Growth Status of a Sample of Children with Cerebral Palsy

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Abstract

Background: Children with cerebral palsy are frequently associated with poor growth mainly due to inadequate nutritional intake resulting from feeding difficulties. The majority of the studies on growth status of children with cerebral palsy had been performed in western countries.

Objectives: To evaluate growth status of a sample of children with cerebral palsy.

Methods: A descriptive cross sectional study on 92 Iraqi children with cerebral palsy (52 males and 40 females). All the care givers were interviewed and anthropometric measurements of children were performed.

Results: Mean age was 2.8±1.66 years with 17.4% of children were infants, 67.4% were less than 5 years of age, and 15.2% were 5 years and more. The percentage of weight for age, height for age, and weight for height z-scores under -2SD were 32.6%, 34.78%, and 11.95% respectively, and they were all higher among children of the older age group 5 years and more. Microcephally was present in 36.95% of cases, and macrocephally in 3.26% of cases.

Conclusion: The study showed that the children with cerebral palsy suffer from growth retardation.

Key words: Growth status, cerebral palsy

Introduction

Cerebral palsy (CP) is a disorder affecting the ability to control movement and posture especially. Depending on the location and extent of the damage, cerebral palsy can be mild or severe. It is sometimes associated with other problems such as seizures, mental retardation, hearing and vision problems, and communication problems [1].

It has been well documented in the literature that the children with CP are frequently associated with poor growth. The main cause of growth failure in the children with CP is inadequate nutritional intake resulting from feeding difficulties [2, 3, 4, 5,6].

The majority of the studies on growth status of children with CP have been performed in western countries. The aim of the current study is to evaluate the growth status in a sample of children with CP in Baghdad.

Patients & Methods

Ninety two children with CP, admitted to the Child Welfare Hospital for the period from 15th of September 2002 to 15th of March 2003, were included. All the studied children had a detailed neurological examination performed by the investigator. Cerebral palsy was diagnosed on the basis of this examination and standard criteria namely, persisted abnormality of movement and posture resulting from impairment of the immature brain [7]. No patient had any other chronic systemic illness (cardiac, renal), or history regarding use of medication (*e.g.*, steroids) that are known to affect growth were included. CP diagnosis was based on neurological examination. Severity of impairments, were evaluated according to the Rasul et al Classification of Mobility disorders [8] which include, no useful movement, rolling in bed, sitting, crawling, bottom shuffling, walking with aids, walking alone.

All caregivers were interviewed and informed consent obtained. Information on demographic characteristics was gathered using a special questionnaire designed in well structured form including age (according to birth certificate and identity card), gender, feeding type (exclusive breast feeding, bottle feeding, or mixed), supplementary feeding, and other diseases. None of the children with CP were receiving feeds through nasogastric tubes.

Measurements of weight, height, were performed using standard methods. The weight measurement was performed using calibrated weight scale (Seca), for children below 2 years another scale supplied with a basket was used (Seca). Weight scales were

standardized by one standard five kilograms to the point of 5 kg before every day work and then adjusted before each measurement [1, 6, 9, and 10]. In order to obtain correct weight, 0.6 Kg was deducted from each weight, this amount of weight represented the weight of clothes [11], the head circumference was measured using tape measure (centimeters), the length of the child measured using the same measuring tape (centimeters), by placing the child, barefooted, prone on the board, those who can stand the height is measured by using a Statiometer, the measurement was taken to the nearest 0.1 cm.

SPSS-15 Software Program (version 15) was used for calculation of z-scores of weight for age (WAZ), height for age (HAZ) and weight for height (WHZ) and compared to the WHO standards [11]. The head circumference classified according to Westropp et al Standards [12].

Results

The study was done on a sample of 92 children with cerebral palsy, 52 were males and 40 were females. **Table 1** shows the distribution of the age groups of the study sample. The highest frequency was for the preschool age group; 62 cases (67.4%) then infants; 16 cases (17.4%), and lastly the 5+ years' age group; 14 case (15.2%). Regarding the type of feeding, especially for those under two years of age (35 children), the majority were on bottle feeding (30; 85.7%) and only 5 (14.3%) were exclusively breastfed.

