



## Study Of Undernourishment In Children With Cerebral Palsy In Dr.D.Y.Patil Medical College,Pune

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### ABSTRACT

**Background:** Neuro Developmental Delay (NDD) is a complicated condition as the condition keeps on changing with respect to the following characteristics like age of the patients, his/her gender, their socioeconomic status, cultural background, the geographical area that they live in and the person's health condition. The main objective of this study is to assess the nutritional status of children with Cerebral Palsy.

**Material methods:** A cross sectional study done at Dr. D.Y. Patil Medical College, Hospital and Research Centre, Pune among the children admitted in the paediatric ward between the age group of 6-24 months with a sample size of 34.

**Results:** Of 34 children with Cerebral Palsy, HIE was diagnosed in 61.8% (n=21), NHBI was found in 20.6% (n=7). Kernicterus in 17.6% (n=6)

**Exclusion Criteria: Exclusion Criteria:** 1.Small for Gestational Age babies, 2.Inborn errors of metabolism, 3.Those with immunocompromised status 4.Those with bulbar/pseudobulbar palsy, 5.Those with associated defects (CHD, NTD) .

**Conclusion:** Malnutrition has an adverse effect on the patient's physical and mental health. Children suffering from NDD have different energy requirements which need to be met with. MUAC findings correlate with wasting and should also be used as a tool to identify and monitor children with severe malnutrition.

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## **INTRODUCTION:**

The occurrence of undernourishment of children in neurologically affected ones is tough to estimate, as these Neuro developmental delay (NDD) is divergent. NDD is a complicated condition as the condition keeps on changing with respect to the following characteristics like age of the patients, his/her gender, their cultural background, socio economic level, the geographical location they live in and the person's health condition (1). The link between various environmental elements in one's environment determines the degree of impairment for every given person. (2). Long term diseases have a powerful impact on a person's dietary status. For patients who are neurologically impaired (NI), undernourishment affects the person's way of life adversely and is allied as they are more under medical care and are unable to participate in various activities (3). Once there is an improvement in the nutritional condition, there will be an improved health, an improvement in peripheral circulation, healing of sores, decreased in muscle tonicity, decreased peevishness with an abatement in gastroesophageal reflux in patients with neurodevelopmental disorders (4). It has been documented that a large percentage of children suffering with neurodevelopmental disabilities are malnourished (5) (6) (7) (8). There are not many studies found in this set up that have documented results on the nutritional status of children with neurodevelopmental disorder. Most of the studies, exploring children's nutrition in neurodevelopmental, has been dedicated to cerebral palsy patients who suffer from malnutrition in 50% - 90% of the cases (9,10,12). This study's main objective was to assess nutritional status and variables associated with undernourishment in children with neuro-disorders between the ages of 6 months and 2 years. This research is intended to increase interest in the nutritional status of kids with neurodevelopmental disorders.

## **MATERIAL AND METHODS:**

This was a cross sectional study conducted in Paediatric department in a tertiary care centre in Western part of India, with a sample size of 34 patients during May 2022 to October 2022 of age group 6 months to 24 months. The evaluation of patients was done who are admitted in the paediatric ward after taking informed written consent from the parents. All the patients were studied carefully and a detailed history, and examination was done for every patient as per attached proforma.

In this study we are determining malnourishment in the children with Cerebral palsy, so a detailed antenatal, natal and post-natal history was taken and then detailed developmental history was taken to label the developmental delay followed by complete anthropometrical, general and systemic examination to document malnutrition.

On anthropometric analysis we have taken the **accurate weight** measured using digital weighing scale, **recumbent length** is measured using portable infantometer which contains a fixed head rest and a mobile foot piece and the child is laid on a supine position and head end is fixed by one person and the foot is straightened and held against the mobile foot piece by the other person. **Middle upper arm circumference** measured using non-stretchable measuring tape at the midpoint between the olecranon and acromion process.

**Head circumference** is measured with the help of a non-stretchable measuring tape by placing it

posteriorly over the occiput and anteriorly over supraorbital ridge and glabella.

