

Nutritional Impact on Associated Features in Children with Cerebral Palsy

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ABSTRACT

Background: Cerebral palsy is Non-Progressive developmental disability disorder in children. CP used for a broad term umbrella term for various neurological conditions that effects movements and posture because of damage in developing brain in early stages. There are topographically classifications which are based on effective part of body due to brain damage in CP. It includes Monoplegia, dieplagia, hemiplegia, paraplegia, Trapaga, quadriplegia. Types of CP with brain lesion include Spastic CP, Ataxic CP, Athletic CP, Dystonic and Mixed cerebral palsy.

Objectives: To evaluate the effect of nutritional status on associated symptoms in children with cerebral palsy.

Material and Methodology: A Cross Sectional Survey was conducted to evaluate the nutritional status and associated symptoms in cerebral palsy children. The sample was collected from PIMS, NIRM and HFH hospital, after taking Approval from REC and the setting. A total of 257 CP children with ages between 2 to 12 years and fulfilling inclusion and exclusion criteria were included in the study. Children were assessed using CPQL, CHQ and Nutritional assessment chart. Data collection tools/instruments structured questioner guide was used to collect data. From these questionnaires, data was collected about cerebral palsy children.

Statistical Analysis: Demographic details are measured through calculating the percentages. Data will be analysed through SPSS version 21

Results: Out of 257 children 195 were having fiber in diet, 62 were not reported to have any fiber diet, 209 were having protein in diet and 48 were not reported to have any protein diet, 232 were having carbohydrate in diet and 25 were not reported to have any carbohydrate diet.

Conclusion: Most of the children were suffering from GIT problems with most of the cases reporting of constipation and alternating Diarrhoea. Children who were at low level of GMFCS were having CNS symptoms i.e. balance problem and seizures and children with low BMI were showing CVS, respiratory and renal symptoms.

Keywords: Ataxia, CP cerebral palsy, Nutritional Status, Ataxia, Spastic

INTRODUCTION

Cerebral palsy is Non-Progressive developmental disability disorder in children. It is first described in the 1840s by William little. CP used for a broad term umbrella term for various neurological conditions that effects movements and posture because of damage in developing brain in early stages. Its clinical presentation may change with the passage of time due to growth and maturation of central nervous system." (1) Cerebral palsy is worldwide 2 to 3.5 per 1000 births. Spastic children with cerebral palsy are more common with 70-75%. (2). There are following classification of CP according to physical activity status. Mild-moderate-sever. In mild category child can move without assistance in 2nd, child need some assistance and in 3rd, child is totally dependent on assistance. (3) There is also topographically classifications which are based on effective part of body due to brain damage in CP. It includes Monoplegia, dieplagia, hemiplegia, paraplegia, Trapaga, quadriplegia. Types of CP with brain lesion include Spastic CP, Ataxic CP, Athletic CP, Dystonic and Mixed cerebral palsy. (3)

Complications of cerebral palsy can be tightness, spasm, contractures and deformities, joint stiffness, irritation and mood swings, depression, secondary respiratory complications, pressure sore, GIT problems, and renal problems.(4) Communication disorders and impaired speech are 38% in children with CP. Nearly half of the patients may have paralysis o gaze, cataracts, Perceptual and errors. Ears are partially or complete loss hearing followed by receptive auditory aphasia. In Speech Aphasia, dysarthria are common.Psychiatric disorders such as anxiety, depression, conduct disorders and hyperkinesia's and inattention are present 61% of 6%- 10 year-old-children. The associated difficulties can be more devastating for the CP child than the motor problem. Intelligence problems are also present.

