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Research Article

**A RETROSPECTIVE ANALYSIS OF THE HOSPITALIZED  
CHILDREN (AGE > ONE MONTH) DIAGNOSED WITH  
NEUROLOGICAL DISORDERS WITH REPEATED INCIDENCE  
OF CNS INFECTION**<sup>1</sup>Dr. Nasira Nuzhat, <sup>2</sup>Dr. Ayesha Saleem, <sup>2</sup>Dr. Maryam Liaqat<sup>1</sup>DHQ Hospital Narowal<sup>2</sup>Services Hospital Lahore**Abstract:**

**Objectives:** Research was aimed at the observation of the presentation of all the neurological patients who were hospitalized in the pediatrics general ward, we also reviewed the outcomes in the research including treatment complications and investigations.

**Methodology:** Our research was by design patient's retrospective analysis who were hospitalized in the duration of Sep, 2016 to Sep, 2017 at Allied Hospital, Faisalabad (Pediatrics general ward). We included all the cases with neurological issues and above one-month age; whereas, neonates and metabolic fits cases were excluded from the research.

**Results:** The cases of neurological illness were admitted in considerable proportion in the general pediatrics ward 67 / 687 (8.9%). CNS infection was the most common neurological problems which was observed in 42 / 67 cases (62.5%). Related reason behind the hospitalization were complicated cerebral palsy observed in 7 / 67 cases (10.4%), epilepsy in 7 / 67 cases (10.4%), febrile fit in 5 / 67 cases (7.5%) etc. Fever was most common sign which was observed without the incidence of seizures in 59 cases (87.9%). Every patient who was suspected by CNS infection was managed through antibiotics. Intravenous quinine was managed in the cerebral malaria patients.

**Conclusion:** Children with neurological issues were under five years of age that makes an important cause of the hospitalization with frequently observed infection. Nervous system bacterial infections were more common than protozoal or viral infections. Our outcomes will assist in the expert planning for the emergency management in the hospitals and concerned wards by the duty physicians.

**Key Words:** Childhood, Children, Meningitis, Encephalitis, Tuberculous meningitis, Cerebral malaria, Neurological deficits and Neurological complications.

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**INTRODUCTION:**

A serious illness issue is formed by the neurological problems in children causing increased mortality and morbidity and sequelae. A CNS infection which includes encephalitis, meningitis and cerebral malaria are among the repeated reasons of the hospitalization in pediatric general ward. An in-time diagnosis and rapid management of the infection helps the overall treatment process which can be helpful in the reduction of death toll. It is important to comprehend the neurological diseases pattern and distribution of the demographics that can be helpful in the emergency management planning of the disease treatment.

Bacterial meningitis is attributed to three organisms including H Influenzae, Strep Pneumoniae and N. Meningitidis risky for the children above five years of age [1, 2]. Most repeated cause among the meningitis is H Influenza back in eighties in USA.

There is a considerable decrease in the infection incidence through regular immunization with the conjugate of HiB vaccinations [3]. There is still a chance of the disease occurrence in Pakistan because of the non-availability of vaccination. Sequelae can be developed in the fifty percent of the acute bacterial meningitis survivors [4].

Numerous viruses may attribute to the incidence of encephalitis. Outcomes and severity of the encephalitis is dependent on various factors basically an undue virulence of an undue and organism host susceptibility [5]. In large scale research conducted in Finland about the viral PCR on three thousand samples of CSF (Varicella Zoster Virus) was observed as common Encephalitis cause in twenty-nine percent of the patients [5].

Another serious complications of falciparum malaria are cerebral malaria. It is referred to an unarousable coma (GCS under 7) in positive smear of patient's blood. Sequelae incidence may be referred after the cerebral malaria that ranges to ten percent [6]. Cerebral malaria is traditionally treated with Quinine [7].

One of the other grace infection of the nervous system is tuberculous meningitis which can be diagnosed through six factors including five days history, total CSF white cell count (< 1000 / cmm), headache, lymphocyte proportion above 30% and content of protein (above 100 mg) [8].

We can define the febrile seizure as a triggered convulsion which is initiated by fever in the absence of CNS pathology which is found in children in the age which ranges from six months to five years with a febrile convulsion in the family history.

Research was aimed at the observation of the presentation of all the neurological patients who were hospitalized in the pediatrics general ward, we also reviewed the outcomes in the research including treatment complications and investigations.