Table 2 shows the weight for age z-score. The proportion of infants, preschool, and the school age group patients with moderate to sever under weight was 18.8%, 25.8%, and 78.6% respectively **(Figure 1).**

Table 1: The age, sex, and type of feeding distribution of the studied sample of children with CP.

Age groups (years)	**No**	**%**
Infants (<1)	16	17.4
Preschool (1-<5)	62	67.4
School age (≥5)	14	15.2
Total	**92**	**100**
Sex Males	52	56.2
Females	40	43.8
Total	**92**	**100**
Feeding (<2 years) Exclusive breast feeding	5	14.3
Bottle feeding	30	85.7
Total	**35**	**100**

Table 2: The Z-score of height for age, weight for age, and weight for height distribution of the studied sample of children with CP.

Age groups (years)	**Moderate-severe stunting (Height for age Z-score)**		**Moderate-severe underweight (Weight for age Z-score)**		**Moderate-severe wasting (Weight for height Z-score)**	
	No	**%**	**No**	**%**	**No**	**%**
Infants (n=16)	2	12.5	3	18.8	2	12.5
Preschool (n=62)	20	32.3	16	25.8	6	9.7
School age (n=14)	10	71.4	11	78.6	3	21.4

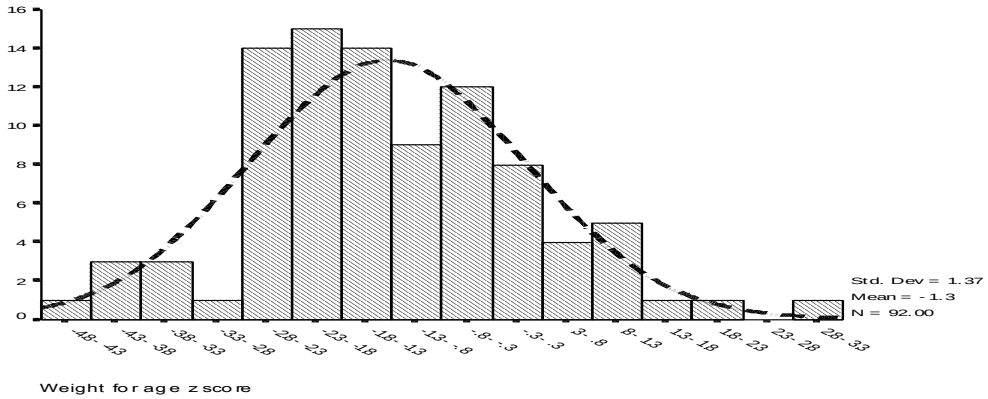

Figure 1: The weight for age z-score (WAZ)

Regarding height for age z-score **(Table 2),** the proportion of infants, preschool, and school age groups of patients with moderate to sever stunting was12.5%, 32.3%, and 71.4% respectively **(Figure2),** while for the proportion of infants, preschool, and the school age group of patients with moderate to sever wasting (weight for height z-score) was 12.5%, 9.7%, and 21.4% respectively (**Figure 3).**

Table 3 shows the measurements of head circumference of the study group.

The head circumference of 10 of the infant patients (62.5%) was within normal, while 6 (37.5%) of them had microcephaly, and no one had macrocephaly. For the preschool age group, the head circumference was within normal in 36 (58.1%) of the cases, microcephaly in 23 (37.1%) of cases, and macrocephaly in 3(4.8%) of cases. In the school age group 9 cases (64.3%) had within normal head circumference, while 5 cases (35.7%) had microcephaly, and no one had macrocephaly.