(5)(6)

Poor growth and malnutrition in CP are correlates to each other because of their effects on health, including psychological and physiological function, healthcare utilization, societal participation, motor function, and survival. Understanding the cause of poor growth and disabilities are lead to worsen their condition. One of the major causes of poor growth and disabilities is malnutrition, is the best-studied with scientific evidence regarding malnutrition has contributed to improvements in clinical management and, in turn, survival over the last 20 years. The investigators found that children with CP and severe disabilities have had increased life expectancy with healthy nutritional condition. (7) Eating healthy foods is important fact to maintain overall health. It is not something that can change if a person has a disability; in actuality, the cultivation of healthy habits will provide a person with Cerebral Palsy well all over the life. 17 The ill effects of malnutrition on physiology, motor function, neurological and psychological function are broad ranging and can be particularly overwhelming during early growth. Diminish muscle power leads to mutilation in motor function as well as weakness of other organ systems. (8)(9)

A study showed that the children with cerebral palsy show abnormal feeding problems and their food consumption reduces that result in malnutrition. Most of the children present GIT symptoms such as GERD and constipation and poor motor functions. Nutritional assessment was done through BMI and motor functions through gross motor function measure and results showed that GIT disorders and malnutrition are common in children with cerebral palsy and fat free weight gain shows positive impact on motor functions of children with cerebral palsy. (10)

Another study was conducted to determine the pattern of food intake and nutritional status in cerebral palsy children. It was a cross sectional survey in which 90 children were included and their nutritional status was accessed by age, weight and height and food frequency questionnaire and 24 hour recall method was used for assessing food intake. Study showed that there is a nutritional

compromise in cerebral palsy children and also with an obvious compromise in height. Children with tetraplegia show problems in chewing and swallowing.⁽¹¹⁾

Study conducted to evaluate the association between gross motor function and nutritional status in children with cerebral palsy who were resident in urban areas of developing country. A cross sectional survey with 177 children of ages 2-12 years who were diagnosed with cerebral palsy and are attending rehabilitation centers in Colombia. Patient evaluation was done with the help of GMFS by physiotherapist and nutritionist evaluate the nutritional status according to the WHO growths charts which shows that children with level IV –V were malnourished as compared to those at level I-III which reflects malnutrition is prevalent in among paediatric patients and is linked with the higher level of gross motor dysfunction⁽¹²⁾. There is no study available related to the malnutrition and associated symptoms in C.P children in our epidemiology. This study will help to figure out the nature and timing of nutritional, feeding and growth abnormalities and will highlight the relative contribution of poor dietary intake, oral motor and feeding difficulties and sedentary behavior on growth and body composition taking into account severity of disability.

Objectives: To evaluate the effect of nutritional status on associated symptoms in children with cerebral palsy.

METHODOLOGY

A Cross Sectional Survey was conducted to evaluate the nutritional status and associated symptoms in cerebral palsy children.

Setting: Pakistan institute of medical sciences Islamabad.

2 National institute of rehabilitation medicine. 3. Holy family Hospital Rawalpindi

Duration of Study: Duration of study was 3 months

Sample Size: A sample of 257 children of cerebral palsy was taken for the study.

Sampling Technique: It was a Non-Probability Convenience sampling technique conducted by the inclusion and exclusion criteria that is mention as following:

Inclusion Criteria: Those who have following characteristics will be included in study;

Children are with all type of cerebral palsy between the ages of 2 to 12 years.

Exclusion Criteria: Subject having following characteristics was excluded from study.

- Other congenital disorders and diagnosis associated with neurological symptoms.

- The people who refuse to sign the consent form to take part in the study.

Data Collection Procedure: All those children who full fill the inclusion criteria are included in the study. Children are assessed on a detailed questionnaire prepared for this purpose. Following standard questionnaires were used to develop a (self-structured) specific questionnaire for the assessment of nutritional status and associated symptoms in children with cerebral palsy. 1. CPQL(cerebral palsy quality of life)

CHQ(child health questionnaire)

Nutritional assessment chart

Data collection tools/instruments structured questioner guide was used to collect data. From these questionnaires, data was collected about cerebral palsy children.

