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### INTER-DEPARTMENTAL REFERRAL PATTERN FOR CHILDREN WITH NEUROLOGICAL COMPLAINTS IN A TERTIARY CARE CHILDREN'S HOSPITAL IN BANGLADESH

Dr. Shaoli Sarker<sup>1</sup>, Dr. A. Z. M. Azam<sup>2</sup>

1. Assistant Professor, Department of Pediatric Neurosciences, Bangladesh Shishu Hospital and Institute, Dhaka, Bangladesh

2. Associate Professor, Department of Pediatric Neurosciences Bangladesh Shishu Hospital and Institute, Dhaka, Bangladesh

#### ARTICLE INFO

#### ABSTRACT

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**Background:** An inter-department referral system is indeed a modern approach to rehabilitation for interdisciplinary and multidisciplinary patient management of chronic and complex cases. Several departments might have child patients who need certain specialist care on neurological disorders who are referred by specialists of other disciplines to the pediatrics neurology department for specified diagnosis & proper management since they excel in such cases. **Objective:** In this study, our main goal is to evaluate the inter-departmental referral pattern for children with neurological complaints in a Tertiary Care Children's Hospital. **Methods:** This retrospective study was done over a period from May 2021 to October 2021. Where 1070 children with neurological problems who attended the specialized care unit referral visits were included as a sample size. The data recorded in a register included the following; patients' age, sex, past medical history with an emphasis on the history of pregnancy and delivery, a general clinical evaluation, thorough neurological evaluation. The data also included the provisional diagnosis, the treatment given, and the advice and the referral information. **Results:** During the study, the majority belonged to 1month to 12 months, 29.90%. Followed by 22.90% belonging to 7 to 10 years, 16.73% belonging to 1 to 2 years, 14.20% belonging to 0-28 days, and 12.05% belonging to 3 to 6 years. 69.81% were male, and where the majority were coming from rural, 63.08%. Most had Epilepsy 24.3%, followed by Cerebral palsy with comorbidity in 19.16%, Meningoencephalitis with complications in 17.29%, Neonates with seizures in 11.77%, 25% of children admitted to PICU, NICU, and CCND. The reason for referral were intractable seizures, acute stroke, and metabolic derangements. Most patients at the Adolescent unit are visited with complaints of epilepsy with poor seizure control, somatic symptom disorder, and malingering. 10% received mechanical ventilation. **Conclusion:** This study showed the number of children that are getting

**Corresponding Author**  
\*Dr. Shaoli Sarker

admitted with neurological and neurodevelopmental disorders in a tertiary care children's hospital is significant, where epilepsy cases were most common. The interdisciplinary referral system plays an important role in the appropriate holistic management and opens up the opportunity for further follow-up at the pediatrics neuroscience department which further results in better compliance and outcome.

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## INTRODUCTION

Globally neurologic disorders represent a major burden of disease. Patients in the hospital can develop complaints unrelated to the condition they are admitted for. There are seven different models of team-oriented modern health care medical management: parallel, constructive, collaborative, coordinated, interdisciplinary, multidisciplinary, and integrative. <sup>[1]</sup> In neurology inpatients and outpatients, a significant proportion of psychiatric illnesses have been reported. A large number of children, ranging in age from newborn to 18 years old, have been recorded in neurology outpatient and inpatient settings. <sup>[2]</sup> A pediatric neurologist treats children of all ages with comprehensive neurologic treatment age ranging from newborns to age 18 yrs.<sup>2</sup> With a particular emphasis on follow-up treatment. The discipline of child neurology incorporates diseases and disorders of the peripheral nervous system, autonomic nervous system, muscles, spinal cord, brain, and blood vessels that affect individuals in these age groups. A pediatric neurologist has the specialized training and knowledge to assess, diagnose, and treat the child if a child has problems that involve the nervous system. In a tertiary specialized hospital, the pediatric neuroscience department deals with the diagnosis and management of neurological conditions in neonates (newborns), infants, children, and adolescents referred to a specialized branch of medicine. The spectrum of disease ranges from non-communicable disorders like stroke and neurodegenerative disorders to central nervous system infections., Especially in developing countries, the burden of neurological diseases may be on the increase.