**METHODOLOGY:**

Our research was by design patient's retrospective analysis who were hospitalized in the duration of Sep, 2016 to Sep, 2017 at Allied Hospital, Faisalabad (Pediatrics general ward). We included all the cases with neurological issues and above one-month age; whereas, neonates and metabolic fits cases were excluded from the research. The age was limited from one month to twelve years. We divided the children with respect to their age such as young infant, infants respectively having their ages as (1 – 2 months) & (two months to one year), with another two groups as 1 – 5 and above 5 years. We documented sex, age, symptoms, treatment and outcomes. We also compared total hospitalized cases to the neurological disorders cases.

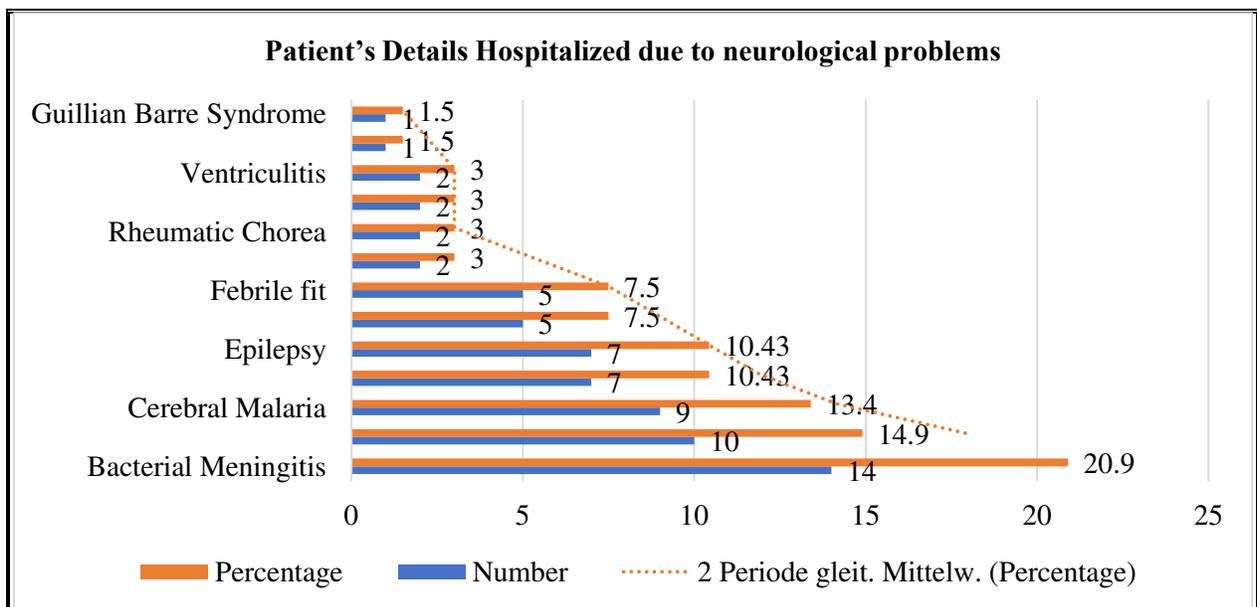
**RESULTS:**

The cases of neurological illness were admitted in considerable proportion in the general pediatrics ward 67 / 687 (8.9%). CNS infection was the most common neurological problems which was observed in 42 / 67 cases (62.5%). Related reason behind the hospitalization were complicated cerebral palsy observed in 7 / 67 cases (10.4%), epilepsy in 7 / 67 cases (10.4%), febrile fit in 5 / 67 cases (7.5%) etc. Fever was most common sign which was observed without the incidence of seizures in 59 cases (87.9%). Every patients who was suspected by CNS infection was managed through antibiotics. Intravenous quinine was managed in the cerebral malaria patients. Males were dominant in number as (61%) population was male remaining were females (39%), 61 cases were in the age limit of 1 – 5 years (48%). Below five years age cases were 54 / 67 (81%).