Intervention: The association between the nutritional status and associated symptoms measured through calculating the Means, Standard Deviations and Range. Demographic details are measured through calculating the percentages. Data will be analysed through SPSS version 21. While data collection all ethical and moral values were considered. Every subject has given the written informed consent for the study. The privacy, confidentiality and physical wellbeing were the most important consideration for researcher.

RESULTS

This study included 257 children with cerebral palsy within age group of 2 to 12 year from the hospital of Islamabad and Rawalpindi with a total of 53.7%(n= 138)and 46.3% (n=119). All the Children participated voluntarily in the study. Malnutrition was significantly associated with spastic type of CP in this study.

As associated symptoms 65%(n=167) had constipation (GIT), 65%(n=167) fatigue, weakness and dizziness (CVS), 44%(n=113) balance problems, 20%(n=53) seizures (CNS), 10%(n=27) urinary incontinence (renal), 40%(n=105) irritability (psychosocial). Parents stated the health of their children as fair up to 75% (n=145) and bad 20%(n=51).

In this study, the commonest type of CP was spastic 63.8% (n=165). Most of the children had Gross Motor Function V 25.3%(n=65) followed by GMF IV 12.8%(n=33), GMF III 55.6%(n=148), GMF II 1.6%(n=4) and GMF I 4.7%(n=12).

Table 1: Body mass index

N	257
Mean	14.554
Standard deviation	3.644
Range	22.00

Table 2: Gender within Type of CP

Gender	Type of CP				Total
	Ataxic	spastic	Athetoid	Mixed	
Male percentage total	2.3%	33.1%	3.5%	14.8%	53.7%
Female percentage of total	2.3%	30.7%	2.7%	10.5%	46.3%

Table 3: Score at GMFCS within type of CP

GMFCS (percent of total)	Type of CP				Total
	Ataxic	Spastic	Athetoid	Mixed	
Level 1(walk without restrictions)	0.4%	3.5%	0.0%	0.8%	4.7%
Level 2(walk without assistive devices)	0.4%	1.2%	0.0%	0.0%	1.6%
Level 3(walk with hand held mobility devices)	2.7%	38.5%	3.1%	11.3%	55.6%
Level 4(self mobility with limitations)	0.8%	7.4%	1.2%	3.5%	12.8%
Level 5(self mobility severely limited even with mobility devices)	0.4%	13.2%	1.9%	9.7%	25.3%

Advice from nutritional consultant

Figure 5: Intake of fiber in Diet

Advice from nutritional consultant		
BMI	YES	NO
9.40	0	1
10.00	2	17
10.80	0	2
11.00	1	26
11.80	0	1
12.00	1	34
12.40	0	1
12.50	0	1
12.60	0	1
12.70	0	1
13.00	0	22

13.40	0	1
13.70	0	1
14.00	2	39
14.60	0	1
15.00	2	17
16.00	4	11
17.00	2	8
18.00	2	6
18.50	1	0
19.00	3	9
19.40	0	1
20.00	2	13
21.00	0	7
21.60	0	1
22.00	0	9
23.00	1	1
25.00	0	1
26.00	0	1
Total	23	234

