outpatient clinics at a tertiary care hospital in Baghdad, Iraq.

#### MATERIALS AND METHODS:

This is a prospective descriptive study carried out in the neurology outpatient clinics of the central teaching hospital of pediatrics over the period from June 2022 to January 2023. The data were collected through a pre-designed questionnaire from hand-written registers maintained by neurology consultants and seniors at the neurology clinics.

#### RESULTS:

There were a total of 4325 children consulted the pediatric neurological outpatient clinic in the central teaching hospital of pediatrics in Baghdad Iraq during the 6 months of the study time, their ages range from 1 day to 14 years. The most common age group was those from 1 to 5 years old about 1641 children (37.94%). Male were more common than female 2474(57.20%) of children. Nearly one-third of the patients consulted the outpatient clinic were complaining of seizure and epilepsy disorders (1537 children). The next most common neurological problem was cerebral palsy in 984 patients (22.75%). Almost 6% of outpatient clinic visitors were suffering from behavior problems.

#### CONCLUSION:

Knowing the spectrum of neurological diseases in neurology outpatient clinic at the tertiary care level will help to understand the neurological demands and supply in our pediatric hospitals, the results put forward that neurological and behavioral disorders are common in pediatrics and vary in range among them. The higher frequency of epilepsy and cerebral palsy suggests that priority should be given to training and anticipatory measures with early diagnosis and proper management.

**KEYWORDS:** pediatric neurological disorders, behavioral problems, epilepsy, neurology outpatient clinic, Iraq.

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### INTRODUCTION:

In developing countries, neurological disorders are the leading cause of disability among children. They typically go through prolonged and severe impairment of quality of life, which often persists into adulthood <sup>(1)</sup>. Many children with these conditions also face the additional burdens

of poverty, ignorance, and inadequate healthcare facilities. Most of the time, these children are not able to receive the proper care and support they need. <sup>(2)</sup> Around 20% of the global disease burden is attributed to these disorders.

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Some of the most common neurological conditions include epilepsy, cerebral palsy, and seizures. Communication disorders for example autistic spectrum disorders<sup>(3,4)</sup>.

In developing countries, children with these conditions often require specialized care that is not available to most kids. This type of care often costs a lot of money and time and can impose a heavy burden on the relatives, the authorities, and society at large.<sup>(5)</sup> Besides the cost of treatment, neurological disorders are also challenging due to their chronicity, overdue presentation, and unavailability of current and modern diagnostic facilities in many of those developing countries<sup>(6)</sup>.

parents of children with chronic illnesses, and parents of children with neurological diseases in particular, have been observed to tend to switch doctors frequently in search of a cure or a solution that ends up being managed by non-specialized personnel or worse by non-medical juggler staff as a result of frustrations with either long management duration or due to progression and worsening of some of these disorders over time despite the treatment and their parents' best efforts. Many of these kids are incapable of taking care of themselves, such as feeding, dressing, and living independently later on when their memory, motor, cognitive, communications abilities, and concentration, can be significantly affected<sup>(2)</sup>. Modern therapeutic approaches and advancements in diagnostic equipment and the utility of recent therapeutic measures have significantly improved final health outcomes in developed countries.<sup>(7)</sup>

### **AIM OF STUDY:**

To observe and evaluate the patterns of neuropsychiatric disorders of the children that are encountered in the neurology outpatient clinics at a tertiary care hospital in Baghdad, Iraq.

### **PATIENTS AND METHODS:**

This is a descriptive prospective outpatient-based study held in the pediatric Neurology outpatient clinic of the central teaching hospital of Pediatrics from June 2022 to January 2023. Baghdad, Iraq. This outpatient clinic receives referrals from other hospital departments such as the general pediatric outpatient clinic, other inpatient departments, as well private and state hospitals, and private clinics. These patients come from areas in Baghdad and surrounding states. In each clinic day, patients number varies from 20 to 45 children per day, 5 days a week from Sunday to Thursday. They are