<sup>[7-9]</sup> Improved outcomes in these settings may require an appreciation of the spectrum of neurological diseases and the impediments to their management. Recent studies have reported a high disease burden of neurological diseases among children. There appear to be different patterns of neurological diseases in different settings. The commonest disorders are epilepsy, cerebral palsy, post febrile seizures, and auditory and communication disorders. <sup>[7-9]</sup> In this study, our main goal is to evaluate the interdepartmental referral pattern for children with neurological complaints in a tertiary care children's hospital.

## OBJECTIVE

To assess the interdepartmental referral pattern for children with neurological complaints in a Tertiary Care Children's Hospital.

## METHODOLOGY

This was a retrospective study conducted in the department of Paediatric Neurosciences, Bangladesh Shishu Hospital and Institute, Dhaka, Bangladesh over a period from May 2021 to October 2021. 1070 children with neurological problems who were seen at the specialized care unit referral visits were included in the study as the study population. The data were recorded in a register that included the following: patient's age, gender, and past medical history with an emphasis on the history of pregnancy and delivery. For all the participants, a thorough evaluation was done including general examination, neurological examination, and developmental assessment. After that, a provisional diagnosis was made followed by advice for further investigation, medical management advice, and advice

regarding psychological evaluation, psychosocial counseling, physiotherapy, etc. were provided according to the diagnosis of the particular child. Data were entered in an MS excel sheet and analyzed by using SPSS software trial version 21. Qualitative data were represented as proportions/percentages and quantitative data was represented as Means & standard deviations.

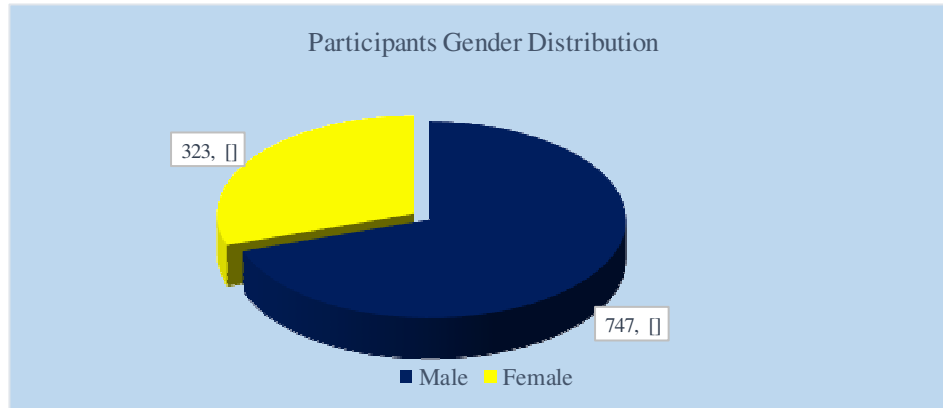
## RESULTS

In table-1 showed the age distribution of the patients where the majority belonged from 1month to 12 months, 29.90%. Followed by 22.90% belonging to 7 to 10 years, 16.73% belonging to 1 to 2 years, 14.20% belonging to 0-28 days, and 12.05% belonging to 3 to 6 years. The following table is given below in detail:

**Table-1:** Age distribution of the patients (N=1070)

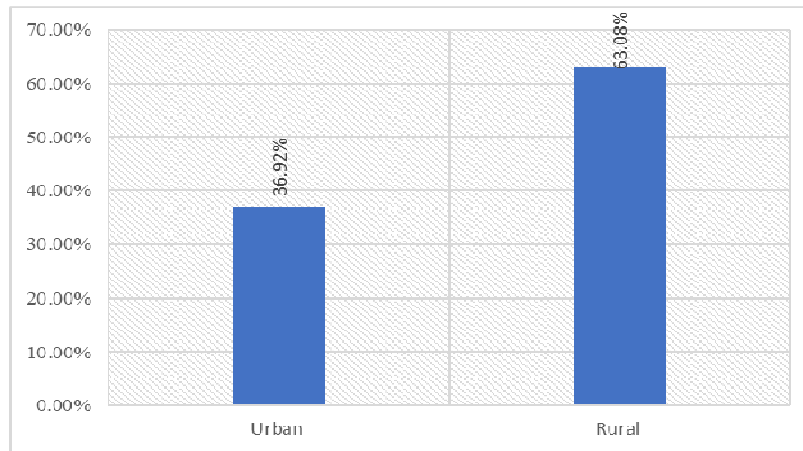
Age group	Frequency (n)	Percentage (%)
0-28 days	152	14.20%
1 to 12 months	320	29.90%
1 to 2 years	179	16.73%
3 to 6 years	129	12.05%
7 to 10 years	245	22.90%
10 to 14 years	45	4.22%