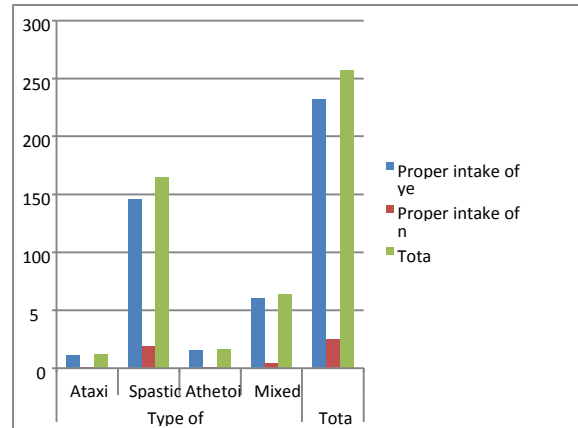
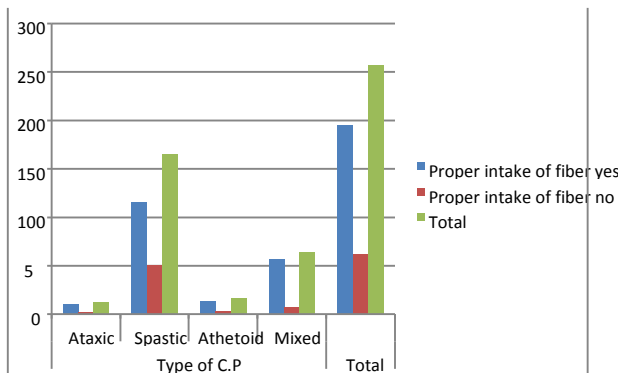


Figure 3: Intake of carbohydrate in Diet

Out of 257 children 232 were having carbohydrate in diet and 25 were not reported to have any carbohydrate diet. Individually in ataxic (12 out of 257) type of C.P 11 children were having carbohydrate in diet and 1 were not having followed by spastic(165 out of 257) 146 were having carbohydrate in diet and 19 were having athetoid (16 out of 257)15 were having carbohydrate in diet and 1 was not having, Mixed(64 out of 257) 60 were having carbohydrate in diet and 4 were not having any carbohydrate diet.



Out of 257 children 195 were having fiber in diet and 62 were not reported to have any fiber diet. Individually in ataxic (12 out of 257) type of C.P 10 children were having fiber in diet and 2 were not having followed by spastic(165 out of 257) 115 were having fiber in diet and 50 were not having ,athetoid (16 out of 257) 13 were having fiber in diet and 3 were not having, Mixed(64 out of 257) 57 were having fiber in diet and 7 were not having any fiber diet.

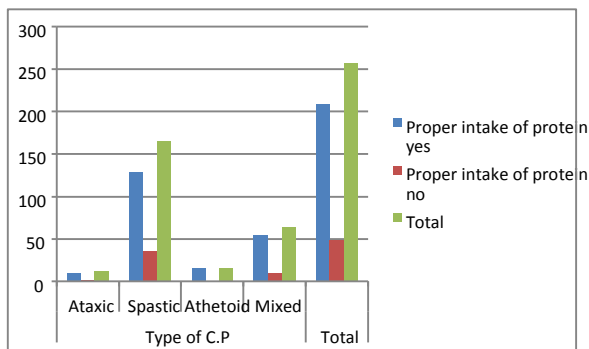


Figure 2: Intake of protein in Diet

Out of 257 children 209 were having protein in diet and 48 were not reported to have any protein diet. Individually in ataxic (12 out of 257) type of C.P 10 children were having protein in diet and 2 were not having followed by spastic(165 out of 257) 129 were having protein in diet and 36 were not having , athetoid (16 out of 257) all of 16 were having protein in diet, Mixed(64 out of 257) 54 were having protein in diet and 10 were not having any protein diet.