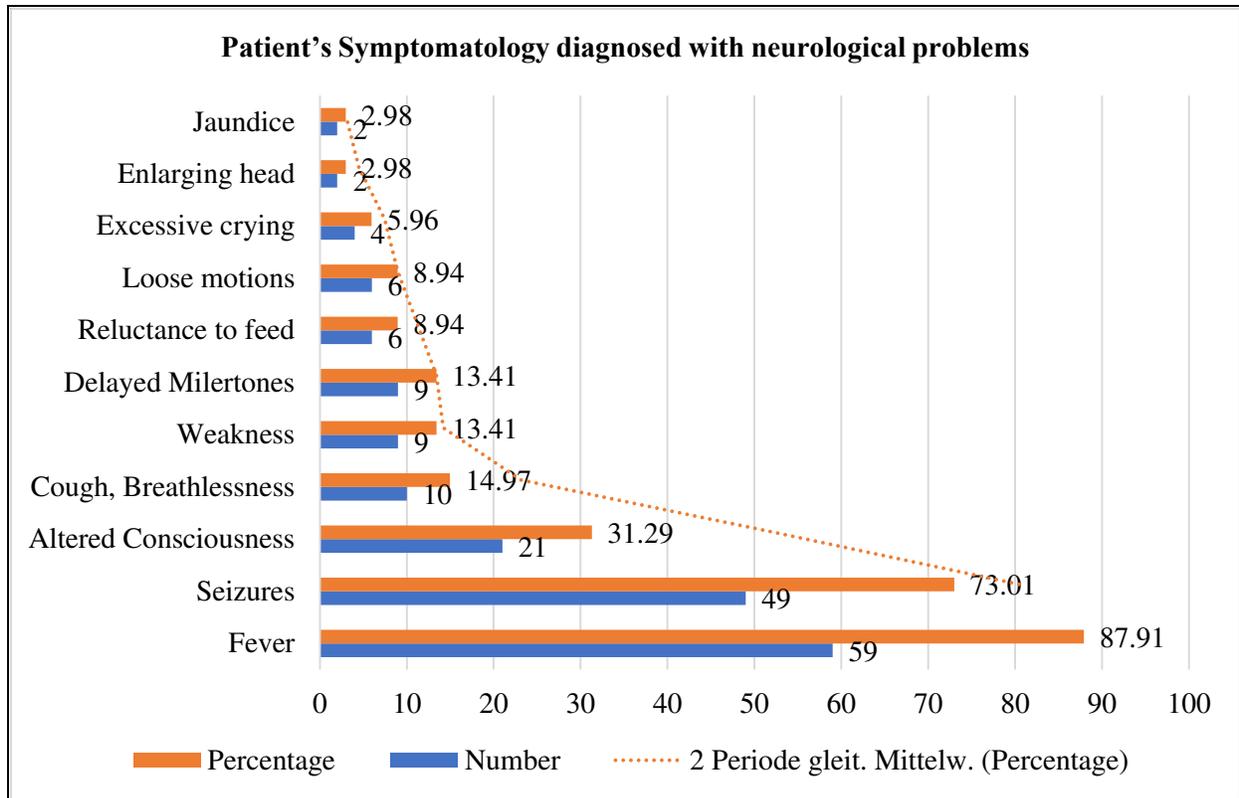
Tables I, II, III & IV respectively show detailed outcomes of the research about "Patient's Details Hospitalized due to neurological problems", "Patient's Symptomatology diagnosed with neurological problems", "Patient's Symptoms diagnosed with neurological problems" and "CNS infected cases with neurological complications".

**Table – I: Patient's Details Hospitalized due to neurological problems (67)**

Case	Number	Percentage
Bacterial Meningitis	14	20.9
Encephalitis	10	14.9
Cerebral Malaria	9	13.4
Cerebral Palsy with complication	7	10.43
Epilepsy	7	10.43
Tuberculous meningitis	5	7.5
Febrile fit	5	7.5
Brain Abscess	2	3
Rheumatic Chorea	2	3
Hepatic encephalopathy	2	3
Ventriculitis	2	3
Muscular dystrophy	1	1.5
Guillain Barre Syndrome	1	1.5