Then calculated further according to their weight for age, weight for length, length for age, head circumference for age w.r.t WHO growth chart. According to WHO, MUAC and Presence of edema has been graded and assigned them into groups of severe acute malnourishment, moderate acute malnourishment, normalcy and over nourishment.

The **socio-economic status** of the parents were taken into consideration and then categorized into five categories according to Modified Kuppaswamy scale.

**Inclusion Criteria:** 1.Children with Cerebral Palsy between 6 month to 2 years, 2.Those children with Cerebral Palsy willing to participate in the study.

**Exclusion Criteria:** 1.Small for Gestational Age babies, 2.Inborn errors of metabolism, 3.Those with immunocompromised status 4.Those with bulbar/pseudobulbar palsy, 5.Those with associated defects (CHD, NTD)

#### **LIMITATIONS OF THE STUDY:**

The overall prevalence of malnourishment in neurologically impaired children is difficult to estimate, due to the heterogeneity of neurological disorders and the sample size is less as it is a single centre study.

#### **RESULTS:**

Of the 34 cases admitted, more cases were between the age group of 13-24 months 73.5% (n=25) with a mean age of 15.48 months; female dominance of 58.8% (n=20) and more of Hindu religion 91.1% (n=31) [Table 1]. 35.2% (n=12) are of III<sup>th</sup> category of Socio economic status with female dominance 39.4%(n=8) cases. 41.1%(n=13) cases had severe acute malnutrition; 17.6% (n=6) had moderate acute malnourishment. [Table.2]

Of the 34 children with Cerebral Palsy, HIE was diagnosed in 61.8% (n=21), NHBI was found in 20.6%(n=7). Kernicterus in 17.6%(n=6) [Table 6]

**TABLE NO. 1: Demographic characteristics**

Age (months)	Frequency(n)	Percentage(%)
6-12	9	26.5
13-24	25	73.5
Gender		
Male	20	58.8
Female	14	41.2
Religion		
Hindu	31	91.1
Muslim	3	8.9

Socioeconomic Status		
II	10	29.4
III	12	35.2
IV	9	26.5
V	3	8.9

**TABLE NO. 2: Distribution of cases according to MUAC**

MUAC (cms)	FREQUENCY(n)	PERCENTAGE(%)
<11.5	13	41.1
11.5-12.5	6	17.6
>12.5	15	44.3

### DISCUSSION:

Nutrition plays a very important part with regards to development of brain in the first 1000 thousand days of life. It affects the overall health and the quality of a person's life. This study is carried out to identify the various factors that are responsible for nutritional status that are below the required level.

In this study, we have assessed the status of nutrition in children with cerebral palsy.

In this study period of 6 months, we examined a total of 34 patients in the age group of 6 months to 24 months. These patients were divided in 2 groups, one between 6 to 12 months of age and the other from 13 months to 24 months. There were 26.5%(n=9) children in the group of 6 -12 months and 73.5%(n=25) children in the group of 13 -24 months.

Akhter, A. et.al. (9) studied a total of 149 children and maximum patients were in the age group of 0 to 36 months 56% (n=84).<sup>9</sup>

In this study, out of the 34 (100%) children who were examined, 58.8% (n=20) were MCH and 41.2% (n=14) were FCH, similar studies stated male and females effected were 59% vs 40.5%.<sup>10</sup> ; 53% vs 47%<sup>9</sup>

This data shows that the males are brought for treatment and follow up more often than the females.

In this study, we divided the children in five categories according to the modified Kuppaswamy scale as I, II, III, IV & V as per their education, occupation and income of the parent. 29.4%(n=10) were in the II category, 35.2%(n=12) were in the III category, 26.5%(n=9) in category IV and 8.9%(n=3) in V.

In study carried out by Ahkter F. (9) has shown a corelation between the socioeconomic groups relating to their per month income and its nutritional status. and the number of patients found in each group. In their study, in case of the lower income group of 10000 Tk, the number of children affected in a moderate and severe state was more as compared to the other groups. In the income group of 11000 to 25000 Tk per month, moderately and severely impaired children were the maximum<sup>9</sup>.