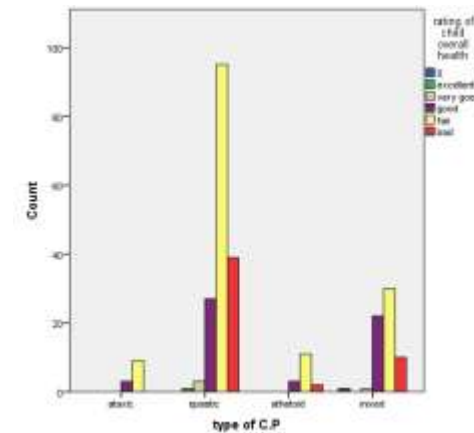


Figure 4: Association between overall health status and type of CP

Excellent in Ataxic0%(n=0), Spastic0.4%(n=1), Athetoid 0%(n=0), Mixed 0%(n=0), Very Good in Ataxic0%(n=0), Spastic1.16%(n=3), Athetoid 0%(n=0), Mixed 0.4%(n=1),Good in Ataxic1.16%(n=3), Spastic10.50%(n=27), Athetoid 1.16%(n=3), Mixed 8.56%(n=22),Fair in Ataxic 3.50%(n=9), Spastic 36.96%(n=95), Athetoid 4.28%(n=11), Mixed 11.67%(n=30),Bad in Ataxic0%(n=0), Spastic 15.17%(n=39), Athetoid 0.8%(n=2), Mixed 3.89%(n=10)

DISCUSSION

Nutrition disorders are common secondary health conditions in children with cerebral palsy (CP) having effects on their abilities and disabilities. Poor growth and malnutrition in CP are correlates to each other because of their effects on health, including psychological and physiological function, healthcare utilization, societal participation, motor function, and survival. Understanding the cause of poor growth and disabilities are lead to worsen their condition. One of the major causes of poor growth and disabilities is malnutrition. (13)

Cross sectional study was conducted by Lopes PA et al to determine the pattern of food intake and nutritional status in cerebral palsy children it was a cross sectional survey in which 90 children were included and their nutritional status was accessed by age, weight and height and food frequency questionnaire and 24 hour recall method was used for assessing food intake. Study showed that there is a nutritional compromise in cerebral palsy children and also with an obvious compromise in height.

Children with tetraplegia show problems in chewing and swallowing.⁽¹⁴⁾

Another study conducted by Campanozzi A. et al showed that the children with cerebral palsy shows abnormal feeding problems and their food consumption reduces that results in malnutrition most of the children presents a GIT symptoms such as GERD and constipation and poor motor functions.⁽¹⁵⁾ Another study was conducted to determine the pattern of food intake and nutritional status in cerebral palsy children. It was a cross sectional survey in which 90 children were included and their nutritional status was accessed by age, weight and height and food frequency questionnaire and 24 hour recall method was used for assessing food intake. Study showed that there is a nutritional compromise in cerebral palsy children and also with an obvious compromise in height. Children with tetraplegia show problems in chewing and swallowing.⁽¹⁶⁾ Hence, outcomes of previous studies support our current research findings.

CONCLUSION

It was concluded that children who were having a good nutritional diet along with the nutritional supplements and vitamins have a high BMI and good score at the GMFCS.

Moreover in our study we have find that children are having systematic problems depending upon the nutritional status. Most of the children were suffering from GIT problems with most of the cases reporting of constipation and alternating Diarrhoea and other GIT problems. Children who were at low level of GMFCS were having CNS symptoms i.e. balance problem and seizures and children with low BMI were showing CVS, respiratory and renal symptoms. All of the children were having some kind of psychosocial problem with the most of the cases reporting with irritability.

We also find that the children who were having a proper nutritional consultant advice reports less symptoms of GIT and who that were not having any advice from nutritional consultant reports with GIT problems i.e. constipation ,nausea and vomiting.

So, it is strongly recommended that a proper nutritional plan should be followed for CP children with a advice of nutritional consultant and physician based on type of CP and individual symptoms. Early recognition of symptoms and nutritional status of children can help to improve the overall health status and functional capacity of the child

Study Limitation: This study was conducted in tertiary care hospitals of Islamabad and Rawalpindi so it is might not representative of the cerebral palsy children in Pakistan.

Response rate was 257 from tertiary care hospitals. Due to shortage of time we were unable to cover its all aspects. We only cover population of Rawalpindi/Islamabad it is recommended that one can expand this study by taking sample size from different parts of country to make results more generalize. Questionnaire can be making better by using some more authentic tools or by pilot study.

Recommendation: Study needs to be conducted at larger scale and in multiple hospitals so that could be generalized.

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