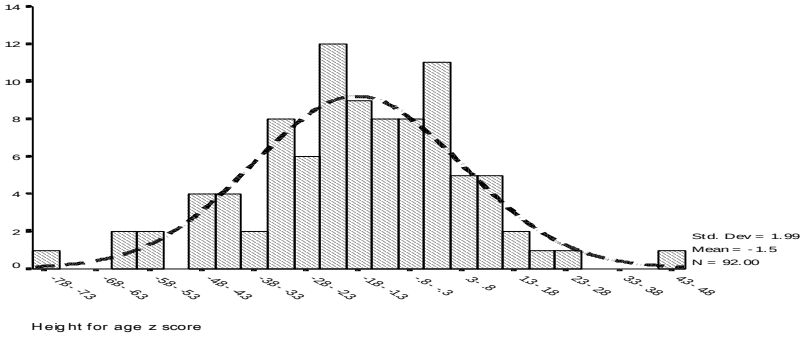

Figure 2: The height for age z-score (HAZ)

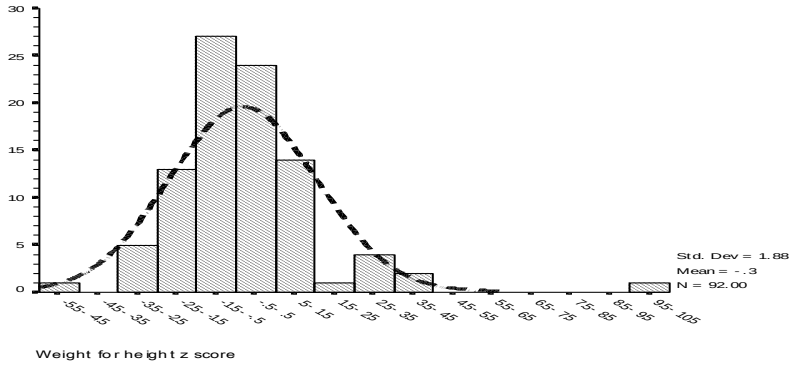

Figure 3: The weight for height z-score (WHZ)

Table 3: The head circumference distribution of the studied sample of children with CP.

Age groups (years)	Microcephaly (<= -2 SD)		Within normal (>-2 and < 2 SD)		Macrocephaly (> + 2SD)	
	No	%	No	%	No	%
Infants (n=16)	6	37.5	10	62.5	-	-
Preschool (n=62)	23	37.1	36	58.1	3	4.8
School age (n=14)	5	35.7	9	64.3	-	-

Discussion:

Growth retardation in the children with CP has been well documented in the literatures. Stallings, *et al* [5] reported that there was a strong relationship between linear growth, neuro-motor involvement, and nutritional status in the children with quadriplegic CP. In the study of Stevenson et al [13], among 171 patients attending a pediatric rehabilitation center, the mean z scores of height and weight were found to be as –1.7±1.9 and–1.6±1.8 respectively, and the proportions of the children below the 2.5th centile for normal height and weight were 38%, and 42%, respectively. The proportion of patients with WAZ, HAZ, and WHZ scores below -2SD was 34.9%, 30.2% and 9.3% respectively [1].

The current study finding of growth impairment among CP cases and other similar figures goes with what had been reported by other workers like Johnson & Maeda [14].

It has been reported that patients with CP have growth failure when compared with age and sex-matched healthy children, and have different body compositions; Stallings, *et al* [3] reported lower WAZ and HAZ scores, in children with spastic quadriplegic CP in comparison to normal children. More children are malnourished in the developing countries, including Iraq, as compared to the NCHS (National Center for Health Statistics\ American) reference population [15, 16]. Although no comparison between the children with CP and a control group was made, one can predict or assume that the Z scores in those patients were lower than healthy children.

Krick and Van Duyn [17] found similar results of reduced weight and height among children with CP than their age-and sex-matched counterparts without such impairment.

Regarding the head circumference, there is no similar study done in the region to compare with for the time being other than the standards of Westropp & Borber [12].

In conclusion; children with cerebral palsy suffer from marked growth retardation that needs further medical and nutritional attention and other future studies should be carried out taking a control group for comparison.

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