usually non-emergent cases, but certain cases need to be admitted to an emergency room or neurology ward when indicated, for example; those with uncontrolled epilepsy, lower limbs weakness in Gullein Berre Syndromes or transverse myelitis, suspected meningoencephalitis and cerebrovascular stroke for complete investigations and treatment. All patients who attended the pediatric neurology outpatient clinic at the child central teaching hospital aged from one day of live to 14 years were subjected to detailed medical and neurological history including personal, perinatal, developmental, and family history. Full general examinations with emphasis on general appearance and dysmorphic features, measurement of weight, height, head circumference parameters, vital signs, abnormal posture, cutaneous manifestations, and heart, chest, and abdomen examination. The children were subjected to full neurological examinations including Mental state, Speech, ophthalmological examination, Cranial nerves, Motor system, Coordination, Sensory system, and Gait when applicable by pediatric neurologist. Investigations were done as indicated including basic tests; complete blood test, liver and renal test, and relevant imaging techniques like brain ultrasound, skull, spine, and chest X-Ray. Brain Computed Topography (CT) and Magnetic Resonance Imaging (MRI), Magnetic Resonance Angiography (MRA), Magnetic Resonance Venography (MRV), and Spine Magnetic Resonance Imaging. Electroencephalography (EEG) and nerve conduction study (NCS)/electromyography (EMG). Thyroid function test , celiac screen, parathyroid hormone Serum creatine kinase, according to each case. The consultation time allowed for each patient was approximately 10 – 15 minutes

### **RESULT:**

There were a total of 4325 children consulted the pediatric neurological outpatient clinic in the central teaching hospital of pediatrics in Baghdad Iraq during the 6 months of the study time, their ages range from 1 day to 14 years (the age limit policy of pediatric hospitals in Iraq. The most common age group was those from 1 to 5 years old about 1641 child ( 37.94%) and the least common were the infants (less than one year) 568 babies (13.13% ). Males were more common than females approximately 2474 children (57.20%). vs. 1851 females (42.80%), as shown in table(1)

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**Table 1: Age and gender distribution of the cases visited the neurological outpatient clinic.**

Age (years)	Male		Female		All cases	
	No.	%	No.	%	No.	%
<1 yr.	381	67.08	187	32.92	568	13.13
1 - <5 yrs.	969	59.05	672	40.95	1641	37.94
5 - <10yrs.	786	61.36	495	38.64	1281	29.63
10 - <15yrs.	338	40.48	497	59.52	835	19.29
Total	2474	57.20	1851	42.80	4325	100

Approximately one-third of the patients consulted the outpatient clinic were complaining of seizure, febrile convulsion, and epilepsy disorders (1537 children). The next most common neurological problem was cerebral palsy in 984 patients

(22.75%). headache whether due to migraine, tension headache, pseudotumor cerebri, tumors, or even non-neurological causes like sinusitis was around one-tenth of all cases (479 children). As described in Table (2)

**Table 2: Frequency of neurological conditions visited the neurological outpatient clinic .**

Neurological condition	No.	%
Seizure and epilepsy	1537	35.5
Cerebral palsy	984	22.7
Headache	479	11.1
Mental retardation	274	6.34
Behavioral disorders	253	5.85
Neuromuscular disorders(Duchenne muscle dystrophy ,anterior horn cell dise palsy, facial palsy, sciatic nerve injury )	247	5.71
Central Nervous System infection	216	4.99
Speech delay	135	3.12
Cerebrovascular stroke	94	2.17
Breath holding spell	47	1.08
Neural tube defect and hydrocephalus	34	0.78
Ataxia	17	0.39
Miscellaneous*	8	0.18

\*miscellaneous include congenital anomalies of the central nervous system, dysmorphic features, and syndromes that are diagnosed clinically without genetic proof.

There were 984 cases of cerebral palsy seen over the 6 months periods, the most common cause that could explain their palsy was birth asphyxia in 23.68% of them. Interestingly the majority of these children (36.48%)had no obvious risk factors or had a positive family history of a similar condition

making genetic cause a more reliable explanation but unfortunately lacking these types of genetics test keep them unidentified.

The causes of cerebral palsy and percentages are summarized in Table (3).

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**Table 3 :Etiology of cerebral palsy of children visited the neurological outpatient clinic.**

Etiology	No	%
Birth asphyxia	233	23.68
Prematurity	176	17.89
* Central Nervous System infection	119	12.09
Kernicterus	97	9.86
Unknown	359	36.48
Total	984	100%

\* Central Nervous System infection includes prenatal infection (TORCH), and post-natal (early and late septicemia and meningoencephalitis)

Behavior problems were common among children who visited the neurological clinic { 253 children (5.85%) of all cases} .of these 253 children; 113 children were diagnosed with one autistic spectrum disorder and referred to psychological and behavioral therapy, next to autism was hyperactivity and attention deficit 37.94% of all behavioral problem. As summarized in Table (4)

**Table 4 : Types of behavior disorder and sex distribution.**

Type of behavior disorder	Male		Female		No and % from total behavior disorders	
	no	%	no	%	no	%
Autism	65	57.52	48	42.48	113	44.66
Hyperactivity	54	56.25	42	43.75	96	37.94
Enuresis	21	61.76	13	38.24	34	13.45
Miscellaneous*	4	40	6	60	10	3.95
Total	144	56.92	109	43.08	253	100

\*Miscellaneous include simple and complex Tic, aggressiveness, and stuttering.