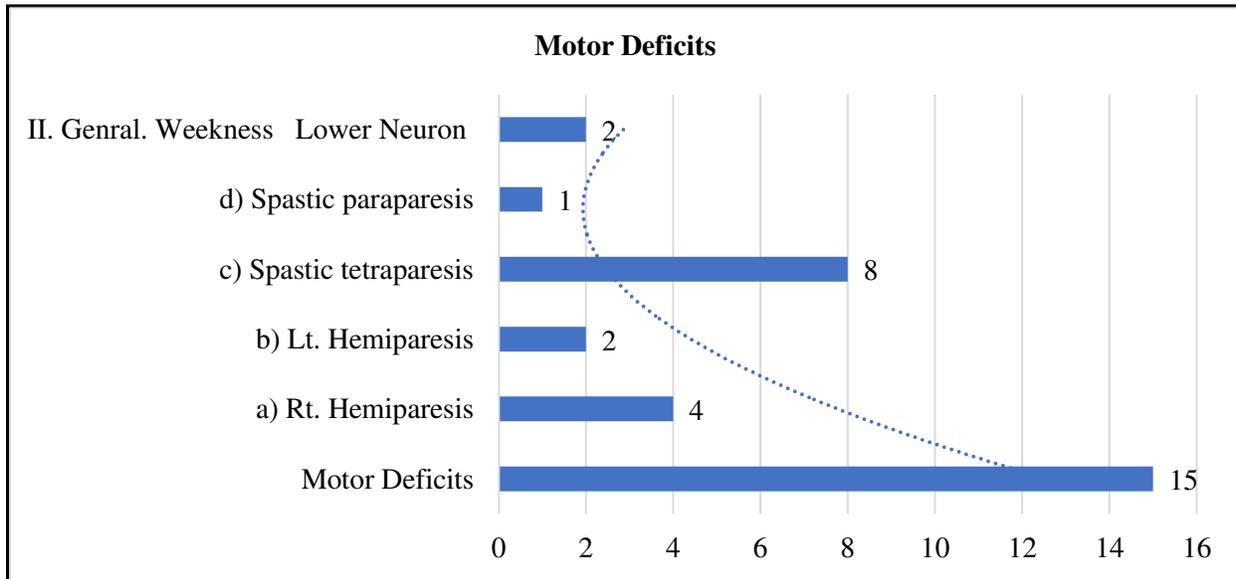
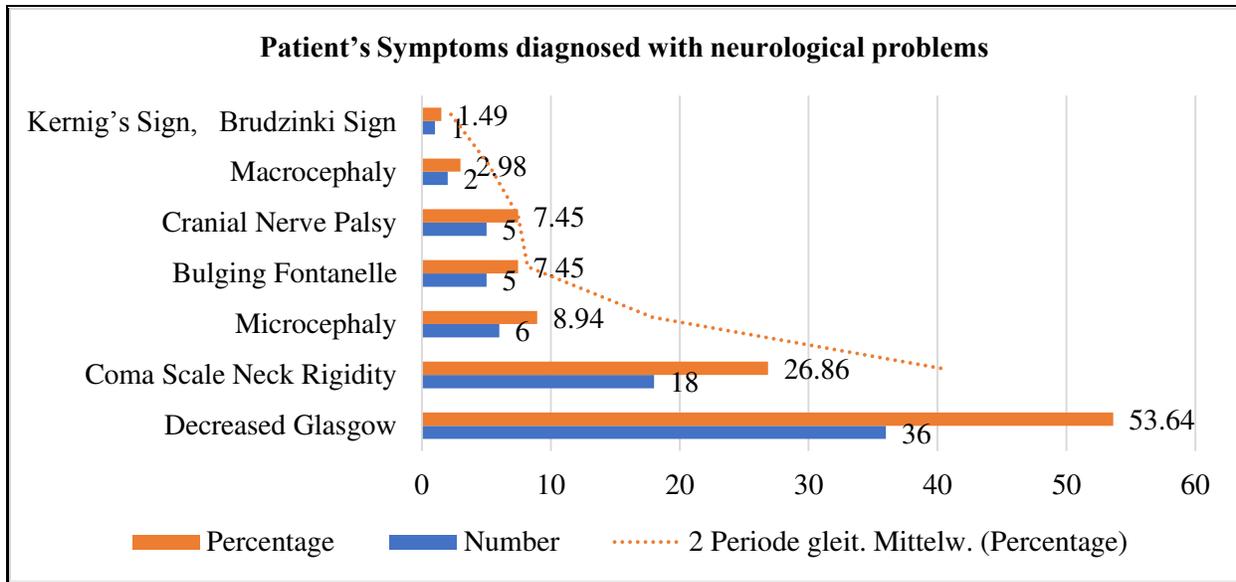
**Table – II: Patient's Symptomatology diagnosed with neurological problems**

Symptom	Number	Percentage
Fever	59	87.91
Seizures	49	73.01
Altered Consciousness	21	31.29
Cough, Breathlessness	10	14.97
Weakness	9	13.41
Delayed Milestones	9	13.41
Reluctance to feed	6	8.94
Loose motions	6	8.94
Excessive crying	4	5.96
Enlarging head	2	2.98
Jaundice	2	2.98