According to the MUAC tape studies, the children who were examined, they were categorised into **severe acute malnourishment, moderate acute malnourishment and within normal limits.**

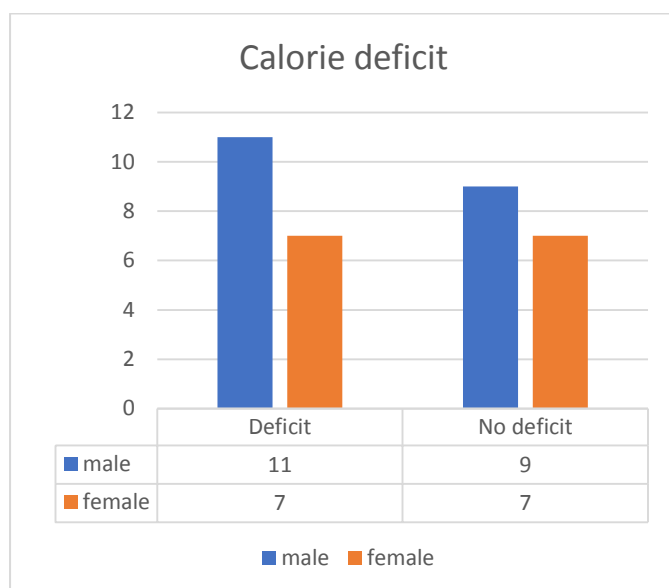
In this study w.r.t MUAC, Severe Acute Malnutrition was found in 41.1% (n=13) , Moderate Acute Malnutrition was found in 17.6% (n=6) .

In a similar study by Kuperminc MN et al (12), MUAC assessment in cerebral palsy patients, Severe Acute Malnutrition was found in 32% (n=19) out of 58 CP patients.

In this study, HC was in the range of 38-50.5 cms with a mean of 44.48 and a SD of 2.91 with microcephaly in 23.5%, **The p value for HC was clinically significant with 0.01.**

In the study carried out by Kulandaipalayam, NS, et. al. (13) they have shown the correlation between HC measure and malnutrition in the patients. They have stated that a low HC count highly correlates to stunting. It also showed a co-relation between comparatively low socio-economic ranking.

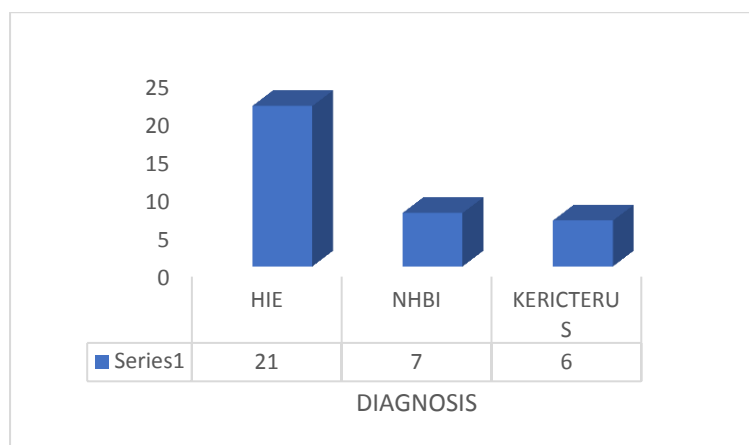
Hence, we can say that age, height weight, MUAC, and HC help us to derive the nutritional status of the patient and understand if the child is malnourished.



In this study, calorie deficit was seen in 53%(n=18) out of which 61.1%(n=11) were male and 38.9%(n=9) were female.

According to Dimitrova, R. et. al, (14), the rate of metabolism in the children with NDD differs from the energy requirement of the normal children.

This is probably seen because of the different metabolic rates in children with NDD.



In this study, Of the 34 children with Cerebral Palsy, HIE was diagnosed in 61.8% (n=21), NHBI was found in 20.6%(n=7). Kernicterus in 17.6%(n=6)

In a study conducted by Eghbalian, F. (15) he has mentioned that out of 34 neonates that were examined for seizure, 11(32.4%) had HIE.

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#### **AUTHOR CONTRIBUTION:**

Dr.Dhivakar K.T manuscript making, collecting patient data and analysis,

Dr.Shalaka Agarkhedkar protocol development, formulating consents and contributing to the research conduction .

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