### DISCUSSION:

In the current study, there were a total of 4325 children consulted the pediatric neurological outpatient clinic in the central teaching hospital of pediatrics, their ages range from 1 day to 14 years. The most common age group was those from 1 to 5 years old about 1641 children (37.94%). This result was also reflected in a pediatric neurology clinic in Ibadan, Nigeria by I.A. Lagunju and O.O.Okafor<sup>(5)</sup>, and Eritrea a study done by Zemichael Ogbe et al shows that 49.5% of children were between one and five years collectively while infants less than 1-year accounts only for 7% of all outpatient clinic visitors.<sup>(8)</sup> This can be explained by that after the first birthday the child expect to speak, and walk so delay in these gross activity worries the parents and makes them seek medical help. In addition to that, a child at this age is more vulnerable to infection, so fever and febrile

convulsions, and lastly many types of epilepsy onset occurred at this age.

Males were more common than females approximately 2474 children (57.20%). vs 1851 females(42.80%), the numerousness of males in this study agrees with results reported by S.Y. Darwish etal<sup>(9)</sup> in Egypt and K. J. Burton& S. Allen in Gambian<sup>(10)</sup> and Zemichael Ogbe etal<sup>(8)</sup>. This may be assumed by a male child being brought to the hospital more than a female for medical attention in developing countries and some families considered having a girl with neurological disease stigma which is considered as a part of social culture.

Approximately one-third of the patients (35.54%). consulted the outpatient clinic were complaining of seizure, febrile convulsion, or epilepsy disorders (1537 children).

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This is consistent with the findings presented by Samir M, A. et al. <sup>(11)</sup> In Egypt (21.7% of total) additionally Mosser et al. <sup>(12)</sup> in Tanzania noted that epilepsy accounts for (27%) of all neurological cases, significantly burdensome to both physical and mental health. According to Sander<sup>(13)</sup>, epilepsy is the most serious neurological condition in the world. It affects people of all ages and all geographical boundaries. Shora Y. Darwish et al <sup>(9)</sup> another Egyptian study reported that (32.08%) of cases who visited the neuro clinic were epileptic or had other paroxysmal disorders. In Sudan; epilepsies accounted for (47.8%) of the pediatric patient as noted by Mohamed IN et al <sup>(14)</sup>

This high frequency of epilepsy may be explained by increasing consciousness that epilepsy is a medical illness that is remediable and sometimes curable in contrast to the older myth that is a stigma caused by demonic possession. Also, convulsions and the associated cognitive and psychological problems are a burden not just for the patient but also for his family, it will affect his social and academic life.

The second most common neurological problem was cerebral palsy 984 (22.75%) of all patients This finding does not differ significantly from results reported by Shora Y. Darwish et al<sup>(9)</sup> Zemichael Ogbe et al<sup>(8)</sup> Mohamed IN et al <sup>(14)</sup> in Sudan, Izuora GI et al <sup>(15)</sup> in Nigeria; 19.4%,19.3% 19.1%,16.1% respectively

In this study; the common cause that could explain their palsy was birth asphyxia in 23.68% of them. Interestingly the majority of these children (36.48%) had no obvious perinatal risk factors or had a positive family history of a similar condition making genetic issues a more reliable explanation unfortunately lacking of these types of genetics tests in hospitals and very expensive cost in private sector keep them unidentified till the time of study. While kernicterus is a preventable cause of cerebral palsy, unfortunately, it is account for 10% of all cases, delays in seeking medical help in neonatal jaundice, and dependence on herbal and traditional therapies as local belief in rural and suburban areas. These results agree with Kareem AA, Kamel MAS <sup>(16)</sup> in Iraq who state that the most frequently encountered factors for cerebral palsy were preterm, asphyxia, neonatal jaundice, and consanguinity.

This high rate ensures the fact that many of the neurological disorders could be traced to either poor perinatal facilities in some areas (home labor) leading to perinatal asphyxia or on the contrary

increasing the survival rate of the preterm babies after intubation and surfactant therapy.

Headache whether due to migraine, tension headache, pseudotumor cerebri, tumors, or even nonneurological causes like sinusitis was around one-tenth of all cases (479 children). In Shora Y. Darwish et al <sup>(9)</sup> Headaches accounted for 40 cases (7.46 %) of neurological disorders.

Mental retardation account for 6.34% of children (274 children) related to trisomy 21, congenital hypothyroidism chromosomal, and other without obvious reason (presumed genetic) a result similar to that noted by Izuora GI<sup>(15)</sup>. This was 7.3% of pediatric neuroclinic visitors.