**Table – III:** Patient's Symptoms diagnosed with neurological problems

Signs	Number	Percentage
Decreased Glasgow	36	53.64
Coma Scale Neck Rigidity	18	26.86
Motor Deficits	15	19.4
a) Rt. Hemiparesis	4	-
b) Lt. Hemiparesis	2	-
c) Spastic tetra paresis	8	-
d) Spastic paraparesis	1	-
II. General. Weakness Lower Neuron	2	-
Microcephaly	6	8.94
Bulging Fontanelle	5	7.45
Cranial Nerve Palsy	5	7.45
Macrocephaly	2	2.98
Kernig's Sign, Brudzinski Sign	1	1.49



**Table – IV:** CNS infected cases with neurological complications

Neurological Sequelae	Bacterial Meningitis	Encephalitis Malaria	Cerebral Meningitis	Tuberculous Abscess	Brain	Total
<b>Motor Deficit</b>	1	2	-	3	2	8
<b>Cranial Nerve Palsy</b>	1	1	1	1	1	5
<b>Seizures</b>	1	2	-	2	-	5
<b>Hydrocephalus</b>	2	-	-	3	-	5
<b>Speech Loss</b>	2	-	-	-	-	2
<b>Cortical Atrophy</b>	1	-	-	-	-	1

Initial treatment to the CNS infected cases was empiric intravenous (IV) antibiotics specifically in the febrile fits cases. A combined medical intervention of chloramphenicol and ampicillin was also given to the patients. In the serious cases while admission the ceftriaxone was treated with related medicines such as meropenem and ceftazidime. Ten days course of antibiotics was completed in the patients of meningitis. In two instances we also treated patients with acyclovir; first in the confirmation of herpes simplex encephalitis and it was continued for three weeks. Intravenous quinine was given to cerebral malaria patients for ten days. Outcomes were welcoming by the patients. We treated the TBM cases with anti-TB medicines for one complete year.

### DISCUSSION:

Outcomes of our research show that infection of CNS is observed commonly in the cases diagnosed with neurological issues hospitalized in the pediatric general ward. CNS infections which includes encephalitis, meningitis and cerebral malaria are among the repeated reasons of the hospitalization in pediatric general ward. It has been learnt through literature review that CNS infection is caused because of related viral infections as few of the viral infections are missed or they are mild. Majority of the cases were in the age bracket of one month to five years. According to Perez & Dickinson bacterial meningitis in infants is high in the same age as stated in our research [9].

Fever, change of mental state and neck stiffness was seen under fifty percent of the adults diagnosed with meningitis [10]. Brudzinski and Kernig's reported bacterial meningitis in five percent of the adult population [11]. Children frequently present these symptoms. We observed the rigidity of the neck in 8 / 14 cases (57%) who were diagnosed with an acute bacterial meningitis; whereas, Brudzinski & Kernig's symptoms were observed in one case.

Untreated bacterial meningitis was seen in 80 – 90 percent cases having +ve gram stain [12]. We found 25% CSF cases of positive gram stain because of non-judicious antibiotics management which is also true for the yielding of low CSF culture; it also reduces with the antibiotic treatment [13]. Future assistance can be extended through even sensitive methods including amplified (16 S rRNA) by polymerase chain reaction which may also diagnose the cases already treated with antibiotics [14].

Firstly, we treated the children with bacterial meningitis with chloramphenicol and ampicillin.

However, as per the recent empiric meningitis therapy recommendations beyond neonatal period is Vancomycin with an addition of 3<sup>rd</sup> generation cephalosporin [15].

Our outcomes about the sequelae followed by Cerebral malaria are same as already reported as ten percent. Long-term cognitive issues are focused following cerebral malaria in the recent research works. According to Boivin cognitive issues were observed in twenty-one percent children for a period of six months [16]. The cognitive issues include memory function impairment and loss of attention in the children who had been in come for longer period and before admission experienced seizures. Long-term follow-up is also suggested for our children. Malaria vaccines are also developed [17].

Five to seven cases also had birth asphyxia history which was more than the outcome of other international research works such as (3% – 21%) [18]. Which clearly demands for the improved and better services in the field of obstetrics.

### CONCLUSIONS:

Children with neurological issues were under five years of age that makes an important cause of the hospitalization with frequently observed infection. Nervous system bacterial infections were more common than protozoal or viral infections. Motor deficit cases are normally observed with neurological deficits in the infection of CNS. Our outcomes will assist in the expert planning for the emergency management in the hospitals and concerned wards by the duty physicians.

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