In figure-I showed gender distribution where the majority were male, 69.81%. The following figure is given below in detail:



**Figure-I:** Gender distribution

In figure-II showed the distribution of the patients according to the residential area where the majority were coming from rural, 63.08%. The following figure is given below in detail:



**Figure-II:** Distribution of the patients according to a residential area

In table-2 showed the distribution of the patients according to diagnosis status where most had Epilepsy at 24.3%, followed by Cerebral palsy with comorbidity at 19.16%,

Meningoencephalitis with complications at 17.29%, Neonates with a seizure at 11.77%, The following table is given below in detail:

**Table-2:** Distribution of the patients according to diagnosis status (N=1070)

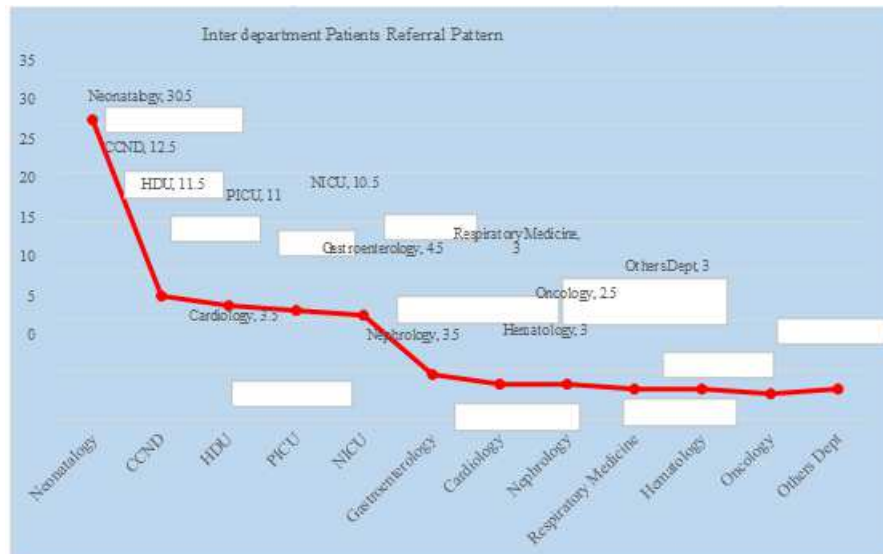
Diagnostic status	Frequency (n)	Percentage (%)
Epilepsy	260	24.3
Cerebral palsy with comorbidity	205	19.16
Meningoencephalitis with complications	185	17.29
Neonates with seizure	126	11.77
Acute stroke syndrome	90	8.41
Suspected neurometabolic disorder	58	5.42
GBS	30	2.8
Muscular dystrophy	28	2.62
Syndromic child	24	2.24
Myopathy	15	1.4
Autism spectrum disorder with comorbidities	10	0.93
Somatic symptom disorder	35	3.27
Malingering	4	0.39

In table-3 showed out of a total of 1070 patients, the highest 326(30.5%) patients were referred to the Neonatology department followed by the CCND department 134(12.5%), HDU department 128(12.0%), PICU department 123(11.5%), NICU department 112(10.5%), Gastroenterology department 48(4.5%),

cardiology department 37(3.5%), Nephrology department 37(3.5%), Respiratory department 32(3.0%), Hematology department 32(3.0%), Oncology department 28(2.5%) and rest 33(3.0%) in others respected department as per patient's needs. The following table is given below in detail:

**Table-3:** Inter-department wise referred patients (N=1070)

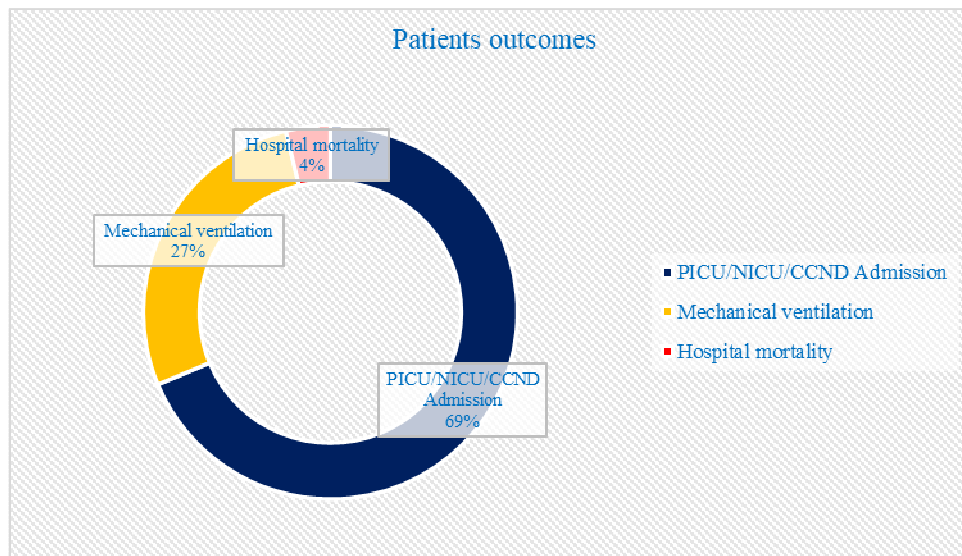
Department	Frequency (n)	Percentage (%)
Neonatology	326	30.5
CCND	134	12.5
HDU	128	12.0
PICU	123	11.5
NICU	112	10.5
Gastroenterology	48	4.5
Cardiology	37	3.5
Nephrology	37	3.5
Respiratory Medicine	32	3.0
Hematology	32	3.0
Oncology	28	2.5
Others departments	33	3.0

**Figure-III:** Inter-department Patients Referral Patterns (N=1070)

In table-4 showed the hospital admission status of the children where 25% of children were admitted to PICU, NICU, and CCND. The reason for referral were intractable seizures, acute stroke, and metabolic derangements. Most patients at the Adolescent unit are visited with complaints of epilepsy with poor seizure control, somatic symptom disorder, and malingering. 10% received mechanical ventilation. The following table is given below in detail:

**Table-4:** Patients outcomes

Patients' outcomes	Percentage (%)
PICU/ NICU/CCND admission	25%
Mechanical ventilation	10%
Hospital mortality	2%



**Figure-III: Patients Outcomes**

## DISCUSSION

Out of a total of 1070 patients, the highest 326(30.5%) patients were referred to the Neonatology department followed by the CCND department 134(12.5%), HDU department 128(12.0%), PICU department 123(11.5%), NICU department 112(10.5%), Gastroenterology department 48(4.5%), cardiology department 37(3.5%), Nephrology department 37(3.5%), Respiratory department 32(3.0%), Hematology department 32(3.0%), Oncology department 28(2.5%) and rest 33(3.0%) in others respected department as per patient's needs. In this study, epilepsy was the most common neurological problem with a predominance of males which is consistent with the findings in a previous study.<sup>[10]</sup> Besides epilepsy, cerebral palsy with comorbidity in 19.16%, Meningoencephalitis with complications in 17.29%, and neonates with seizures in 11.77%. In addition, in another study, the proportions of the types of epilepsy with grand mail being the most common type of seizures were similar to the findings from the Nigerian study and also to the observations made in Ethiopia and Uganda.<sup>[11-13]</sup> Another report suggested that the partial seizures remain unnoticed and the patients sought medical

attention when they had secondarily evolved into a generalized tonic-clonic seizure and this is especially true in the absence of EEG investigation.<sup>[14]</sup> A relatively high prevalence of drop attacks was found among epileptic cases in our study which was one point of departure from the findings in the other studies.<sup>[15]</sup> Another study reported that children with neurological diagnoses made up a fourth (25.8%, N=31,530) of ICU admissions. Children with neurological diagnoses had a longer median hospital LOS than others which was quite similar to our study where 25% of children were admitted to PICU, NICU, and CCND.<sup>[16]</sup> A modern effective model of patient management should be by a multidisciplinary and interdisciplinary approach which is required inter-departmental referral. The reason for referral were intractable seizures, acute stroke, and metabolic derangements. Most patients at the adolescent unit are visited with complaints of epilepsy with poor seizure control, somatic symptom disorder, and malingering. 10% received mechanical ventilation.

## CONCLUSION

The number of pediatric patients getting admitted with neurological and neurodevelopmental disorders in a tertiary care

children's hospital is significant. The interdisciplinary referral system plays an important role in the appropriate holistic management. For the better management of neurological patients, if an interdisciplinary multidisciplinary approach is provided effectively, it opens up the opportunity for further follow-up at the pediatrics neuroscience department which results in better compliance and outcome.

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