Behavior problems were common among children who visited the neurological clinic {253 children (5.85%) of all cases} .of these 253 children; 113 children were diagnosed with one autistic spectrum disorder and referred to psychological and behavioral therapy, next to autism was hyperactivity and attention deficit 37.94% of all behavioral problem. this is less than those reported by Samir M <sup>(11)</sup> 17.3% this can be explained that these cases are usually treated by pediatric psychologists.

### Limitations of study:

Till the time of this study, there are many crucial investigations in the diagnosis of pediatric neurological and neurometabolic disorders not available so some cases remained without a conclusive final diagnosis.

### CONCLUSIONS & RECOMMENDATION:

Epilepsies, cerebral palsy, headaches, mental retardation, and behavioral problems most common conditions encountered in an outpatient pediatric neurology clinic, and hence the most likely to yield the highest returns for investment in neurology and rehabilitative medicine, to ensure the ideal quality of healthcare provided to our children.

### REFERENCES:

1. Akpalu A, Adjei P, Nkromah K, Poku FO, Sarfo FS. Neurological disorders encountered at an out-patient clinic in Ghana's largest medical center: A 16-year review. *eNeurologicalSci* [Internet]. 2021;24:100361. Available from: <https://doi.org/10.1016/j.ensci.2021.100361>
2. MD AC. Neurology in Developing Countries. *Neurology*. 1992;42:2060–60.
3. Mung'ala-Odera V, Meehan R, Njuguna P, Mturi N, Alcock KJ, Newton CRJC. Prevalence and risk factors of neurological disability and impairment in children living in rural Kenya. *Int J Epidemiol*. 2006;35:683–88.

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4. Obi JO, Sykes RM. Neurological diseases as seen at the outpatient pediatric neurology clinic in Benin City. *Ann Trop Paediatr.* 1984;4:217–20.
5. Lagunju IA, Okafor OO. An analysis of disorders seen at the Paediatric Neurology Clinic, University College Hospital, Ibadan, Nigeria. *West Afr J Med.* 2009;28:38–42.
6. Frank-Briggs AI, Alikor EA. The pattern of Paediatric Neurological Disorders in. *Int J Biomed Sci.* 2011;7:145–49.
7. Mathers CD, Lopez AD, Murray CJL. The Burden of Disease and Mortality by Condition: Data, Methods, and Results for 2001. In *Global Burden of Disease and Risk Factors*, eds. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJL. New York: Oxford University Press. 2006; 45-240.
8. Ogbe Z, Nyarang'o P, Mufunda J. Pattern of neurological diseases as seen in outpatient children: the experiences from Orotta Referral Hospital Asmara, Eritrea. *J Eritrean Med Assoc.* 2010;1:11–15.
9. Shora Y, Darwish, Morsy A, Ammar, Hassan K, Gad, Hussein A, El-Gharieb, Mohie El –Din T, Mohamed, Ahmed M. El-metwaly Pattern of Paediatric Neurological Disorders in Paediatric Neurology Unit of AL-Azhar University Hospitals in Egypt. *Nat Sci* 2015;13:139-44. (ISSN: 1545-0740). <http://www.sciencepub.net/nature>.
10. Burton KJ, Allen S. A review of neurological disorders presenting at a pediatric neurology clinic and response to anticonvulsant therapy in Gambian children. *Ann Trop Paediatr.* 2003;23:139–43.
11. Samir M, Abomayla H, Elkeiy MT, Al-aziz OA. Retrospective Outcome of Pediatric Neurology Outpatient Clinic In Bab Al-sharyea University Hospital By Pediatric neurological disorders in developing countries very challenging . This is due to its chronicity , late presentation, and of that the general a.
12. Mosser P, Schmutzhard E, Winkler A, et al, (2007): The pattern of epileptic seizures in rural Tanzania. *J NeurolSci.* 2007; 258:33-38. Epub Apr .
13. Sander J,: The epidemiology of epilepsy revisited, *Curr Opin Neurol*, 2003;16: 165-70.
14. Mohamed IN, Elseed MA, Hamed AA. Clinical Profile of Pediatric Neurological Disorders. *Child Neurol Open.* 2016;3(JANUARY):2329048X1562354
15. Izuora GI, Iloeje SO. A review of neurological disorders seen at the Paediatric Neurology Clinic of the University of Nigeria Teaching Hospital, Enugu. *Ann Trop Paediatr.* 1989;9:185–90.
16. Kareem AA, Kamel MAS. Risk factors and clinical profiles in Iraqi children with cerebral palsy. *New Iraqi J Med.* 2009;5:64–68.